

NEW GRADUATE DEGREE OR GRADUATE CERTIFICATE FORM D

UNIT PREPARES IN QUADRUPLICATE
Route as indicated below under approvals. Return to the Registrar's Office once all signatures have been obtained.

Date: January 15, 2016

Maria Lane

(Name of individual initiating Graduate Degree or Graduate Certificate)

Associate Professor, Chair, 277-5041

(Title, position, telephone number)

mdlane@unm.edu

(Email address)

Dept of Geography & Environmental Studies

(Department/Division/Program)

Note: Proposals for new graduate degrees or graduate certificates need to follow an approved format. Please call the Office of Graduate Studies and ask for an outline. Revisions of graduate degrees and some new certificates also may need state approval, depending on the extent of changes proposed. Please consult the Office of the Provost for advice prior to initiating this form.

Attach the following required documents:

1. Executive Summary.
2. Program Proposal (in the approved format).
3. Catalog Description (to include program curriculum).
4. Graduate Program Projected Costs (only for new degrees).
5. Library Impact Statement.

Does this new degree affect any existing program? Yes ☐ No ☒ If yes, attach statement.

Proposed date to admit new students: Term Fall Year 2018

Required Signatures:

Department Chair

[Signature]

Date

2/16/2016

College Curricula Committee

[Signature]

Date

8/2/2017

College or School Dean

[Signature]

Date

8/1/17

Dean of Library Services

[Signature]

Date

2/22/2016

Office of the Registrar—Catalog

[Signature]

Date

8/9/17

FS Graduate Committee

[Signature]

Date

10/5/17

Dean of Graduate Studies

[Signature]

Date

10/5/17

FS Curricula Committee

[Signature]

Date

11-3-17

Office of the Provost

[Signature]

Date

4-9-18

Faculty Senate

Date

Board of Regents

Date

Additional Approvals for Degrees:

Board of Regents

Date

Council of Graduate Deans

Date

Academic Council of Higher Education

Date

Higher Education Department

Date

State Board of Finance

Date

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For Registrar's Office ONLY:

Copies Mailed



DEPARTMENT OF
GEOGRAPHY &
ENVIRONMENTAL STUDIES

April 6, 2018

Pamela Cheek
Interim Associate Provost for Curriculum and Assessment
Office of the Provost
University of New Mexico

Dear Dr. Cheek,

Thank you for your feedback on our proposal for the New Mexico Joint Doctoral Program in Geography. In response to your helpful suggestions, we have revised the proposal in several areas. We have also taken this opportunity to update cost worksheets, based on financial information that was not available when we first submitted the proposal in 2016. The following revisions have been completed:

Section 1: executive summary updated, as noted above

Section 2:

- (under 2.5) adds information responding to recent Academic Program Review and ensuring sustainability for the Joint PhD in relation to other GES initiatives
- (under 2.8): updates information about relation to other UNM programs

Section 3: minor editorial corrections

Section 4:

- (under 4.4) adds information about the proposal status at NMSU

Section 5:

- (under 5.5) clarifies the breadth of potential recruitment from Latin America

Section 6: minor editorial corrections

Section 7:

- Table 7.1 updated to remove cost of HVAC upgrade in Spatial Computing Lab
- Table 7.2 updated to add F&A revenue figures from FY16 and FY17
- Table 7.3 updated to make F&A projections more conservative for FY18-FY23, with explanation provided in the bullet points below
- Table 7.5 updated to reflect reduced startup cost, as per the change in Table 7.1
- Table 7.6 also updated to reflect reduced costs, as per the change in Table 7.1

Section 8: no update

Section 9: no update

Section 10: no updates

Appendices

- Appendix O revised with new cost estimate summaries, as per Tables 7.1, 7.5 and 7.6 above
- Appendix Q revised with latest F&A data and with a more conservative estimate of returns, as per Tables 7.2 and 7.3 above.
- Appendix X now includes a memo from NMSU clarifying the proposal status and listing institutional commitments to the program

These items have been updated in all four paper copies of the Form D submission, which we are returning to your office for review and signature. I have also sent you a digital copy of the revised proposal (minus appendices) using "track changes," as a resource for finding and evaluating the revised text.

Please do not hesitate to contact me with any questions. We are eager to minimize any further delay as the Form D resumes its path through the approval process.

With very best wishes,

A handwritten signature in black ink, appearing to read "K. Maria D. Lane", with a long horizontal flourish extending to the right.

K. Maria D. Lane
Associate Professor & Chair
Geography & Environmental Studies
University of New Mexico
Bandelier West, Rm 224
mdlane@unm.edu

July 26, 2017

Michael Raine, M.A.
Associate Registrar for Curriculum and Catalog
University of New Mexico
Mesa Vista Hall One Stop

Dear Mr. Raine,

I'm including this note to clarify the whereabouts of the extra copies, as well as the missing signatures, which you noted in your 29 June letter. We had been holding the extra copies of the Form D in GES, for purposes of making revisions. After Elizabeth Barton completed the technical review in Fall 2016, we brought the copies back to GES to fix a few mistakes in course titles and numbers. At the same time, we realized the need to update cost worksheets and faculty lists, based on recent changes to our department's resources. (We hadn't realized that one copy had been inadvertently left behind in your office; thanks for sending it back.)

We have now completed the following revisions –

- Executive summary: updated with information about new department resources
- Cost worksheet: updated with information about new department resources
- Full proposal:
 - Section 1: executive summary updated, as noted above
 - Section 2: course titles/numbers corrected, program timeline updated
 - Section 3: no updates
 - Section 4: no updates
 - Section 5: no updates
 - Section 6: updated to reflect new faculty resources
 - Section 7: cost worksheets updated, as noted above
 - Section 8: UNM faculty list updated with new personnel
 - Section 9: no updates
 - Section 10: no updates
- Appendices are updates as follows:
 - Appendix B updated to correct the list of associated course proposals
 - Appendix C updated to correct all course titles/numbers
 - Appendix L updated with revised course rotation plan
 - Appendix M updated with latest hiring plan
 - Appendix N updated with additional vitas for new UNM faculty
 - Appendix O updated with new cost information, as noted above
 - Appendix Q updated to update cost projections, as noted above
 - Appendix U updated with a revised letter of support from A&S Dean Peceny

These items have been updated in all four copies of the Form D submission, which we are now forwarding to A&S for review and signature. By the time you see the Form D again, all required signatures should be complete. We will also re-submit the associated GEOG 601, 602, and 603 course proposals for concurrent review.

Please do not hesitate to contact me with any questions. We are eager to minimize any further delay as the Form D resumes its path through the approval process.

Very sincerely,

A handwritten signature in black ink, reading "K. Maria D. Lane". The signature is fluid and cursive, with a long horizontal line extending from the end of the name.

K. Maria D. Lane
Associate Professor & Chair
Geography & Environmental Studies
University of New Mexico
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UNM

DIVISION of ENROLLMENT MANAGEMENT

OFFICE of the REGISTRAR
RECORDS & REGISTRATION

June 29, 2017

Dr. Maria Lane
Department of Geography and Environmental Studies
University of New Mexico

Dear Dr. Lane,

I was recently given the Form D for the proposed Joint Doctoral Program in Geography by the University Registrar. I am returning this Form for the following reasons:

- The signatures from the College Curricula Committee and College Dean are missing;
- There should be four copies of the proposal, and so far, I have only been able to locate the one in my possession;
- The GEO 601, 602 and 603 course proposals will not go forward at this time. If you wish to have them returned, just let me know.

Once the four copies of the proposal are approved in the order listed on the routing form and arrive at the Registrar's Office, we will be responsible for routing the proposal through the rest of the steps.

Let me know if you have any questions.

Sincerely,

Michael Raine, M.A.
Associate Registrar for Curriculum and Catalog
Mesa Vista Hall One Stop
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mraine@unm.edu



UNM COLLEGE of UNIVERSITY LIBRARIES
& LEARNING SCIENCES

University Libraries

February 29, 2016

Dr. Maria Lane
Department of Geography & Environmental Studies
University of New Mexico

Dear Dr. Lane,

The University Libraries has reviewed the Department of Geography & Environmental Studies' proposal for a joint Ph.D. degree in Geography with New Mexico State University. The main UNM Libraries has long been supporting research in Geography and its related disciplines -- including material related to integrative research -- and we believe that we have the resources (books, journals, databases and data resources) to support the proposed new degree program and the faculty at UNM currently teaching and conducting research in this area.

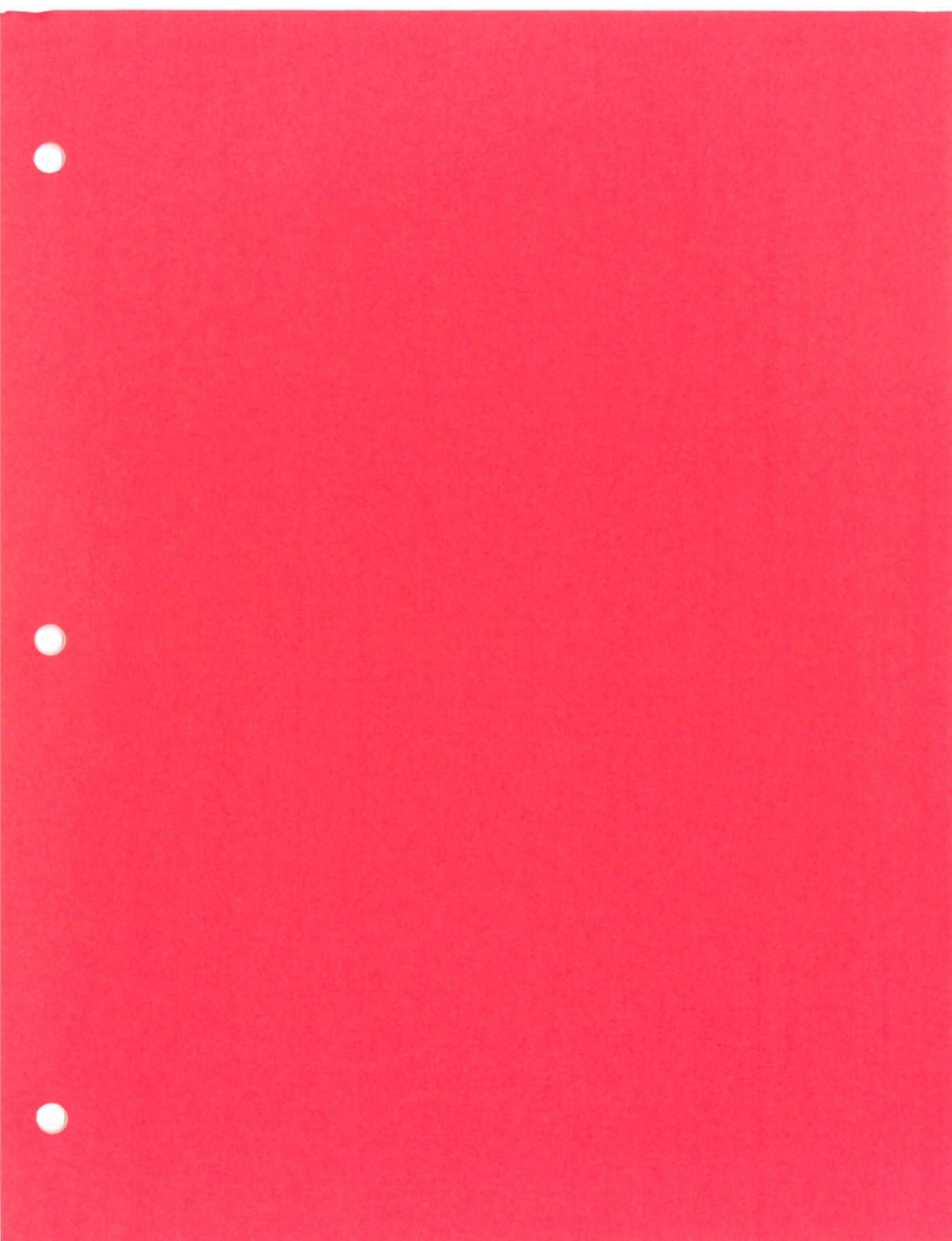
As new faculty are hired at UNM it is possible that new or additional library resources will be needed to support their specific research areas. Since we operate with limited resources the library may need to cancel some existing resources to meet the need for new resources. We will work closely with the Department of Geography & Environmental Studies to identify not only new resources but also potential cancellations of existing resources as the need arises.

Sincerely,

Susanne K. Clement
Director of Collections
University Libraries
sclement@unm.edu
505-277-5176

cc:

Richard Clement, Dean of Libraries
Dr. Mark Emmons, Associate Dean of Public Services, University Libraries
Dr. Karl Benedict, Director of Research Data Services, University Libraries



PROPOSAL FOR A

**NEW MEXICO
JOINT DOCTORAL PROGRAM
IN GEOGRAPHY**

to be offered cooperatively by
University of New Mexico & New Mexico State University

submitted February 2016
revision submitted July 2017
revision submitted October 2017
revision submitted April 2018



<p style="text-align: center;">Proposal for a New Mexico Joint Doctoral Program in Geography offered cooperatively by University of New Mexico & New Mexico State University</p>

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1. EXECUTIVE SUMMARY

The New Mexico Joint Doctoral Program in Geography is designed to leverage existing geography-related resources at UNM and NMSU to develop a nationally competitive PhD program focused on integrative human-environment dynamics. This program will build on the two universities' successful master's degree programs to offer a rigorous research-based PhD program that recruits and trains the next generation of resource managers, policy thinkers, geospatial innovators, professional scientists, and academic leaders who are needed to solve complex contemporary problems in dynamic environments. Our innovative joint-program structure combines both theory and practice, offering students a unique opportunity to develop both academic and practical expertise that crosses conventional disciplinary boundaries.

1.1 Description

The New Mexico Joint Doctoral Program in Geography will be administered and delivered collaboratively across both campuses, with dedicated staff support in UNM's Department of Geography & Environmental Studies. A joint admissions committee will select each cohort to match student interests with faculty expertise at both institutions, maintaining high admissions standards. Applicants will designate either UNM or NMSU as the home institution, but courses will be delivered in both locations, including a number of courses that use creative instructional models to maximize scholarly exchange without necessitating residency requirements. The joint program will require the completion of three core seminar courses, coursework sufficient to achieve competency in three subject areas, written comprehensive exams, an oral defense of the research proposal and an oral defense of the written dissertation. The program is designed to be completed in as little as four years of full-time study, and we expect that some portion of each cohort will complete the program on a part-time basis while maintaining employment in a geography-related field.

1.2 Evidence of Need

The US Department of Labor projects that employment of geographers will grow 35 percent from 2010 to 2020, compared to 14 percent for all occupations (U.S. Department of Labor, see Appendix A). This growing labor market indicates a simultaneous need for expanded geographical research and graduate training. Because there is no PhD program in Geography offered at any private or public institution of higher education in New Mexico, this need is currently being met regionally in neighboring states. We receive inquiries about the potential for a UNM PhD program on a regular basis from our own MS graduates and from professionals working in central New Mexico's geography-related agencies, labs, and industries (e.g. Sandia National Labs, Office of the State Engineer, City of Albuquerque). Beyond this robust local need for doctoral training, we expect a national flow of applicants who will be attracted to New Mexico by the joint program's focus on environmental change and drylands resource management in a region dominated by complex cultural landscapes.

Another area of potential demand for this PhD program is international, as UNM's Latin American and Iberian Institute (LAI) has identified GES as a top destination for PhD students it recruits from Latin American universities. An existing collaboration between LAI and the Universidad Central de Ecuador (UCE) has already

demonstrated that many recruits are explicitly seeking PhD training in environment, development, and sustainability issues, which our joint doctoral program will be uniquely qualified to provide.

1.3 Program Content

Both UNM and NMSU currently have well-respected departments of geography that explore socio-ecological phenomena through the various lenses of human-environment geography (*e.g. resource conservation, policy, law, history, economics*), physical geography (*e.g. biogeography, geomorphology, hydrogeography*), and Geographic Information Science & Technology (*GIS&T, e.g. GIS, remote sensing, spatial modeling, geovisualization*). The New Mexico Joint Doctoral Program in Geography will be built at the intersection of these lenses, delivering an interdisciplinary program focused on human-environment dynamics and the development of integrative theories, methods, and applications relevant to this scholarship.

1.4 Evaluation and Assessment

Program evaluation will be conducted on a regular basis by a joint steering committee drawn from the Geography faculties at both universities. Summative assessment will be based on graduates' employment placement; formative learning assessment will be based primarily on comprehensive exams and dissertations.

1.5 Existing Resources to be Leveraged

Because both UNM and NMSU already have existing graduate programs in Geography at the Master's level, many structural resources are already in place to develop the joint PhD program and prepare for its launch. Resources to be leveraged at both universities include existing faculty lines (13 at UNM and 5 at NMSU), existing facilities (dedicated labs for GIS&T at both institutions), and existing graduate curricula at UNM (MS Geography with two concentrations; graduate certificate in Geography, Environment & Law; and PhD concentration within the Latin American Studies program) and NMSU (Master's in Applied Geography, and active participation in the administration of the interdisciplinary PhD in Water Science and Management). The Regents of NMSU have already approved the proposal, and NMSU has committed to fund two GA lines and to replace a retiring faculty member as part of its commitment to the program's success.

1.6 Required Resources at UNM: to be funded by the College of Arts & Sciences

As the administrative home of the joint program, UNM will require an additional staff person (1.0FTE) to serve as program manager and to provide research support to both faculty and students. UNM will also require a minimum of six additional GA lines (3.0FTE) for recruiting and supporting competitive PhD students, three of which will be funded by A&S (1.5FTE). When used as teaching assistants, these GAs will increase our teaching capacity, thus allowing for higher undergrad enrollments while also offsetting the need for new faculty to cover additions to our graduate course offerings. The increased teaching and advising loads associated with providing education and research training for PhD students, however, will nonetheless require the net addition of one faculty member at UNM in the early years of the program. The Dean of Arts & Sciences has committed to fund all resources described in this paragraph and they are included in

his hiring plans and funding priorities over the next half-dozen years, reflecting that the development of this program fits within UNM's existing resource allocations. If funding for these critical resources is not forthcoming on the timeline we expect, we intend to delay the program launch (by pushing back the inaugural admissions process) until sufficient resources are in place to ensure program success.

1.7 Required Resources at UNM: to be funded by other sources

Development of a successful PhD program with strong employment placement for graduates will require additional resources at UNM to fund competitive recruiting packages (including three GA lines beyond those to be funded by A&S above) and student research, including support for publications and conference travel. Delivery of the joint program will also require an augmentation of our computing infrastructure, research equipment, and workspace facilities. For all of these necessary resources, we will seek competitive external funding through agencies and donors committed to interdisciplinary and environment-related research. Our intended program focus intersects directly with the NSF's foundation-wide initiative in Science, Engineering and Education for Sustainability (SEES), which prioritizes "the simultaneous consideration of social, economic, and environmental systems and the long-term viability of those systems." We expect that a doctoral program offered jointly by two Hispanic-Serving Institutions will compete successfully for research and infrastructure funding from state and federal agencies, as well as private organizations.

1.8 Projected Enrollment and Costs

We expect to keep the program small in its early years, enrolling ~5 students per year until external funding sources increase our ability to recruit and support larger cohorts. Startup costs (~\$70,000) are focused on one faculty hire and on critical infrastructure updates for our dedicated computing and lab facilities that support both teaching and research. As the program becomes more established and begins to generate significant research funding, additional facilities augmentation will be pursued through external funding. Recurring costs (eventually ~\$350,000) are focused on staff, student, and faculty lines that increase research and teaching capacity, as described above.

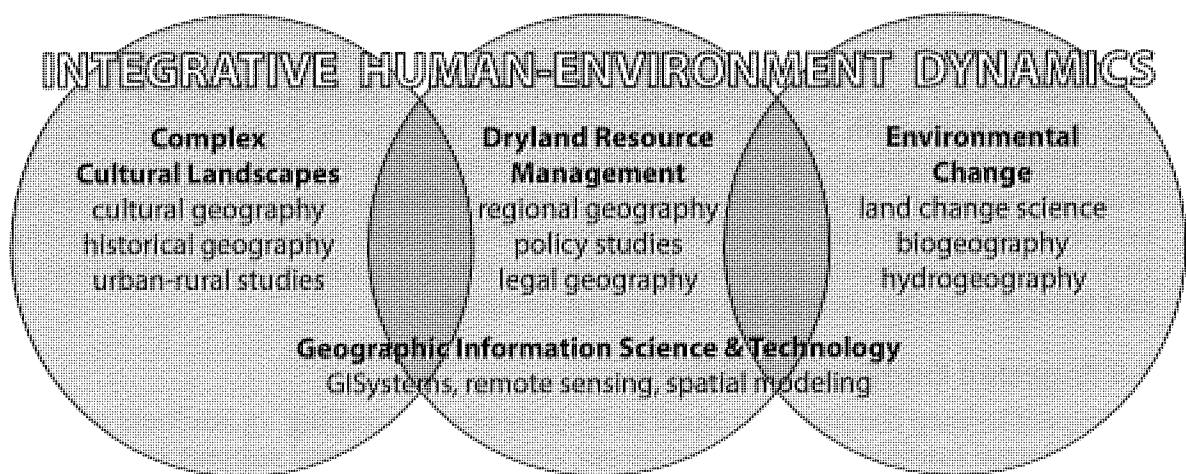
1.9 Conclusion

As inherently interdisciplinary scholars, geographers are well positioned to lead meaningful collaborations in integrative human-environment research. UNM's faculty and student geographers already collaborate actively with Biology, American Studies, Anthropology, Economics, Latin-American Studies, Community and Regional Planning, Civil Engineering, and History. The New Mexico Joint Doctoral Program in Geography will provide further benefit to both institutions by increasing capacity to engage in cross-cutting research and program-building around the issues of environment and sustainability. In addition, the new program will provide broad benefits to the State by recruiting top-notch scholars to New Mexico for a unique educational opportunity and by preparing graduates for leadership positions in New Mexico's many industries, agencies, and labs that address complex problems in dynamic human-environment contexts.

2. PROGRAM DESCRIPTION AND PURPOSE

2.1 Overview

The New Mexico Joint Doctoral Program in Geography is a rigorous research-based program that focuses on integrative human-environment dynamics, with research foci in the areas of environmental change, dryland resource management, and complex cultural landscapes. Our research employs a wide variety of methods – qualitative, quantitative, mixed – with a particularly strong expertise in the theory and application of Geographic Information Science & Technology.



The program is designed to leverage the strengths of New Mexico's existing graduate programs, faculties, and facilities at UNM's Department of Geography & Environmental Studies and NMSU's Department of Geography to deliver an innovative PhD program that puts integrative thinking at the center of its structure, curriculum, and research agenda.

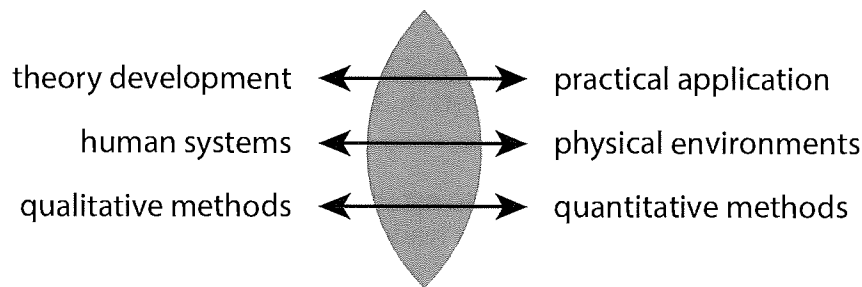
2.2 Program Goals

Currently, the Department of Geography & Environmental Studies at UNM is known both for a sustained focus on theory and policy in natural resource management and for the development of cutting-edge theory and methods in Geographic Information Science & Technology (GIS&T). NMSU's Department of Geography, alternately, has a robust program in applied geography that generates healthy undergraduate enrollments as well as a steady flow of external funding for applied projects in resource conservation, mapping, and geography education.

We see tremendous potential to leverage these differences for the creation of a truly revolutionary doctoral program that merges theory and praxis in fundamental ways, empowering scholars to work both within and outside of traditional intellectual and professional spheres, while also preparing students for a wide range of leadership positions within and beyond the academy. The

joint nature of the proposed program represents more than the mere union of two departments on two different campuses. We have envisioned a curriculum that both reflects and responds to complex place-based differences, changing human-environment systems, and the evolving place of higher education in modern society. Our innovative joint-program structure requires students to develop expertise in both qualitative and quantitative research methods, to develop sophisticated understandings of both human and environmental systems, and to cross disciplinary boundaries in building theory and developing geographic applications.

PROGRAM APPROACH TO INTEGRATIVE HUMAN-ENVIRONMENT DYNAMICS



2.2.1 Mission

The New Mexico Joint Doctoral Program in Geography prepares the next generation of resource managers, policy thinkers, geospatial innovators, professional scientists, and academic leaders who solve complex contemporary problems in dynamic environments. We achieve this mission through research, teaching, mentoring, service, and outreach that:

- Combines theory and praxis, with applied geography projects informing theory development.
- Conceptualizes human and physical systems as inseparable parts of an integrated whole.
- Emphasizes the integration of qualitative and quantitative techniques to solve real-world problems.

2.2.2 Research Goals

The primary reason for developing a joint doctoral program (rather than simply maintaining two existing master's programs in Geography) is to significantly increase geographic research capacity across both institutions. Our research goals are categorized at three different scales:

- Discipline – We aim to become a national leader in geographic research approaches that integrate qualitative and quantitative techniques to understand human-environment dynamics.
- Institution – We aim to provide an interdisciplinary anchor for UNM's and NMSU's environment-focused research programs, building institutional capacity across the natural sciences, social sciences, and humanities.

- State – We aim to connect our research expertise with New Mexico’s needs relating to the study of dynamic cultural landscapes and physical environments.

2.2.3 Learning Goals

The primary objective of our teaching and mentoring is to produce graduates who are well prepared for professional careers within and beyond the academy.

Broadly, we intend for all students to graduate with:

- Broad capability in the discipline of geography, with a critical understanding of how their specific areas of theoretical, methodological, and practical expertise relate to scholarship in other areas of the discipline;
- Advanced competency in the design and implementation of original research;
- Ability to engage in contemporary problem solving; and
- Professional skills in communication, teaching and mentorship.

2.2.4 Service Goals

Faculty service to the profession aims to establish the New Mexico Joint Doctoral Program in Geography as a disciplinary leader in innovative scholarly approaches to human-environment dynamics. This is accomplished primarily through:

- Leadership in regional and national organizations, and
- Scholarly service as editors, reviewers, and funding panelists.

In addition, we aim to contribute actively to campus initiatives, governance, and interdisciplinary program-building.

2.2.5 Outreach Goals

As New Mexico’s only doctoral program in Geography, we are keenly aware of the role we will play as standard-bearers for geography education and outreach in the state. In this role, we aim to support ongoing K-12 geography education initiatives and to promote broad awareness of the benefits of an integrated perspective on complex human-environment dynamics.

2.3 Joint Program Structure

The New Mexico Joint Doctoral Program in Geography is a single academic program delivered jointly across two campuses, with collaborative participation from both faculties. Although development of a joint program is a complex undertaking that requires very clear administrative and structural design, this program will be much greater than the sum of its parts. The program is structured to promote (and indeed require) authentic student engagement with both faculties, institutions, cities and regions. This engagement is critical to the development of an integrative scholarly perspective based in real-world problem-solving across a variety of dynamic human-environment contexts. All aspects of the program’s structural design are meant to maximize the scholarly benefits of student engagement with both UNM and NMSU in a truly joint fashion.

2.3.1 Admissions

At the time of application, potential students will identify a desired primary advisor and will apply formally to that professor's home institution. After an administrative check to ensure that candidates meet minimum requirements, the home institution will conduct a first round of admissions review and forward acceptable applications to the secondary campus. The second round of review will determine whether there is at least one sponsor at the secondary campus and will evaluate the applicants' overall fit with faculty expertise and research strengths. The final decision on admission of candidates to the program will be made by a joint review committee, while the final ranking of candidates for funding priority will be made at the home institution, based on the funding availability and service loads of that institution's faculty.

2.3.2 Curriculum

As described in the section on "Proposed Curriculum," courses will be delivered in a variety of formats, with many courses using innovative instructional modes that allow for students from either campus to attend. The first-year core courses, in particular, will be structured to maximize new students' engagement with faculty and peers on both campuses. At the same time, co-teaching arrangements in the core courses will allow for regular faculty communication and coordination on program goals.

2.3.4 Cross-Enrollment

The New Mexico Joint Doctoral Program in Geography relies on the state's newly developed "cross enrollment" protocol, which allows students to register seamlessly for graduate courses at multiple New Mexico institutions of higher education, in cases where a course is not offered at the home institution. To register for courses at a secondary ("host") institution, the cross-enrollment protocol requires simply that the student get permission to register for a designated cross-enrollment course at the *home* institution, which then triggers an administrative process that admits the student and enrolls him/her at the *host* institution. After the course is completed, grades are reported to the home institution, and the course credits will be transcribed at the home institution. Under this program, tuition is paid to the home campus, but any special fees are paid to the host institution. Student credit hours are awarded to the host institution that is actually delivering the course. This protocol will allow students in the New Mexico Joint Doctoral Program in Geography to take courses at either UNM or NMSU (as long as courses taken at the host institution are not offered at the home institution), thus facilitating the creation of a totally joint curriculum. In the event that a student desires to switch advisors within the Joint Doctoral Program, thus necessitating a change in the home institution, the registrars of the two institutions will work together to facilitate an advisor change without any prejudice against the student's standing or progress.

2.3.5 Doctoral Committee Coordination

As described in the section on "Proposed Curriculum," every student will have a joint Committee on Studies, which will necessarily include two faculty members from each institution and one external member at the home institution. This

structural requirement is meant primarily to ensure that students engage with faculty from both institutions, but it will also serve to promote cross-faculty communication and regular participation in the standards-based gatekeeping work that typically accompanies the evaluation of comprehensive exams and dissertation defenses.

2.3.6 Communication Structure

The New Mexico Joint Doctoral Program in Geography will have a single dedicated staff coordinator to provide administrative support in the areas of registration (admissions, enrollment, and transcription), research (including grant writing, conference travel, and publication support), and advising (re committee formation, program of study, and career planning). This program coordinator will be housed at UNM but will provide support to all doctoral students across both campuses.

In addition to the program coordinator, the graduate program directors from both UNM and NMSU will serve as liaisons on day-to-day activities and student issues. A larger Joint Steering Committee for the program will take responsibility for screening applications; making admissions decisions; reviewing and advising curriculum; handling conflicts, grievances, and appeals that cannot be resolved within the student's research committee; and maintaining communication between both institutions on relevant issues as they arise. Composition of the Joint Steering Committee will reflect representation of faculty from both institutions, specifically including, at a minimum, the graduate program director and at least one additional faculty member from each department. Committee membership may change annually, based on teaching assignments, interest, sabbatical leave, and other fluctuations of effort among faculty members.

To ensure effective and open communication lines, a single listserv will be created for all doctoral students, regardless of home institution. Similarly, a single doctoral program listserv will be created for faculty at both institutions. In addition to the email listservs, more robust digital technology options will be explored to select a standard communication platform for regular use across the two campuses. Finally, we envision holding at least two face-to-face meetings annually for all members of the Steering Committee: at either UNM or NMSU at the start of the academic year, and at the regional conference of the Southwest Division of the American Association of Geographers (SWAAG)

2.4 Purpose of the Joint PhD Geography Program

It has become increasingly clear that finding solutions to some of the most difficult environmental problems will require highly skilled professionals with multiple disciplinary perspectives. National-level research bodies – like the National Science Foundation and the National Research Council – now acknowledge the fundamental necessity of interdisciplinary perspectives that cross spatial scales. The NSF launched its Foundation-wide SEES Initiative (Science, Engineering and Education for Sustainability) to steer investment into interdisciplinary research that explores the integration of social systems, physical environments, and the structures that influence how humans alter their environments in pursuit of sustainability. As stated in the NSF SEES program

announcement, “Fundamental to all sustainability research is the simultaneous consideration of social, economic, and environmental systems and the long-term viability of those systems.”¹ Similarly, the NRC’s recent report, *Understanding the Changing Planet*, notes that “Innovation in the geographical sciences has the potential to advance knowledge of place-based environmental change, sustainability, and the impacts of a rapidly changing economy and society.”²

The New Mexico Joint Doctoral Program in Geography is accordingly designed to recruit and train highly skilled researchers who understand the interdependence of theory and practice, who can solve complex real-world problems, and who are capable of thinking in integrative ways about human-environment dynamics. Our graduates will be well placed to deal with the changing landscapes that define New Mexico and, more broadly, the American Southwest. From water resource issues, rapid urban growth, and urban/wildland interface conflicts to questions about the appropriate use of public lands, mining impacts and “sacrifice zones,” the Southwest is a hotbed of cultural and environmental complexity that requires new research approaches to effectively understand and address associated challenges.

Beyond New Mexico and the Southwest, however, many regions in the United States and around the globe face similar issues. Our doctoral program focuses specifically on research areas that have immediate regional applicability – environmental change, aridlands resource management, complex cultural landscapes, and Geographic Information Science & Technology – but our broader purpose is to build a program that is nationally recognized for academic leadership in the area of integrative human-environment dynamics. This leadership will not only provide national-caliber graduate training to New Mexico’s own citizens but will also attract students to New Mexico to undertake doctoral study in a regional setting that allows for extensive practical application.

2.5 Relationship to Plans for UNM Geography & Environmental Studies

UNM’s Department of Geography & Environmental Studies underwent an Academic Program Review (APR) in 2007-2008, and faculty members engaged at that time in a comprehensive strategic planning effort as part of the preparatory self-study. One of seven key goals to emerge from that effort was “Lay the ground for the future addition of a PhD program in Geography.” External reviewers confirmed the importance of this goal, particularly given the lack of any Geography PhD program in the state of New Mexico, and provided an action plan with concrete intermediate steps to strengthen the master’s program in order to prepare for future PhD program development effort. Subsequent departmental efforts were focused on strengthening the existing master’s program, increasing

¹ Available at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504707.

² Committee on Strategic Directions for the Geographical Sciences in the Next Decade, Board on Earth Sciences and Resources, Division on Earth and Life Studies, National Research Council of the National Academies (2010) *Understanding the Changing Planet: Strategic Directions for the Geographical Sciences*. Washington, DC: National Academies Press.

the size and quality of the faculty, and identifying additional resources in terms of both student support and facilities, all with an eye toward building the capacity necessary to undertake a PhD program proposal.

This commitment was renewed in a 2011 faculty retreat, where the UNM faculty in GES strategically evaluated existing degree programs and initiated a multi-pronged process of program-building to increase our institutional readiness for proposing a PhD program in Geography at UNM. Since 2011, the department has created a minor in Law, Environment and Geography in collaboration with UNM's Law School, a minor in GIScience, a shared-credit degree program with UNM's Department of Economics (that enables students to acquire both a Bachelor and Master Degree in 5 years), and a Graduate Certificate in Law, Environment and Geography, also in collaboration with UNM's Law School. These collaborative programs have not only leveraged the expertise of Geography faculty members for the benefit of UNM, but they also indicate strong preparation for a joint PhD program with NMSU.

By strategically broadening and strengthening curricular programs in our areas of expertise, we have vastly improved the quality of our annual master's cohorts in the last four years. This in turn has helped us attract and retain highly qualified faculty members who have further improved our research profile and added significantly to our activity levels in sponsored research. Our current hiring plan is focused on adding faculty with expertise that intersects with and adds to our existing strengths, while also expanding our ability to engage in integrative research and attract high-quality graduate students.

The next steps in our strategic plan call for evaluation of a potential GIScience certificate program and implementation of a focused PhD program. These initiatives were reviewed in our latest Academic Program Review (spring 2017), where the external review committee acknowledged the department's growing profile across campus, its extraordinary work rate, and its scholarly ambition – traits that position GES well to undertake new programs that add significant value to UNM's teaching and research enterprises. The 2017 review cautioned, however, that GES faculty should carefully consider the sustainability of its program commitments, given the likelihood that declining enrollments and budgets would only increase the burdens on individual faculty and staff over time. We have thus considered whether there is a conflict between the proposed PhD program and the concurrent development of a GIScience certification program in "Spatial Entrepreneurship," which is in the pre-proposal stage yet has already received enthusiastic feedback from both the College of Arts & Sciences and from Academic Affairs. At this time, we see good synergy between the two potential programs, as we expect the certificate program could quickly become self-sustaining and could also generate funding to add teaching capacity across the department. Rather than detract from the proposed PhD program, therefore, we expect that a profitable certificate program could actually help provide bridge funding for critical staff and faculty resources.

2.6 Relationship to UNM Mission and Strategic Plan

The University of New Mexico's *UNM 2020 a View to the Horizon* articulates UNM's mission, its vision, and its institution-wide strategies and goals for realizing this plan. The creation of the New Mexico Joint Doctoral Program in Geography will directly enhance core components of the University's strategic vision and help fulfill many of the goals set forth by the UNM 2020 plan, as follows:

2.6.1 Discovery and Innovation

UNM 2020 envisions the University as a leader in "basic and applied research and the translation of that research into knowledge and applications of value to academic communities and the public." A fundamental part of this vision is the spread of interdisciplinary teams that focus on some of the most important social challenges of our time. Likewise, a commitment to an "interdisciplinary education model designed to produce competence-based value" is core to this vision. The Joint Doctoral Program in Geography will directly contribute to this vision by building a program that is premised upon integrative, interdisciplinary, multi-methodology research and education. By premising the PhD course of study upon a pedagogy and research that bridges theoretical and applied approaches, the Joint Doctoral Program in Geography will directly contribute to the creation of applied yet theoretically robust solutions to the very real problems facing New Mexico and the region. And by training PhD students through a curriculum that requires understanding of multiple methodologies and the essential interrelations between applied and theoretical approaches, the Joint Doctoral Program in Geography will facilitate the training of students who are both committed to create positive change and have the broad ranging competencies required to build careers implementing positive change.

2.6.2 Students: The Lobo Experience

UNM 2020 envisions the University as an institutional leader in creating multidimensional programs "that go far beyond 'segmentation' initiatives' to more inclusive topic, challenge, skill and competency based sharing that brings diverse perspectives to challenges shared by all." The Joint Doctoral Program in Geography will directly contribute to this vision by building a program that is premised upon integrative approaches to research and education. By premising the PhD course of study upon a pedagogy and research that bridges theoretical and applied approaches, the Joint Doctoral Program in Geography will stress the very kind of topic, challenge, skill and competency based sharing that is at the heart of the "Lobo Experience" vision for students.

2.6.3 Strategic Partnerships

UNM 2020 envisions the University as engaging in a robust network of relations with other educational institutions as well as a system of public/private initiatives as part of a broader effort to "define new relationships that hold promise against society's most complex challenges." The Joint Doctoral Program in Geography is exactly the kind of strategic partnership envisioned by UNM 2020. By bringing

together the respective academic, research, and methodological strengths of UNM and NMSU, the program will provide resources for the University, the state, and our communities that are far greater than the sum of its parts. Moreover, given the two departments' existing partnerships with such key institutions as the National Park Service, the Bureau of Land Management, the Department of Justice, the Federal Highway Administration, the Jornada and Sevilleta Long-Term Ecological Research Programs, Doña Ana County, the Earth Data Analysis Center, and a variety of state agencies (e.g. NM Department of Transportation, NM Department of Housing and Urban Development, NM Department of Health), the opportunity for both departments to engage in strategic partnerships will increase exponentially.

As an example, GES faculty began participating this past year in the New Mexico Collaborative Research and Development Council (NM-CRDC), organized by New Mexico's U.S. Senators Martin Heinrich and Tom Udall. The NM-CRDC is designed to foster collaboration between the federal and state research facilities (e.g. national labs, military bases, and universities) with a goal of increasing innovation and subsequently attracting economic activity to New Mexico. The Executive Committee of the NM-CRDC has identified remote sensing from unmanned airborne systems (UAS) and big data exploitation as two of six priority clusters of research activity. The UAS remote sensing (UAS-RS) cluster is the most established, having already held two meetings and scheduled a full day workshop for February 2016, where UNM Geography and Environmental Studies will present on at least 4 different active UAS-RS research projects. As routine operators of UAS for remote sensing and a center of excellence for remote sensing methods in the state, UNM Geography and Environmental Studies is well poised to contribute substantially to both the UAS-RS and Big Data exploitation clusters through collaborations with Sandia and Los Alamos National Labs and New Mexico State University's Physical Sciences Laboratory.

Beyond contributing to important research and development in New Mexico, these relationships will also serve to broaden the career opportunities of the PhD graduates. The blending of preparation in basic and applied research will produce graduates with a diverse skills and competencies that will be of interest to these types of employers.

2.6.4 Market Position and Brand

UNM 2020 envisions the University as building its market position and brand on a reputation as a destination university that provides "tremendous value to state, national, and global students seeking an education relevant to diverse social and economic environments." By offering a uniquely integrative program that is premised upon the locational advantages and specialties of both UNM and NMSU, the New Mexico Joint Doctoral Program in Geography will draw students from around the world who are interested in developing integrative competencies in a particularly multicultural, and environmentally critical context. Because the New Mexico Joint Doctoral Program in Geography has been designed from the ground up to offer a unique program that is literally rooted in the social,

economic and environmental contexts of New Mexico, it promises to contribute to ongoing efforts to establish UNM as a destination university.

2.7 Relationship to Specific UNM 2020 Goals

2.7.1 Goal: Become a Destination University

As discussed above, the Joint Doctoral Program in Geography would offer a uniquely interdisciplinary program focused on human-environment dynamics and the development of integrative theories, methods, and applications relevant to this scholarship. It would not directly compete with other PhD programs in the region or country. Rather, it would capitalize on UNM's locational advantages and programmatic innovations in creating a "one of a kind" PhD track.

2.7.2 Goal: Prepare Lobos for Lifelong Success.

While the contributions of the New Mexico Joint Doctoral Program in Geography to students' lifelong success are outlined above, the program would specifically address one of the key objectives under this goal: to "increase the number of doctorates awarded" by UNM. Because our program will offer the only PhD in Geography in New Mexico, citizens will finally be able to obtain the highest degree available in Geography without having to go out-of-state.

2.7.3 Goal: Advance Discovery And Innovation

Over the last several years, UNM's Department of Geography & Environmental Studies has seen a marked increase in funded and collaborative research, with major recent grant awards for innovative techniques in infrastructure assessment, methods for disaster response, and studies of landscape change. In the last couple years, our faculty have published highly influential publications in environmental policy and theory, historical biogeography, urban legal geographies, critical physical geography, and time-sensitive remote sensing. The addition of a doctoral program will provide even greater capacity to fulfill one key UNM2020 objective: creating "structures and processes that support collaborative and interdisciplinary team research and scholarship." Since the New Mexico Joint Doctoral Program in Geography will be fundamentally oriented toward collaborative and interdisciplinary research that spans campuses, methodologies, and specialties, it will allow for significant advancements in geospatial discovery and innovation.

2.7.4 Goal: Advance And Accelerate Economic Development

UNM 2020 states that "elevating economic development to the goal level is a strong statement of the commitment UNM has to partnering with and enhancing the communities served." In keeping with this goal, the New Mexico Joint Doctoral Program in Geography is premised upon engaging PhD candidates with research rooted in the real-world problems of social and economic development in New Mexico. The program will also explicitly emphasize non-academic career tracks in addition to the traditional academic doctorate track. Increased research activity and high-level training, particularly in GIS&T, trains both existing and new residents of New Mexico in the skills necessary to launch new research and technology ventures.

2.8 Relationship to other offerings at UNM

Overall, the New Mexico Joint Doctoral Program in Geography will enhance UNM's interdisciplinary capacity in environment-related research and teaching without duplicating any existing programs or courses. UNM's faculty and student geographers already collaborate actively with Biology, American Studies, Anthropology, Communication & Journalism, Economics, Latin-American Studies, Community and Regional Planning, Civil Engineering, and History, and we expect that the development of a doctoral program will only enhance these existing partnerships. The new program will provide further benefit to UNM by increasing its institutional capacity to engage in cross-cutting research and program-building around the issues of environment and sustainability.

2.8.1 Research

As inherently interdisciplinary scholars, geographers are typically well positioned to lead meaningful collaborations in integrative human-environment research. Geography faculty at UNM currently study pressing environmental issues – related to energy development, food production, water policy, etc. – in a wide variety of projects that integrate approaches from natural sciences, social sciences, and humanities. With the addition of doctoral students as scholars and research practitioners, our ability to undertake large collaborative projects will expand, leading directly to increased external funding for research activities, facilities, and publications. This will allow UNM's faculty and student geographers to contribute more meaningfully to major collaborations, including the development of environment-related research centers or mapping support operations that enhance existing initiatives in other departments and colleges. Our long list of affiliated faculty members indicates the interdisciplinary scope and impact of our collaborative potential in research. We expect that the development of the New Mexico Joint Doctoral Program in Geography will allow us to more fully realize the potential of these existing relationships, leveraging our interdisciplinary perspective into a vibrant and substantial research presence at UNM that tackles human-environment dynamics from an integrated perspective.

2.8.2 Teaching

There are a number of units on the UNM campus that already provide course offerings on environmental or spatial topics. Through our faculty affiliations, we regularly seek feedback on these courses and provide cross-listings in Geography & Environmental Studies where possible. The New Mexico Joint Doctoral Program will support the continuation of robust cross-listing opportunities, with the expectation that (a) Geography doctoral students will engage in graduate courses offered by other units, and (b) students from other environment-related units will take advantage of the courses offered in our department, especially in the realm of spatial techniques. Although UNM students from other departments would need to use the cross-enrollment protocol to take advantage of any courses offered remotely at NMSU, we envision that the doctoral program would continue to serve students needs in multiple units.

We have discussed the joint doctoral program with the following units – Biology, Earth and Planetary Science, Anthropology, Economics, American Studies, Communication & Journalism, History, Civil Engineering, Law, Community & Regional Planning, Political Science, Water Resources, Sustainability Studies, Latin American Studies, Global and National Security Studies, Art & Ecology, Landscape Architecture, Peace Studies, and the Center for Health Policy – and have received positive feedback on the potential for curricular synergy. As a result, we feel confident in putting forward a proposed curriculum (see below) that includes numerous cross-listing opportunities as a vital part of our proposed interdisciplinary program.

2.8.3 Programs

In addition to enhancing interdisciplinary research and teaching engagement with faculty and students in other UNM departments, we anticipate that the New Mexico Joint Doctoral Program will provide significant benefit to a number of existing interdisciplinary programs, either by explicitly contributing to research and teaching initiatives or by providing a path for students interested in pursuing interdisciplinary graduate work. We have consulted with all of the following units to ensure that our proposed program would maximize potential benefit without duplicating existing resources:

- *Water Resources Program* – Although the WRP is narrowly focused on providing an applied master's degree, there is good potential for cross-listing and co-teaching in the areas of water policy and modeling. There is potential that students would graduate with a Master's in Water Resources and enter the Joint Doctoral Program in Geography. Geography faculty currently serve on the advisory board for the WRP, and we have jointly targeted a faculty hire within a water resources cluster.
- *Sustainability Studies* – Currently housed in the Department of Biology, the Sustainability Studies program offers an undergrad minor for students interested in interdisciplinary environmental topics. A number of Geography majors participate in this program, and Geography faculty also serve as affiliated faculty in Sustainability Studies. The Joint Doctoral Program in Geography would provide a meaningful degree path for students who want to continue their interdisciplinary training at the graduate level.
- *Latin American Studies* – The Latin American and Iberian Institute is a major presence on the UNM campus, with significant funding to support interdisciplinary engagement and research at both the faculty and student levels. Its academic arm, Latin American Studies, has recently revived the interdisciplinary PhD program and added a number of concentrations in the social and environmental sciences. This is partly due to the unit's strategy for recruiting a steady flow of PhD students from Latin American universities, where faculty members are often now required to attain the PhD in order to maintain their professorships. Geography has been active in a pilot version of this program (with the Universidad Central de Ecuador), and we now provide an environment-focused concentration in the Latin American Studies PhD program. The joint doctoral program in Geography will provide another

degree option for Latin American recruits and will enhance cross-listing options for LAS students more generally.

- *Global and National Security Studies* – The UNM Provost recently convened a committee to explore and propose programmatic opportunities related to Global and National Security Studies. Geography faculty are represented in this committee and have proposed a suite of courses to fulfill two potential tracks related to National Security: environmental analysis and geospatial analysis. Although it is not yet decided what form a National Security Studies program would take at UNM, the potential addition of undergraduate and graduate degrees and/or certificates in this area would clearly be enhanced by robust course offerings and research opportunities in Geography. The joint doctoral program in Geography would therefore offer significant potential to contribute in this area.
- *RWJ Center for Health Policy* – As the Robert Wood Johnson Foundation’s support for a health-focused center has declined, it is not yet clear exactly how the RWJ Center for Health Policy will evolve within the new IPEAR. The director expects, however, that it will continue to engage in community-based participatory policy work that draws from multiple disciplinary perspectives. If this is the case, the joint doctoral program in Geography could play a significant role at the center by steering policy-oriented students and faculty research toward practical applications in the health domain. We recently added a health geographer to our faculty, and this position has already revealed that GES could be a valuable partner in a variety of health-related research initiatives on campus.

2.9 Timeline for Program Development and Implementation

Assuming timely approval, we optimistically expect that the New Mexico Joint Doctoral Program in Geography could begin accepting and enrolling students as early as 2019 under the following timeline scenario:

- 2016-2018 proposal review at UNM & NMSU
- 2018-2019 HED and legislative review
- 2019- 2020: provisional admissions process & first cohort begins program

Basic resources are already in place on both campuses in terms of faculty, facilities, and student support services. Support that has been promised for additional Graduate Assistantship packages and critical faculty lines at UNM is expected to take effect over the next few years, in time for a program launch by 2019. Curricular additions are proposed as part of this package and would take effect as soon as the program as a whole is approved.

2.10 Proposed Curriculum

The proposed curriculum for the New Mexico Joint Doctoral Program in Geography fulfills all requirements outlined by the University of New Mexico Graduate School and is designed to be able to be completed in as little as four years of full-time study. It builds from the existing Master’s Programs in Geography at UNM and NMSU, leveraging significant pedagogical expertise and

classroom facilities to offer a robust and well-rounded PhD curriculum that will require adding only a few key courses. To achieve program goals for student learning, we will create a suite of 600-level core required seminars, add new courses that complement areas of existing strength, and change our instructional model for existing courses to maximize curricular availability for students across both campuses. Although this curriculum is not dependent on taking courses outside the two departments of Geography, we expect that many doctoral students will take advantage of offerings in other UNM and NMSU departments, including Biology, Earth and Planetary Sciences, Economics, Anthropology, Civil Engineering, Community and Regional Planning, Statistics, and Surveying. A number of these non-Geography courses are explicitly included in the program curriculum as electives, while others may be counted toward a student's program of study with the approval of his or her advisor and committee. The full curriculum is detailed in the following sections and can also be viewed "at a glance" in table format on the last page of this section. Catalog language for the program description is included as Appendix A, followed by curriculum proposals for new courses (Appendix B), catalog descriptions for all existing UNM courses (Appendix C) and sample syllabi for all UNM courses (Appendix D).

2.10.1 Learning Goals

The primary objective of our teaching and mentoring is to produce graduates who are well prepared for professional careers within and beyond the academy.

Broadly, we intend for all students to graduate with:

1. Broad capability in the discipline of geography, with a critical understanding of how specific areas of theoretical, methodological, and practical expertise relate to scholarship in other areas of the discipline;
2. Advanced competency in the design and implementation of original research;
3. Ability to engage in contemporary problem solving; and
4. Professional skills in communication, teaching and mentorship.

2.10.2 Program Requirements

To achieve these learning goals, we have drafted the following program requirements, which will apply to all students in the joint doctoral program, regardless of whether UNM or NMSU is the home institution.

- Maintenance of an overall GPA of 3.0
- Completion of 48 credit hours, 18 of which are dissertation credits
- Completion of all core courses with a grade of B or better
- Demonstrated competency in three subject areas: human geography, physical geography, and Geographic Information Science & Technology. The doctoral committee will evaluate existing competencies in a first-semester diagnostic interview and will then provide individualized guidelines for the student's program of study that lead to successful demonstration of these competencies.
- Successful advancement to candidacy, which will be determined through (1) written comprehensive exams that demonstrate broad competency across the discipline of geography, and (2) an oral exam that requires the

student to defend a research proposal, demonstrate research expertise, and address any concerns identified during the evaluation of the student's written exam.

- Completion of a written doctoral dissertation, with a successful oral defense. Due to the interdisciplinary nature of the joint doctoral program, we expect that dissertations will exhibit variable formats, but in all cases a dissertation must comprise a unified body of original research, as guided by the doctoral committee and advisor.

2.10.3 Core Courses

All students in the New Mexico Joint Doctoral Program will take a series of three core seminars that are designed to provide training in the integrative research approaches that are at the heart of the program. UNM and NMSU will share responsibility for teaching these courses, with the first- and second-semester core courses taught using a nontraditional delivery method that we refer to as the “intensive distance seminar.” (See individual core course descriptions for more detail.) This approach will ensure that all first-year students are able to engage with both campuses and faculties early in their tenure in the program, providing ample opportunity to make progress on committee formation, topic selection, and research design. The final core course will be taken in the student's second year and will be taught locally on each campus, as described below.

- **GEOG 601: Geographic Theory and Application** – This course provides a traditional first-semester overview of geographic history and philosophy, but it does so within a framework that incorporates significant focus on the relationship between theory and praxis. Since this relationship is critical to our conception of the joint doctoral program, this introductory course will carry enormous responsibility for setting intellectual and practical expectations for new students. We envision that teaching responsibility for this course be shared between UNM and NMSU, using innovative instructional models to promote student engagement with student peers and faculty members on both campuses. It will include one face-to-face meeting on each campus during the semester. These meetings will be intensive in nature, including both a seminar meeting and a field component. The two face-to-face meetings will require the instructor and students to travel to the partner institution once during the semester, with travel funding provided directly by the program through class fees. Other class meetings during the semester will be taught in a face-to-face seminar format that is also broadcast to desktops at the partner institution, allowing students from the “distant” campus to engage in seminar discussion via video technology. [Course will be offered every fall semester.]
- **GEOG 602: Integrative Research Design** – This course provides a comprehensive introduction to research design in geography, guiding students through the completion of a literature review, research question, and methodological design. Unlike traditional research design classes, however, this course focuses explicitly on the integration of qualitative and

quantitative methods to conduct cutting-edge interdisciplinary research. This focus will provide advanced research training that addresses the core focus of our program: human-environment dynamics. Like GEOG 601, responsibility for this course will be shared between UNM and NMSU under an instructional model that allows for cross-institutional engagement through two intensive face-to-face meetings (one at each campus, with funding provided by the program for instructor/student travel to the partner institution) and video-enabled seminar meetings. When taught at UNM, the course will meet jointly with our existing GEOG502 course in research design, although GEOG502 students would not be expected to participate in NMSU-based activities. [Course will be offered every spring semester.]

- **GEOG 603: Professional Geographic Practice** – This core course focuses on a variety of professional development topics that prepare students for teaching and applied community engagement projects. All students in this course will receive training in professional communication, professional ethics, and grantwriting. Depending on their individual professional goals, however, the course will allow students to undertake practical training in a variety of areas that range from academic teaching to applied policy work to scientific communication. As a starting point, the course will be developed using the American Association of Geographer's publication series for curricular support.³ All students in the New Mexico Joint Doctoral Program in Geography are expected to engage in applied projects as part of their research design, and this course will lay the foundation for these pursuits. Unlike GEOG 601 and GEOG 602, the final core course will be taught independently on each campus, to maximize the potential for faculty-student interaction on specific location-based project planning. We expect that some students will opt to pursue applied projects that extend beyond this course into an independent-study course or a multi-year dissertation project. [Course will be offered every fall semester.]

2.10.4 Elective Curriculum Overview

Beyond the required core courses, the New Mexico Joint Doctoral Program in Geography focuses on three primary areas of research expertise that require foundational training in three sub-disciplinary fields: human geography, physical geography, and GIS&T. In order to complete the program successfully, each student must demonstrate competency in all three areas while also developing a specialized area of research focus. Our curriculum is therefore designed to provide a variety of courses in the three main sub-disciplines, giving students ample opportunity to develop broad competencies through coursework while also working to design advanced integrative research.

At the time of admission, the faculty review committee will determine whether students have any deficiencies in human geography, physical geography, or

³ Michael Solem, Kenneth Foote, and Janice Monk, eds. (2008) *Aspiring Academics*, Prentice Hall. Michael Solem and Kenneth Foote (2008) *Teaching College Geography*, Prentice Hall. Association of American Geographers (2012) *Practicing Geography*, Prentice Hall.

GIS&T and will identify courses that can be used to remedy deficiencies in the relevant area. Courses taken to remove deficiencies may not satisfy other degree requirements.

Curricular details for each subfield are provided below, with clarifications regarding (a) which courses already exist at either UNM or NMSU, (b) the frequency with which existing courses are offered, (c) which courses are proposed for addition at each campus, whether now or in the foreseeable future, and (d) which existing or new courses will be taught using innovative instructional models that allow students to enroll from either institution. Please see also the “curriculum-at-a-glance” (Table 2.1) for a summary of course offerings and formats across the two institutions. A seven-year course rotation is provided in Appendix L and discussed in Section 6 (“Institutional Readiness for the Program”) in terms of how the curriculum will be staffed in the program’s early years. Formal titles for existing and new courses are included below, while catalog descriptions and all related curriculum forms (including Form B applications and syllabi) are included as appendices. Please note that any 400-level courses listed below are already available for graduate credit and would be suitable for PhD students.

2.10.5 Sub-Curriculum in Human Geography

Courses in Human Geography will be offered either by UNM or NMSU as part of their regular course rotation. Each such course will be offered either as a “local” course that must be taken in person at the campus offering the class, or as a “distance capable” course that can be taken in person at the campus offering the class or by distance learning from the partner campus. As shown below, the bulk of the human geography courses will be offered at UNM, with a large number of them available to students at NMSU via distance learning. A qualitative methods course will be added at UNM to round out this sub-curriculum, and Form B paperwork for this course has been submitted in conjunction with this program proposal. One additional graduate seminar is envisioned for future addition, based on program enrollment and faculty staffing levels.

As with the other two sub-disciplines, there is no set number of courses the PhD candidate must successfully complete. Rather, the determination of needed coursework to establish a proper competency in human geography will be determined by the individual candidate’s committee, in consultation with the student, and with reference to the student’s prior studies and life experience.

UNM: Local Courses at Grad Level, Human Geography

- GEOG*445 Geography of New Mexico and the Southwest [annual]
- GEOG466/566 The City [annual]
- ECON540 Natural Resource, Eenvt’l and Ecological Modeling I [biennial]
- ECON542 Topics in Eenvt’l, Resource and Ecological Economics [biennial]
- ECON543 Natural Resource, Eenvt’l and Ecological Modeling II [biennial]
- ECON544 Environmental Economics [biennial]
- WR571 Water Resources I – Contemporary Issues [annual]

- WR572 Water Resources II – Models [annual]
- HIST500 Topics: Digital Mapping in the Humanities [biennial]
- HIST500 Topics: Representing Urban Space [biennial]

UNM: Distance-Capable Courses at Graduate Level, Human Geography

- GEOG514 Natural Resources Management Seminar [annual]
- GEOG515 Cultural and Political Ecology [annual]
- GEOG516 Seminar: Globalization [biennial]
- GEOG517 Legal Geography [biennial, eventually annual]
- GEOG461/561 Environmental Management [annual]
- GEOG462/562 Water Resources Management [annual]
- GEOG463/563 Public Land Management [annual]
- GEOG464/564 Food and Natural Resources [annual]
- GEOG467/567 Governing the Global Environment [biennial]
- GEOG590 Qualitative Research Methods [new course, annual]

NMSU: Local Courses at Graduate Level, Human Geography

- GEOG555 Southwest Environments [annual]
- GEOG583 Field Explorations in Geography [annual]

NMSU: Distance-Capable Courses at Graduate Level, Human Geography

- GEOG567 Transportation Geography [annual]
- GEOG598 Topics Environmental Planning [annual]

2.10.6 Sub-Curriculum in Physical Geography

Courses in Physical Geography will be offered either by UNM or NMSU as part of their regular course rotation. Each such course will be offered either as a “local” course that must be taken in person at the campus offering the class, or as a “distance capable” course that can be taken in person at the campus offering the class or by distance learning from the partner campus. As shown below, the bulk of the physical geography courses will be offered at NMSU or in UNM departments outside Geography & Environmental Studies. Two courses will be added at UNM to round out this sub-curriculum, and Form B paperwork has been submitted concurrently with this program proposal, or will be submitted shortly thereafter. In this sub-curriculum, very few courses will be available to students via distance learning, which will make it necessary for admissions committees to ensure that applicants with a primary interest in physical geography are well matched for their designated advisor and home institution.

All students must develop appropriate methodological competency in physical-geographic research. As with the other two concentrations, however, there is no set number of courses the PhD candidate must successfully complete in physical geography. Rather, the determination of needed coursework to establish proper competencies in physical geography and relevant research methodologies will be determined by the individual candidate’s committee, in consultation with the student, and with reference to the student’s prior studies and life experience.

UNM Local Courses at Graduate Level, Physical Geography

- GEOG*450 Environmental Hazards [annual]
- GEOG551 Drylands [new course, annual]
- CE534 Environmental Engineering Chemistry [annual]
- CE541 Hydrogeology [annual]
- CE542 Intermediate Hydrology [annual]
- CE545 Open Channel Hydraulics [annual]
- CE549 Vados Zone Hydrology [annual]
- CE565 Soil Behavior [annual]
- CRP516 The Natural History of Watersheds: A Field Approach [biennial]
- Any EPS course at the graduate level
- Any BIOL course at the graduate level
- Some courses in the GIS&T list (next sub-curriculum, below) may also be relevant for the student's Physical Geography competency. Additional relevant courses may be counted from the departments of Math & Stats, Earth & Planetary Science, Biology or other UNM units, with approval.

UNM Distance-Capable Courses at Graduate Level, Physical Geography

- At this time, there are no UNM courses in physical geography that will be offered in a delivery mode that supports distance learning.

NMSU Local Courses at Graduate Level, Physical Geography

- GEOG553 Applied Geomorphology [annual]
- GEOG557 Biogeography [annual]
- GEOG552 Landscape Ecology [annual]
- GEOL474 Groundwater Geology [annual]
- BIOL462 Conservation Biology [annual]
- BIOL507 Plant Systematics [annual]
- CE452 Geohydrology [annual]
- CE483 Surface Water Hydrology [annual]
- ES470 Environmental Impacts of Land Use [annual]
- FWCE457 Ecological Biometry [annual]
- FWCE462 Conservation Biology [annual]
- FWCE540 Wildlife Habitat Relationships [annual]
- SUR461 Introduction to Satellite Geodesy [annual]
- Some courses in the GIS&T list (next section, below) may also be relevant for the student's Physical Geography competency. Additional relevant courses may be counted from the departments of Statistics, Surveying or other NMSU units, with approval.

NMSU Distance-Capable Courses at Graduate Level, Physical Geography

- GEOG598 Climate Change and Surface Processes [annual]

2.10.7 Sub-Curriculum in Geographic Information Science & Technology

Courses in Geographic Information Science & Technology (GIS&T) will be offered either by UNM or NMSU as part of their regular course rotation. Each such course will be offered either as a “local” course that must be taken in person at

the campus offering the class, or as a “distance capable” course that can be taken in person at the campus offering the class or by distance learning from the partner campus. As shown below, there are a number of equivalent courses that will be offered at both UNM and NMSU, owing largely to the existing curricular strength shared by both institutions in GIS&T master’s-level education. We expect that virtually all courses in this sub-discipline could be offered in a distance-capable format, although this may not be necessary for those courses that are locally offered in both places on a regular rotation. All needed courses for this concentration currently exist or have recently been proposed as part of a more general curriculum review.

As with the other two sub-disciplines, there is no set number of courses the PhD candidate must successfully complete. Rather, the determination of needed coursework to establish a proper competency in GIS&T will be determined by the individual candidate’s committee, in consultation with the student, and with reference to the student’s prior studies and life experience.

UNM Local Courses at Graduate Level, GIS&T

- GEOG*481L Map Design and Geovisualization [annual]
- GEOG524 Remote Sensing Seminar [annual]
- GEOG525 Advanced GIScience Seminar [annual]
- CE547 GIS in Water Resources Engineering [annual]

UNM Distance-Capable Courses at Graduate Level, GIS&T

- GEOG522 / OILS 515 Introduction to Spatial Data Management [annual]
- GEOG527 Introductory Programming for GIScience [biennial]
- GEOG528 Advanced Programming for GIS [biennial]
- GEOG580L Spatial Statistics [annual]
- GEOG583L Remote Sensing Fundamentals [annual]
- GEOG584L Applications of Remote Sensing [annual]
- GEOG585L Internet Mapping [annual]
- GEOG586L Applications of GIS [annual]
- GEOG587L Spatial Analysis and Modeling [annual]
- GEOG588L GIS Concepts and Techniques [annual]

NMSU Distance-Capable Courses at Graduate Level, GIS&T

- GEOG521 Application and Modeling [annual]
- GEOG 571 Cartography and Geographic Information systems [annual]
- GEOG572 Geodatabase Design [annual]
- GEOG573 Introduction to Remote Sensing [annual]
- GEOG577 GIS&T [annual]
- GEOG578 Fundamentals of GIS&T [annual]
- GEOG 581 System Design for GIS&T [annual]
- GEOG582 Advanced Remote Sensing [annual]
- GEOG585 Advanced Spatial Analysis [annual]
- GEOG586 Geospatial Techn for Natural Resource Assessments [annual]
- GEOG598 GIS for Water Resources [annual]

– FWCE571 GIS Natural Resources [annual]

2.10.8 Joint Program Delivery

The New Mexico Joint Doctoral Program in Geography does not require that students maintain residency at different times in both Albuquerque and Las Cruces. The combined geography faculty at UNM and NMSU feel strongly, however, that the program's success hinges on an ability to foster authentic student engagement across the two faculties, campuses, and cities. To that end, our plan for program delivery includes numerous opportunities for academic engagement at both UNM and NMSU, regardless of which is the student's home institution. We will kick off each year with a field-based orientation experience for incoming students that will offer both (a) an opportunity for cohort-building and (b) an introduction to dynamic human-environment contexts in either Albuquerque or Las Cruces. Building from this annual kickoff experience, the first-year core courses (GEOG601 and GEOG602) will be delivered in compressed formats that integrate distance learning technologies with face-to-face meetings of students and faculty at both campuses. Ideally, one face-to-face session would be incorporated with the annual kick-off event, with a second face-to-face session taking place at the other institution toward the end of the semester. The remainder of the core course meetings would be conducted via distance technologies on each campus, including digital videoconferencing and broadcast-to-desktop models, supplemented with standard web-based and email communications. Under this model, students from each campus would travel to the other campus once per semester, and we envision building travel costs into course fees as a matter of student convenience.

As mentioned above, the GEOG603 core seminar would be duplicated on each campus to facilitate intensive faculty participation in students' applied field projects. All other courses are offered either in "local" formats, meaning that students must be in residence (or must be willing to travel on a weekly basis) to enroll in the course, or are offered in "distance-capable" formats that allow for remote enrollment via distance learning and digital meeting technologies. In general, we do not anticipate offering duplicate courses on both campuses except for courses that are already required to support the existing Master's programs at UNM and NMSU. Courses that are oriented primarily toward doctoral students will typically be offered only at one institution or the other, depending on faculty expertise. (GEOG603 is the exception to this rule.) As a result, some students may choose to change their residency between Albuquerque and Las Cruces in any given semester. To assist students in determining whether and when this might be effective, we will provide a pre-matriculation questionnaire to gather information that can be used to advise each student on both curricular and residency issues related to the student's intended Program of Study. We will also maintain long-term projections for course offerings at each institution, to assist the Program Coordinator in advising students in this regard.

2.10.9 Graduate Committees

In addition to the institutional requirements that govern the formation of

graduate committees at UNM and NMSU, the New Mexico Joint Doctoral Program in Geography requires that each student work with his/her advisor to develop a joint doctoral Committee on Studies, which will necessarily include two faculty members from each institution and one external member. We expect the external member will typically be a faculty member who is from the home institution but outside the home department. Eligibility to serve on doctoral committees is defined in the graduate catalogs at UNM and NMSU, and each institution will therefore follow its own procedures for evaluating graduate committees and qualifying “graduate” faculty. The joint doctoral Committee on Studies will be responsible for all facets of supervising dissertation research, including:

- developing the preliminary research proposal and external funding proposals (where applicable),
- developing expertise needed to conduct the proposed research,
- preparing for comprehensive written exams,
- preparing for the final research proposal defense/oral exam,
- conducting needed field and laboratory analysis,
- preparing for the final defense of the dissertation, and
- writing and revising the articles or other written documents that will summarize the research and comprise the finished product of the dissertation process

2.11 Institutional Priority

Prior to submission to the NMHED and NMGDC, a brief statement will be included regarding the institution’s priority for this program, with reference to documentation provided by Provost’s Office (see section 10).

CORE COURSES	Teaching Responsibility Shared by UNM and NMSU	
	GEOG601: Geographic Theory and Application ¹	Teaching responsibility rotates between UNM and NMSU each year. Taught in a distance format suitable for attendance by all students in each cohort, regardless of home institution.
	GEOG602: Integrative Research Design ¹	
	GEOG603: Professional Geographic Practice ¹	Taught independently on each campus each year.

ELECTIVE COURSES	Offered by UNM		Offered by NMSU	
	Local to UNM only	Distance-Capable Course	Local to NMSU only	Distance-Capable Course
	GEOG566 City as Human Env GEOG*445 Geog of NM & SW ECON540 Nat Res Modeling I ECON542 Ecol Economics ECON543 Nat Res Modelg II ECON544 Env Economics WR571 Water Res Issues WR572 Water Res Modeling CRP516 Watersheds	GEOG514 Nat Resources GEOG515 Cultural Political Ecol GEOG516 Globalization GEOG517 Legal Geography GEOG561 Env Mgmt GEOG562 Water Mgmt GEOG563 Public Lands GEOG564 Food Nat Resources GEOG567 Govern Global Envt GEOG590 Qual Methods ¹	GEOG583 Field Explorations	GEOG567 Transport Geog GEOG598 Env Planning
	GEOG*450 Env Hazards GEOG551 Drylands CE534 Env Eng Chemistry CE541 Hydrogeology CE542 Intermed Hydrology CE545 Open Channel Hydr CE549 Vados Zone Hydrol CE565 Soil Behavior any EPS course at grad level any BIOL course at grad level	No distance-capable classes (Additional relevant courses may be counted from the departments of Math & Stats, Earth & Planetary Science, and Biology. Note: some courses in the GIS&T list (below) may also be relevant for the student's Physical Geography competency.)	GEOG535: Applied Geomorph GEOG555 SW Environments GEOG557: Biogeography GEOG552: Landscape Ecol GEO474: Groundwater BIOL462: Conservation Biol BIOL507: Plant Systematics CE452: Geohydrology CE483: Surface Hydrology ES451: Climate in Real World ES471: Env Impacts Land Use FWCE462: Cons Biology FWCE457: Ecol Biometry FWCE540: Wildlife Habitat Rel SUR461: Satellite Geodesy	GEOG598 Climate Chg Proc (Additional relevant courses may be counted from the departments of Statistics, Surveying or other NMSU units. Note: some courses in the GIS&T list (below) may also be relevant for the student's Physical Geography competency.)
Geographic Information Science & Technology Offerings	GEOG524 Adv Remote Sens GEOG525 GISci Seminar CE547 GIS Water Resources	GEOG*481L Map Design GEOG522 Spatial Data Mgmt GEOG527 Basic Programming GEOG528 Adv Programming GEOG580 Spatial Statistics GEOG583 Remote Sensing GEOG584 App Remote Sensing GEOG585 Internet Mapping GEOG586 Applicants of GIS GEOG587 Spatial Analysis GEOG588 Concepts/Techniques		GEOG521 Applic & Modeling GEOG571 Cartography & GIS GEOG572 Geodatabase Desn GEOG573 Intro Remote Sens GEOG577 GIS&T capstone GEOG578 Fundam GIS&T GEOG581 System Design GEOG582 Adv Remote Sens GEOG585 Adv Spatial Analysis GEOG586 Nat Res Assessmnt FWCE571 GIS Nat Resources

A list of suitable elective courses to be included in each student's program of study will be developed in consultation with the adviser and joint committee.

¹ Form B currently under review.

3. JUSTIFICATION FOR THE PROGRAM

3.1 Overview

The development of a New Mexico Joint Doctoral Program in Geography is amply justified on several levels.

- First, it will produce graduates with advanced training in integrative human-environment research methods and applications. These foundational skills will prepare program graduates for a variety of careers in New Mexico – including in scientific and industrial labs, government agencies, universities, and consulting firms – that require employees and leaders with broad training in both theory and methods appropriate for understanding the complexity of real world natural and human systems.
- Second, it will provide a much-needed educational opportunity for New Mexico residents who wish to undertake advanced, interdisciplinary graduate training on environment-related topics without leaving the state.
- Third, it will contribute directly to the goals of the University of New Mexico by generating significant external funding through increased research capacity in GES, by increasing project opportunities with partner agencies and institutions, by increasing graduate enrollments, and by deepening the institution's commitment to the study of environmental dynamics and challenges.
- Finally, it will attract students to New Mexico from other areas of North America and beyond. By committing current and future resources to the development of an innovative and high-quality program, we will build a national reputation that draws the most competitive applicants to New Mexico for graduate study in integrative human-environment dynamics.

3.2 Justification for Employment Need

Recent advances in geospatial technologies have prompted a mapping renaissance in which public agencies and private firms explore novel and high-impact ways to analyze and visualize environmental data and spatial patterns. Across North America and the globe, the geospatial industry is growing by leaps and bounds.

3.2.1 National Context: U.S. Department of Labor Reports

The U.S. Department of Labor provides the following profile of the technologies that are driving expansion of this diverse employment sector:

Geospatial information is finding ever-increasing applications. The federal government uses it to manage forests, develop defense strategies, establish tax valuations and employ census data to determine voting districts. Utility companies use it to automate transmission and distribution networks and to build and service pipelines and communication networks. Cities are using geospatial technologies for applications as diverse as routing sanitation and emergency vehicles, replacing water mains, and matching equipment to job requirements. Private companies use geospatial information to make more

informed decisions in areas ranging from site selection, to marketing demographics, to analyzing competition. Once a tool that was affordable only to the largest organizations, geospatial systems have become a cost-effective option for even the smallest organizations.

There is a lack of public awareness of the impact of geospatial technology applications on daily professional and personal activities. With greater understanding will come greater interest in entering the profession, as well as greater demand for geospatial capabilities and applications across a wide range of other sectors. The Geospatial Information & Technology Association (GITA) reports that approximately 70 to 80 percent of the information managed by business is somehow connected to a specific location—an address, street, intersection, or ‘xy’ coordinate. This interest in location is drawing geospatial technology into nearly every corner of the business world. Because the technology’s uses are so widespread and diverse, the geospatial market is growing at an annual rate of almost 35 percent, with the commercial subsection of this market is expanding at the rate of 100 percent each year.⁴

Driven by this rapid technological uptake, Geospatial Technologies has been identified by the U.S. Department of Labor as one of the three largest growth sectors in the next twenty years (after nano-technologies and bio-medical research). Accordingly, the sector has been designated as a job training initiative priority both because it is “expected to add substantial numbers of new jobs to the economy or affect the growth of other industries,” and because it leads existing or emerging businesses to be “transformed by technology and innovation requiring new skill sets for workers.”⁵

3.2.2 State Context: New Mexico’s Geospatial Industry

To understand how this employment growth and training need impacts New Mexico, we conducted a focus group and followup interviews with agency and industry representatives from across the state in 2015. (See Appendix G for list of participants.) Participants provided feedback on (a) the need within their organizations for employees with PhD-level training, and (b) the desire within their own organizational ranks for advanced graduate training in Geography. This second topic is discussed in the next section below.

The focus group expressed strong support (even excitement) for the conceptual design of the New Mexico Joint Doctoral Program in Geography, especially its attention to the development of applied and professional research competencies alongside a rigorous theoretical program in integrative human-environment dynamics. There was consensus that geographers with advanced graduate

⁴ U.S. Department of Labor Employment and Training Administration, “Identifying and Addressing Workforce Challenges in America’s Geospatial Technology Sector,” 2 November 2005. [See Appendix F.]

⁵ U.S. Department of Labor, “High Growth Job Training Initiative.” Available at <https://www.doleta.gov/business/PDF/5%20-%20HGJT1%20overview.pdf> [last accessed 8 February 2016].

training are needed in various agencies and businesses throughout the state. In the private sector, Geography PhDs have great potential to make an impact as innovative and entrepreneurial leaders in a rapidly changing economic development context. Within the public sector, PhD credentials and research design experience are seen as critical to agency success with complex analytical projects.

We also asked the focus group to identify the specific competencies through which potential employees would provide the most value to their geospatial endeavors. The group engaged in vigorous discussion on this topic and provided the following list of critical competencies:

- Research design expertise
- Sophisticated understanding of how to set research objectives
- Experience with big data approaches
- Statistical training
- Computing sophistication
- Leadership skills in combination with technical background

These competencies identified by New Mexico professionals echo research findings at the national level, which indicate that general skills in research and leadership are just as important to post-PhD career success as specific geographical and technical skills.⁶ The New Mexico Joint Doctoral Program in Geography has been explicitly designed to address these competencies. Its core curriculum emphasizes the development of multiple integrated skill sets and underscores the critical importance of merging theoretical development with practical applications that can be translated to agency and industry contexts.

3.2.3 Academic Context: Geography in Higher Education

Although the New Mexico Joint Doctoral Program in Geography is based on a unique and innovative design, it will provide the same quality of direct training for the next generation of academic leaders as any existing or traditional Geography PhD program. As the overall labor need for graduates with geographical training has increased, institutions of higher education have seen increasing enrollment in geography programs even as other fields and overall numbers have declined.⁷ This robust enrollment has supported the addition of new degree programs in Geography across the country at all levels,⁸ which in turn

⁶ Solem, Michael, Ivan Cheung, and M. Beth Schlemper (2008) Skills in Professional Geography: An Assessment of Workforce Needs and Expectations. *The Professional Geographer*, 60(3): 356–373. Monk, Janice J., Kenneth E. Foote, and M. Beth Schlemper (2012) Graduate Education in U.S. Geography: Students' Career Aspirations and Faculty Perspectives. *Annals of the Association of American Geographers* 102(6): 1432–1449.

⁷ This trend can be expected to continue, based on the emerging importance of geography education at the K-12 level, as indicated by exploding numbers of high school students taking the AP Human Geography exam and the American Association of Geographers (AAG)'s recent announcement that it is proposing that the College Board add an AP exam in Geographic Information Science and Technology.

⁸ Murphy, Alexander B. (2007) Geography's Place in Higher Education in the United States. *Journal of Geography in Higher Education* 31(1): 121–141

has supported strong academic placement rates for graduates with PhDs in Geography. Indeed, a recent nationwide survey of social science doctorate recipients' post-degree career paths showed that almost three quarters of PhD-holding geographers were entering the academic ranks, primarily at the faculty level.⁹

This same survey noted, however, that the nature of the geography professoriate is changing, as geography professors are increasingly encouraged to participate in university-industry research partnerships and to engage in “interdisciplinary research in response to societal problems – often of global scope” as a central element of the research enterprise (p.185). This evolving higher-education context, therefore, necessitates an evolution of PhD-level geography education. Not only must we broaden the diversity of student recruitment to escape the traditional narrowness and elitism of academia, but we must also broaden and diversify PhD curricula to better equip students with a variety of geographical and general skills needed to succeed in the academic workplace.¹⁰ One of the first tasks of the program's Joint Steering Committee will be to develop a proactive plan for diversity and broadening participation. We envision taking a leadership role in addressing the need to diversify the discipline, not just in New Mexico but nationally as well.

The New Mexico Joint Doctoral Program in Geography is designed with this fundamental re-orientation in mind. Through its interdisciplinary structure and practice- and competency-based curriculum, it is responsive to recent shifts in higher education. It will also help meet the need for academic leaders who are capable of thinking creatively and integratively about the kind of geospatial training that supports a sophisticated workforce. At the same time, it is responsive to recent calls that PhD programs broaden students' career paths beyond the academic workplace.¹¹ As nationwide trends indicate, “PhD holders are viewed as good candidates for staffing the complex knowledge environments that increasingly characterize social institutions.”¹² By attending to the critical importance of practical training and professional development,¹³ the proposed joint program will thus prepare students for a broad suite of professional careers in higher education, business, government, and the non-profit sector.

3.3 Evidence of Student Demand

The target student population for the New Mexico Joint Doctoral Program includes individuals who are already in New Mexico as well as students who

⁹ Rudd, Elizabeth and Maresi Nerad (2015) Career preparation in PHD programs: results of a national survey of early career geographers. *GeoJournal* 80: 181-186.

¹⁰ Boyle, Mark, Kenneth E. Foote, and Mary Gilmartin (2015) Rethinking the PhD in geography: overview and introduction. *GeoJournal* 80:159-168. See also Monk et al 2012 and Solem et al 2008.

¹¹ Monk, Janice (2015) Changing doctoral education: the case of US geography. *GeoJournal* 80:187-191.

¹² Rudd and Nerad, p.185.

¹³ Adams, John S. (2015) Reality therapy for geography PhD programs. *GeoJournal* 80: 169-174.

migrate from outside the region to take advantage of the joint program's unique characteristics. We expect a mix of students who intend to pursue traditional academic paths toward teaching and research careers with those who are oriented toward future employment as resource managers, professional scientists, geospatial innovators, and policy analysts. The program is designed to support all of these paths through its focus on advanced training in integrative research skills, and we expect to recruit widely, both from undergraduate and master's programs in Geography and related fields, as well as from national laboratories, government agencies, consulting firms, or private businesses whose employees would benefit advanced graduate training. The innovative nature of our joint program will provide a recruiting advantage, as will the unique aspects of existing geography programs at both UNM and NMSU. UNM, for example, has the only Geography program in the nation with a concentration in geography, environment, and law, while NMSU is nationally prominent in the area of geography education.

3.3.1 Student demand from the MS Geography program at UNM

To characterize student demand from existing academic programs, we first analyzed the career trajectories of our own MS Geography graduates. Historically over the previous two decades, we have placed only about one master's graduate per year in a PhD program, while the majority of students have gone into government employment, as shown in Table 3.1. Some of these students might have applied for a PhD program in New Mexico if one were available; several reported that they would have pursued a PhD, but could not do so because of their need to stay in New Mexico.

Table 3.1 First post-degree employment placement: MS Geography grads, 1998-2013

First Post-Master's Employment	Placement Rates*
Government	
Federal Agency	18%
National Research Lab	8%
State Government	6%
Local Government	4%
Industry/Consulting	15%
Education	
University Research Facility	10%
College/Post-Secondary Teaching	6%
K-12 Teaching	2%
Entered a PhD Program	13%
Other/Retired/Unknown	17%

*Out of 126 total MS degree recipients.

One cannot assume, however that the historical 13% rate of UNM graduates' post-MS entry into PhD Geography programs will persist once the New Mexico Joint Doctoral Program in Geography is introduced. These historical data are insufficient to predict future trends because the Department of GES at UNM has

undergone radical change in the last five years. With the addition of new programs and certificates and a 150% growth in faculty size since 2006, we have seen a significant increase in the quality of our master's program. Since our most recent students are likely to be more representative of the department's future MS graduates, we have separately surveyed the current cohort to determine their career plans. These survey data show that almost a third of our current MS students consider it "very likely" that they will pursue a PhD in Geography (see Table 3.2). Two thirds of the current cohort consider it desirable to live in New Mexico after completing the Master's degree (see Table 3.3); and one fourth of UNM's current MS Geography students stated they would be "very likely" to apply to a UNM-based PhD program in Geography, if one were offered (see Table 3.4). These new data indicate that we can expect a robust application rate from existing UNM Geography students to the New Mexico Joint Doctoral Program in Geography.

Table 3.2 Survey results: Please rank how likely you are to pursue the following options after completing your MS in Geography at UNM (19 total respondents)

	Very likely	Likely	Neither likely nor unlikely	Unlikely	Very unlikely
Enter a PhD program in Geography	21.1% 4	21.1% 4	10.5% 2	15.8% 3	31.6% 6
Enter a PhD program in another field	31.6% 6	26.3% 5	10.5% 2	21.1% 4	10.5% 2
Enter a Master's program in another field	47.4% 9	21.1% 4	10.5% 2	15.8% 3	5.3% 1
Pursue professional position with a government agency	10.5% 2	5.3% 1	10.5% 2	47.4% 9	26.3% 5
Pursue professional position with a private company	5.3% 1	10.5% 2	26.3% 5	31.6% 6	26.3% 5
Establish your own business as an entrepreneur	31.6% 6	21.1% 4	31.6% 6	5.3% 1	10.5% 2

Table 3.3 Survey results: Please rank the desirability of the following locations in terms of where you would consider living after you complete your MS in Geography at UNM (20 total respondents)

	Very undesirable	Undesirable	No opinion	Desirable	Very desirable
Albuquerque, NM	5.3% 1	15.8% 3	10.5% 2	36.8% 7	31.6% 6
Elsewhere in New Mexico	21.1% 4	15.8% 3	21.1% 4	42.1% 8	0.0% 0
Elsewhere in the Southwest	5.3% 1	21.1% 4	36.8% 7	26.3% 5	15.8% 3
Elsewhere in the United States	5.3% 1	15.8% 3	5.3% 1	42.1% 8	31.6% 6
Elsewhere in North America	10.5% 2	10.5% 2	26.3% 5	36.8% 7	21.1% 4
Outside North America	15.0% 3	15.0% 3	15.0% 3	25.0% 5	30.0% 6

Table 3.4 Survey results: If UNM's Department of Geography currently offered a PhD program, how likely would you be to apply for admission following completion of your MS in Geography? (20 total respondents)

	Very likely	Likely	Neither likely nor unlikely	Unlikely	Very unlikely
Respondents	30.0% 6	10.0% 2	15.0% 3	20.0% 4	25.0% 5

3.3.2 Student demand from other academic programs at UNM

The University of New Mexico has also recently developed a collaboration with the Universidad Central de Ecuador (UCE), in which more than one hundred faculty members from that institution will enroll at UNM to earn PhD degrees over the next five years. A visit to UCE in summer 2014 revealed that many of these faculty members are seeking a PhD that focuses on environment, development, and sustainability. The Latin American and Iberian Studies Institute agrees with our estimate that 2-3 students per annual 30-person cohort would seek to enter the New Mexico Joint Doctoral Program in Geography. (In the first year of the program, 3 UCE faculty have enrolled in GES via a Geography concentration available under the Latin American Studies degree program, with two of them explicitly noting that they would have enrolled directly in GES if a PhD program were available.) Because this mass-enrollment of UCE faculty comes in response to new Ecuadorian legislation aimed at transforming the country's higher education system, we expect that the collaborative model will soon be expanded to other universities in Ecuador that are facing the same imperatives of advancing their faculty's education. In time, other countries in

Latin America may go through similar transformation, which could bring dozens of students through our joint PhD program over the next two decades.

In addition, UNM's Department of Geography & Environmental Studies has seen increased graduate course enrollment from students in related disciplines, especially Biology and Anthropology. It is clear from conversation with these students that the addition of doctoral-level training in geospatial methods will contribute to their own graduate work, and that the New Mexico Joint Doctoral Program in Geography may induce those with geospatial interests to stay in the state for PhD training rather than looking elsewhere for suitable PhD programs.

3.3.3 Student demand from academic geography programs in the region

In 2015, we conducted a survey of all peer institutions (for both UNM and NMSU) that have Geography departments, along with all Geography departments within the Southwest region of the American Association of Geographers (SWAAG). Survey results confirmed that we should expect robust student demand from existing academic geography programs within the region. In the last five years, 36% of 221 students in the sample who received a Master's in Geography went on to get a PhD. The institutions in our sample that currently offer PhD programs in Geography reported that 29% of their PhD graduates in the last five years had already completed a lesser degree from that same institution. This indicates that although we should expect significant demand from our own Master's graduates, the bulk of our students are likely to enter the New Mexico Joint Doctoral Program in Geography after completing Master's level programs at other institutions. (See Appendix I for survey details.)

These same PhD-granting institutions in our sample also reported that 62% of their entering PhD students are returning after taking one or more years away from academic study. This high number suggests that enrollment numbers will likely depend on the program's ability to appeal to students engaged in professional pursuits. In this regard, we expect that our unique program design will be successful in drawing both recent master's graduates and working professionals to New Mexico from throughout the region. After receiving the PhD, we expect that a minimum of 20% of our graduates will stay in New Mexico, as is the average reported by the PhD-granting institutions in our survey.

3.3.4 Student demand from programs elsewhere in the U.S. and other countries

Data collected by the American Association of Geographers show that Geography PhD program enrollments have been rising steadily in the first years of the twenty-first century, with an overall increase of 10 percent.¹⁴ Enrollments in undergraduate and master's-level geography programs, however, are rising even faster, indicating that the nationwide trend toward increased PhD program enrollment will continue. By offering a unique joint program with a focus on integrative human-environment dynamics, the New Mexico Joint Doctoral Program in Geography will be poised to draw students from across the U.S. and other countries to New Mexico.

¹⁴ Murphy 2007.

3.3.5 Student demand from government agencies and private industry

In addition to the predictable demand for PhD training as the terminal destination of those already engaged in undergraduate and master's work in Geography and related fields, we expect significant enrollment from highly qualified individuals at university research facilities, national research laboratories, consulting firms, and governmental agencies in New Mexico. As noted above, many of these individuals are somewhat immobile given their existing employment, but they would like to further their education and job effectiveness by studying for a PhD in geography. Other individuals will be drawn to the program for the opportunities it offers to merge advanced research training with entrepreneurial practice and innovation.

Our 2015 focus group with representatives of New Mexico's geospatial industry revealed not only that many employers are seeking employees with doctoral-level training and qualifications (as described in section above on "Justification for Employment Need") but also that many of them know people in their own organizations who desire PhD education in Geography. These focus-group participants confirmed that a program focused on integrative dynamics would be most valuable in terms of providing a combination of quantitative, qualitative, and advanced research skills. They encouraged us to take the needs of part-time students seriously and to focus on paths to employment. The core curriculum design reflects this influence, as the third required course is explicitly focused on professional development, leading students to design and implement research in their chosen career focus area.

3.3.6 Student demand related to Innovate ABQ initiative

UNM has begun investing in its commitment to support economic development activities in the City of Albuquerque and throughout Bernalillo County by building a district for research and innovation within the city. The Innovate ABQ project – to be located at Central and Broadway – will serve as the core site to catalyze for this district. We anticipate that UNM Geography Masters and PhD students will both be drawn to Innovate ABQ as a research site, and will find their geospatial abilities in high demand by those collaborative projects that will be centered around the Innovate ABQ campus. Importantly, we anticipate that the presence of UNM Geography graduate students at Innovate ABQ will serve as a "living promotion" for our graduate programs, and will serve to bring students into the New Mexico Joint Doctoral Program who might not have otherwise considered doctoral level studies at UNM.

3.4 Evidence of Demand for Program Graduates

The U.S. Bureau of Labor projects that employment of geographers will grow 35 percent from 2010 to 2020, compared to 14 percent for all occupations. The Department of Labor also points to the emergence of geospatial technology as a field in high demand with enormous employment growth. In 2006, the National Research Council (NRC) published the results of a study that broadly assessed the field of mapping sciences in the U.S. In their report, titled *Beyond Mapping: Meeting National Needs Through Enhanced Geographic Information Science*,

the following recommendations (among others) were offered to justify advanced degree programs in Geographic Information Science (GIScience):

The country's colleges and universities must become more flexible if they hope to keep pace with the GIScience industry and with government programs (p.4)...Devising institutional arrangements that favor robust GIS/GIScience and funds necessary to sustain it will yield large dividends in the form of ready employment for undergraduates and advanced degree graduates (p.5)...To meet the need for trained GIS/GIScience professionals as well as an informed citizenry, education programs in GIScience should be implemented at all levels of education (K-20 with special attention at K-16) in the United States. These programs should cut across traditional disciplinary borders and employ the latest technologies. (p.5-6)

Michael Phoenix of Environmental Systems Research Institute (developers of the ArcGIS product line) similarly estimates that "the shortfall in producing individuals with an advanced level of GIS education is around 3,000 to 4,000 [annually] in the U.S. alone" (Phoenix, 2007, p.13). The Assistant Secretary for Labor and Training in the U.S. Department of Labor reports that, "87 percent of geospatial product and service providers...had difficulty filling positions requiring geospatial technology skills" (DeRocco, 2004, p.2).

Geography is in a different position from a number of other disciplines because the demand for trained geographers exceeds the supply. Awareness of the potential supply-demand imbalance was first reported in the mid-1990s and was one of the impetuses behind the National Research Council's 1997 *Rediscovering Geography* report (National Research Council 1997). Three years later Dr. Philip Suckling showed that, just within academia, there were more open positions than new geography PhDs (Suckling 2000). As the revolution in geospatial technologies gains momentum, the demand for geographic expertise continues to grow. Investment in geographical training and research is clearly critical if the possibilities of the geospatial technology revolution are to be realized.

Our own advisory board for the Department of Geography and Environmental Studies has identified a wide range of potential employers in New Mexico for graduates with advanced training in Geography. Based on board members' own professional networks and knowledge of regional employment needs in Albuquerque and beyond, they see great potential for UNM Geography grads to make an impact throughout the state. Table 3.5 summarizes the many employment categories and employers where the GES Advisory Board believes MS and PhD graduates would be welcomed as employees.

Table 3.5 Potential employment categories and employers in New Mexico

Employer Category	Agency/Example
Federal Government	Forest Service Bureau of Land Management National Park Service NASA NOAA CIA USGS Census Bureau FEMA Department of Transportation Homeland Security
National Laboratories	Sandia Los Alamos
State and Local Governments	Planning Departments State Engineer's Office Parks and Recreation Council of Governments Department of Transportation
Education	Public and Private Universities Public and Private Colleges Community Colleges Technical Colleges K — 12 Schools
Utilities	PNM Gas Company of New Mexico
Consulting	GIS Remote Sensing Mapping Environmental Analysis Market Analysis Location Analysis Research Polling Mining
Retail	Market Analysis Location Analysis
Other	Non-profit Organizations Film Industry

Developed 2013 by the Advisory Board for UNM Geography and Environmental Studies

3.6 Needs Assessment

See [Appendix F](#) for Department of Labor analysis of the nationwide need for increased geospatial education and training. No similar report has yet been formally published for New Mexico, although the New Mexico Geographic Information Council (NMGIC) recently conducted a statewide survey of employers to assess the need for new geospatial training and educational opportunities. This “Pathways” survey was completed in late 2015 and is now available as a draft white paper as [Appendix Z](#).

3.7 Workforce Development

Although a Bachelor's degree is the entry-level education for many of the occupations within the expanding geospatial employment sector, higher-level degrees are typical for holders of advanced positions, with a PhD most common at the level of research management, agency/firm leadership, and any scientific/academic position in higher education. Thus, the program provides workforce development for employees in many geospatial and environment-related positions in New Mexico. Large employers in New Mexico who typically require graduate degrees for advanced positions include Sandia and Los Alamos Laboratories, the University of New Mexico, and federal and state governmental agencies.

3.8 Research Grants Development

Creation of the New Mexico Joint Doctoral Program in Geography will significantly increase the ability of both institutions to generate external funding through sponsored research. By engaging with doctoral students who are training to undertake sophisticated multi-year research programs, program faculty will be able to demonstrate and rely on significantly augmented research capacity. This increased capacity, coupled with the fact that both UNM and NMSU are Hispanic-Serving Institutions can be expected to lead to significant competitive advantage in external grant competitions. An increase in sponsored research will return significant F&A to both universities

3.9 Methods for Establishing Demand for the Program

Given that the state of New Mexico does not currently have a PhD program in Geography, there are no existing surveys of student demand for this type of program. To establish initial predictions, we began by consulting our own advisory board to brainstorm whether New Mexico would benefit from the addition of an in-state PhD program in Geography. Table 5 was generated from that initial conversation, held in 2013. After working with our NMSU colleagues to develop a preliminary draft of the program structure and curriculum, we then conducted several additional methods to determine demand.

- We reviewed the employment placements of our own MS graduates over the previous 15 years, focusing specifically on rates of enrollment in PhD programs. Although we did not survey alumni directly, we relied on the institutional knowledge of two long-serving full professors to construct an anecdotal record of successful MS students who did NOT go on to PhD programs because they considered themselves place-bound in New Mexico.
- We then surveyed all of the geography departments at peer institutions of UNM and NMSU, as well as all geography departments who are members of the Southwest Division of the American Association of Geographers. This survey asked department chairs (or grad program directors) to characterize the demand from within their own undergrad and master's programs for additional geography education. We also asked them to provide enrollment rates and student characteristics as a proxy for the general trends we might experience in the New Mexico Joint Doctoral Program in Geography.

Additional information about this survey, along with summary data, is provided in Appendix H.

- We conducted a focus group and followup interviews with agency and industry representatives from across the state, many of them participants in the New Mexico Geographic Information Council (NMGIC) to get a better sense for both employment need and student demand that might come from NMGIC members and their professional colleagues working in geospatial fields. Additional information about this focus group, including a list of participants, is provided in Appendix G.
- Finally, we surveyed our own current cohort of MS Geography students to gauge overall interest in PhD study and to determine the potential application and enrollment demand that might be generated by our own successful Master's program. More information about this survey is provided in the Appendix I.

3.10 Duplication

There currently is no PhD program at any public or private institution of higher education in New Mexico. A number of institutions of higher education offer doctoral programs in Geography in surrounding states (Table 3.6), but none of these are accessible to New Mexico student via the WICHE professional student exchange or WICHE regional graduate program. Even when compared with neighboring regional institutions, the New Mexico Joint Doctoral Program in Geography will offer a unique programmatic focus within the Southwest Region.

Table 3.6 Geography PhD programs in the Southwest Region

State	University	Faculty Size	Total PhD Students,		Program Specializations
			In Residence	Graduated	
Arizona	U. Arizona	27	48	7	Broad Geography
	Arizona State U.	41	141 (all grads)	15	Broad Geography
Colorado	U. of Colorado Boulder	23	59	11	Broad Geography
	U. Denver	15	6	2	Broad Geography
Idaho	U. Idaho*	10	11	1	Physical Geog, Development, Remote Sensing, GIS
Nevada	U. Nevada, Reno	13	18	3	Remote Sensing, GIS Mountains, Deserts
Texas	Texas A&M	24	31	6	Human-Environment Interaction, Geog Education
	Texas State U.	34	57	11	GIS, Geography Education, Environmental Geography
	U. Texas Austin	16	28	8	Broad Geography
Utah	U. Utah	16	18	4	Urban, Economic, GIS

(Data Source: AAG's Guide to Geography Departments in the Americas, 2014-15)

4. INTER-INSTITUTIONAL COLLABORATION AND COOPERATION

4.1 Overview

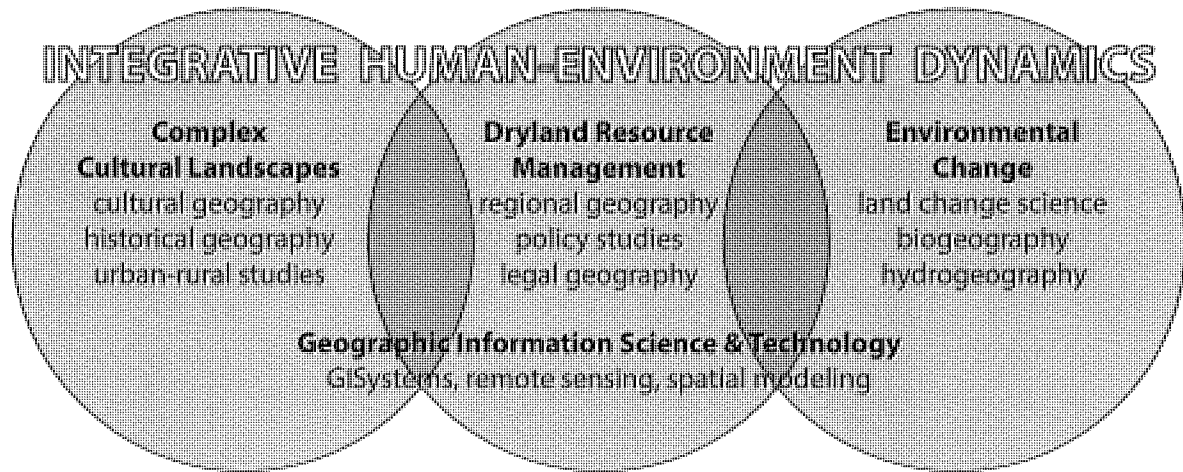
The New Mexico Joint Doctoral Program in Geography is designed as a fully collaborative and cooperative program between the geography faculties at the University of New Mexico and New Mexico State University. As described in the section on “Joint Program Delivery,” the curriculum and administrative structure are intended to include both institutions as equal partners in the development and delivery of the joint program. All specific agreements concerning institutional interactions are detailed in the Memorandum of Understanding, attached as Appendix V.

4.2 Leveraging Existing Strengths at UNM and NMSU

The existing graduate programs at UNM and NMSU focus on human-environment dynamics from a variety of perspectives, with strong master’s curricula and research programs that explore the changing human and physical environments of our world at multiple scales. The New Mexico Joint Doctoral Program in Geography will build on complementary strengths through a collaborative program that focuses on integrative human-environment dynamics in four primary areas: environmental change, aridlands resource management, complex cultural landscapes, and GIS&T. The joint doctoral program will leverage existing teaching strengths in a variety of theoretical and methodological areas, including both qualitative and quantitative methods. By building from existing strengths and seeking opportunities to direct scholarly inquiry toward matters of pressing regional interest, the joint doctoral program will provide significant benefits to New Mexico through its mission to prepare the next generation of resource managers, policy thinkers, geospatial innovators, professional scientists, and academic leaders who solve complex contemporary problems in dynamic environments.

As shown in the figure below, the existing combined strengths from UNM’s Department of Geography and Environmental Studies and NMSU’s Department of Geography have a synergistic nexus in interdisciplinary studies of human-environment dynamics, an area of scholarly inquiry that is driving current research agendas in this era of rapid environmental change. Our joint doctoral program will lay the foundation for a new generation of scholars and practitioners who are trained to understand human-environment interactions through interdisciplinary perspectives that consider not only environmental phenomena but also the human phenomena governed by knowledge production, transition regimes, resilience structures, and governance issues. In New Mexico and the Southwest region more broadly, these perspectives will be critical to developing and managing sustainable approaches to water, land, energy and other environmental resources for the future.

Our current programs are based in the expertise represented in the conceptual diagram below. The joint program will continue each program's growth in these strength areas by focusing on their intersection in human-environment dynamics as the foundation for an outstanding PhD education in Geography.



4.3 Agreements for Collaboration and Cooperation

The New Mexico Joint Doctoral Program in Geography has been developed through collaborative discussion between UNM and NMSU over the last several years. Conversation about a potential joint program was first initiated between the two department chairs in 2011-2012, and a small committee of departmental representatives from both institutions was then tasked with developing preliminary agreements and administrative structures in 2012-2013. Development of different aspects of the program proceeded throughout 2013-2014, based on communication between the two department chairs and within the two individual faculties. In fall 2014, we held a meeting of the two joint faculties to ensure that the joint program's basic structure and focus was in line with faculty expectations and commitments at both institutions. In spring 2015, we followed with an intensive two-day retreat, at which both faculties engaged in detailed strategic and logistical planning to support final development of the proposal document. This highly constructive and collaborative meeting engendered significant consensus across both faculties, which was carried into three cross-institutional working groups that collaborated distantly to evaluate both institutions' existing courses and finalize the proposed curriculum. The success of these joint efforts in 2015 provides a very positive view of the potential for further collaboration in program delivery.

The attached Memorandum of Understanding outlines the agreements that have been brokered at these various planning stages. The MOU document has been agreed by both faculties and vetted by administrative personnel at both institutions.

4.4 Procedure for Submission of the Joint Program Proposal

Separate proposals for the New Mexico Joint Doctoral Program in Geography will be submitted concurrently at both UNM and NMSU. Although the program description in these two proposals is substantially identical, the proposal documents follow different formats, as required by the two institutions' different procedures for review and approval. These proposals also differ in that they emphasize the impact on each institution's individual finances, students, and existing academic programs. The regents at NMSU have already approved the NMSU proposal (refer to memo included as the first entry in Appendix X) and are currently waiting for news regarding UNM's institutional decision. If approved at both universities, the two proposals will then proceed through the state-level review jointly, along with the Memorandum of Understanding attached as Appendix V.

5. CLIENTELE AND PROJECTED ENROLLMENTS

5.1 Overview

Between the growing number of students who are attracted to an integrative approach to human/environment relations in as empirically rich a setting as New Mexico, and those students who are otherwise tied to New Mexico but have had to leave to pursue PhD studies, the Joint Doctoral Program in Geography will be able to attract a steady stream of students. We will uphold the quality of the program through a combination of rigorous admissions standards and procedures. We will implement a targeted recruitment plan that is designed to ensure a vibrant student body by (a) attracting and serving talented New Mexico residents who currently have to forgo doctoral education in Geography or move outside the state and (b) attracting outstanding new students to New Mexico.

5.2 Clientele

The New Mexico Joint Doctoral Program in Geography will draw its students from several discrete populations. Most obviously, the Program will attract a very specific, but increasingly common type of PhD candidate. As we have observed in the course of developing our Masters program over the past decade, there is a growing population of students whose academic trajectories are deeply engaged in human-environment dynamics, who are eager to rigorously delve into the research and theoretical insights that geography has to offer, yet who are also concerned with the applied ramifications of their research. For these students, the New Mexico Joint Doctoral Program in Geography would provide a unique opportunity.

Within New Mexico, we have a substantial body of Masters-level students at both UNM and NMSU who would like to continue their research in New Mexico in preparation for either academic, scientific, or policy related careers. At present, these students have no choice but to leave New Mexico to pursue a PhD. There is also steady demand for doctoral level education from professionals at Sandia and Los Alamos National Labs and similar organizations who would like to pursue a PhD degree for professional advancement. While these institutions have long been a source for Masters students at UNM, we have had to turn students seeking PhD's away.

By actively focusing learning and research in the areas of environmental change, dryland resource management, and complex cultural landscapes we will provide a set of foci that have already proven to be very attractive for out-of-state students. Moreover, the multicultural, high-desert setting of the partner institutions provides a powerful draw for students who are engaged in questions of human-environment dynamics, offering a rich and often under explored set of research sites upon which to build a subsequent career as a professional academic. Unlike most doctoral programs in Geography, the Program will also

emphasize preparation for non-academic career paths, and is thus expected to draw students from around the U.S. who are interested in using the in-depth study and research of a PhD program as a means of either beginning or furthering existing careers as resource managers, policy thinkers, geospatial innovators, or professional scientists.

5.3 Admissions Requirements

To be admitted to the New Mexico Joint Doctoral Program in Geography, applicants must have a master's degree in Geography or a related field, with demonstrated professional research capacity as a fundamental expectation. GPA and GRE scores must be submitted but will not individually determine whether an applicant will be admitted. International students are expected to demonstrate proficiency in English through the TOEFL or a phone interview. All candidates will submit three letters of reference and a letter of intent that explains the student's purpose in undertaking graduate work, details the student's research interests, and identifies a desired advisor at the primary (home) institution as well as a primary sponsor at the partner institution.

5.4 Admissions Expectations to be Published for Applicant Consideration

The most competitive applicants to the New Mexico Joint Doctoral Program in Geography will show evidence of having a thesis completed or in progress in geography or related discipline. In addition, special attention will be paid to following elements of the application:

- GRE scores and grades: We will not admit or deny applicants on the basis of GRE or GPR scores; rather, we will aim to consider the applicant as a whole. For guidance, our average GRE score is expected to be around 300 combined (or 1200 combined verbal and quantitative on the old scale).
- Statement: applicants' statements should consist of an essay describing past experiences relevant to the joint doctoral program and should indicate a proposed research topic in integrative human-environment dynamics. Applicants will be strongly encouraged to contact faculty with whom they share research interests, and they should explicitly identify which faculty members at each institution they would desire as sponsors in the joint program. Strong essays that provide an argument for why an applicant seeks graduate study in our program, making reference to specific faculty expertise, will be favored.
- Letters of recommendation: Letters of recommendation will be encouraged to be provided from academic referees, rather than previous employers. Letters from supervisors at workplaces involving issues relating directly to a student's planned PhD course of study will also be welcomed.

5.5 Recruitment

Recruitment for the New Mexico Joint Doctoral Program in Geography will focus on three different sets of potential PhD students, each with its own set of strategies for attracting top candidates.

The first population for targeted recruitment will be potential students who already have ties to New Mexico, including graduate students from the partner institutions, professionals at major National Labs, personnel at geography-intensive organizations and businesses in New Mexico, and students from Central University of Ecuador (UCE) who are enrolling at UNM as part of an institutional partnership to increase the number of UCE faculty holding PhD credentials. (See Section 3 for a more detailed discussion of the student demand likely to come from this program.) This communication will take place through direct contact with larger institutions, a careful attention to programmatic website design and content, presence at regional conferences, and a continual effort to target outstanding undergraduate and masters students from departments across the two partner campuses, including Geography, Anthropology, Chicano Studies, American Studies, Biology, Community and Regional Planning, and the like. Funding packages will be offered to the most outstanding candidates in an effort to combat "brain drain" away from New Mexico.

The second population we will focus upon for recruitment is Masters level graduates of geography programs outside of New Mexico who may not be familiar with the unique offerings of the Program. Recruitment of these students will focus on outreach and inducement. Outreach will take the form of an active presence at both national (Association of American Geographers) and regional (Southwest Association of American Geographers) conferences. This presence will include information and promotional tables, and hosting a regular annual party. Inducement will take the form of competitive PhD funding packages that are structured such as to create equal incentives for students to choose to primarily study at UNM and/or NMSU. Once sufficient faculty resources are developed to ensure the sustainable delivery of PhD level curriculum, we will allocate any additional programmatic resources to expanding the number and attractiveness of these packages so as to ensure UNM's competitiveness in attracting outstanding PhD students.

Finally, we will focus on communicating the specialties and opportunities provided by the New Mexico Joint Doctoral Program in Geography to those students without a conventional background in Geography, but for whom the New Mexico Joint Doctoral Program in Geography would be an ideal fit for their intellectual and professional development. In particular, we will seek to attract students from academic fields that will enable us to recruit graduate cohorts that more closely reflect the population of New Mexico as a whole. Accordingly UNM will begin to have a regular presence at such trans-disciplinary conferences as the Native American and Indigenous Studies Association, and the National Association for Chicano and Chicana Studies, including hosting an informational table. And as with students from more conventional Geography backgrounds, we will use and expand the use of competitive funding packages to attract top candidates.

Once the program is well established based on enrollment from these initial target populations, we envision undertaking a detailed analysis of the potential for expansion through targeted recruitment of international students.

5.6 Projected Enrollment

Once the New Mexico Joint Doctoral Program in Geography is well established, we anticipate having over 20 PhD students enrolled across the two universities, with 4+ PhD degrees being granted each year. It will take 4 to 5 years to establish the program, however, and we anticipate admitting 5 or fewer students into the program each year. Therefore, it will take at least 4 years before we have 20 PhD students in residence, and not all of these students will be full time.

Table 5.1: Six-Year Enrollment Projection for UNM Students

Timing	New Students		Returning Students		Total Headcount		Student Credit Hrs
	Fulltime	PartTime	Fulltime	PartTime	Fulltime	PartTime	
Year 1	2	1	0	0	2	1	45
Year 2	2	1	2	1	4	2	90
Year 3	2	1	4	2	6	3	135
Year 4	2	1	6	3	8	4	180
Year 5	2	1	8	4	10	5	225
Year 6	2	1	8	5	10	6	234

The following assumptions were used in estimating enrollment and student credit-hour generation at UNM:

1. We assume that five students per year will enroll in the New Mexico Joint Doctoral Program in Geography, with 3/5 of these students based at UNM and 2/5 based at NMSU on average.
2. Full-time enrollment is estimated at 9 credit hours per semester, or 18 credits per year, although we acknowledge that actual credit hours may vary widely among individual students, depending on their program stage/progress.
3. Part-time enrollment is estimated at 4.5 credit hours per semester (since some students will enroll in 3 credits and others will enroll in 6 credits while attending part-time), or 9 credits per year.
4. Full-time students are expected to complete the program in five years and are not counted as returning for a sixth year. .
5. Part-time students are expected to complete the program in an 8-yr average.
6. Although some students based at UNM will take courses offered by NMSU (thus generating tuition dollars at UNM but generating student credit-hours at NMSU for purposes of the funding formula), we assume that cross-enrollments in the joint program will be more or less offsetting between the two institutions. Therefore, the estimates for student credit hour generation at UNM do not reflect any adjustments related to cross enrollment.

6. INSTITUTIONAL READINESS FOR THE PROGRAM

6.1 Overview

While departmental resources at UNM –including faculty, staffing, and space – are currently at or near maximum capacity, careful management and the modest addition of resources in each category over time will allow the Department of Geography and Environmental Studies to expand its institutional readiness for the PhD program as enrollments grow. Specifically, the Department has planned for the phased addition of a new faculty member, several new TA lines, a new staff position, and expanded facility space over the first six years of the program so as to meet our expanded programmatic load with expanded capacity.

6.2 Faculty Size

As shown in Table 6.1, there are 57 geography programs in the United States that grant a PhD in Geography. The average-size PhD program has 16.5 faculty members, 29 PhD students in residence, and graduates 4.4 PhD students per year. The average PhD program in the western half of the United States is not significantly different from the country as a whole.

Table 6.1 PhD Programs in Geography mean faculty, enrollments and degrees granted

Category	N	Mean # of Faculty	Mean PhD Students in Residence	Mean Annual PhD Degrees Granted
All Programs	57	16.5	29	4.4
Western Programs	24	16.9	32	4.0
Established Post 1880	19	15.3	22	4.6
Established Post 1996	14	14.7	23	4.7
Established Post 2006	6	13.5	15	.2

Source: Guide to Geography Programs in the Americas, 1980-2012.

As mentioned above, The Department of Geography and Environmental Studies at UNM currently has 13 tenure and tenure track faculty members, and the Department of Geography at NMSU has 5 tenure-track faculty members, providing a combined total of 18 faculty members. (Each department currently also has one visiting faculty member.) Although this is above the national average of 16.5 faculty members for all programs in the U.S. that offer a PhD in geography, we expect that we will need to add a minimum of one additional faculty line at UNM to teach necessary courses and to provide adequate teaching, mentoring, and research capacity for a complex doctoral program that requires significant faculty coordination across two institutions. For a more direct reference than the national average of all Geography PhD programs: the University of California Santa Barbara/San Diego State University joint PhD program – the only other U.S. joint doctoral program in Geography – has a total of 39 faculty between the two campuses, graduating an average of 4.8 PhD's per year over the past five years.

6.3 Impact on Current Workloads for Faculty

Geography and Environmental Studies faculty at UNM are currently carrying standard workloads for faculty in research-intensive departments that support undergraduate and master's-level graduate programs. The New Mexico Joint Doctoral Program in Geography is expected to increase existing faculty workloads in the areas of advising, mentoring, research supervision, and course development. The program will therefore require two primary forms of additional support: [1] Additional instructional capacity will be needed to support the launch of new courses as well as research-related course releases for some faculty. [2] Additional support resources will be needed to compensate for the increase of faculty time devoted to advising, mentoring, and supervision. These needs will be met through the funding of new GA lines and a new staff position, respectively.

The attached course rotation for 2015-2022 (Appendix L) shows projected course assignments for GES faculty over the next seven years. During this time, we expect to maintain existing graduate course offerings at their current frequencies to support the MS program, and we project that we will begin phasing in PhD-specific offerings as early as Fall 2018. At the same time, we expect continued growth in our undergraduate program, which will require increasing the frequency of some of our required undergraduate courses over time (e.g. GEOG195, GEOG471, and 100-level online courses that meet General Education "core" requirements). Although some of this growth will be eventually be absorbed by assigning advanced PhD students to teach undergrad courses, it is critical that we meet increased need for teaching capacity in GIScience with an additional tenure-track line.

This planned expansion is fully described in the most recent GES hiring plan (see Appendix M) and has received a commitment of support from the Dean of Arts & Sciences (see Appendix U).

6.4 Impact on Current Workloads for Staff

UNM's Department of Geography & Environmental Studies currently has two staff positions:

1. Our *Network Tech* position is funded by course fees to support the operation and maintenance of the Spatial Computing Lab, the Physical Geography equipment checkout facility, the grad student office computers, and other instructional facilities. Because this is a fairly new position in GES, significant workload is now dedicated to the creation and implementation of improved networking systems that improve security and better support instructional needs. In the next two years, however, this "startup" workload will begin to ease somewhat. At that time, this position will be able to absorb some additional workload related to the expansion of the curriculum and grad/undergrad student populations. Depending on how the new joint doctoral program's engagement with distance learning technology evolves

over time, it is possible that tech-support workload would increase beyond the capacity of a single position. At this time, however, we are confident that the existing Network Tech position will be sufficient to support the program launch without an excessive increase in workload.

2. Our *Department Administrator*, on the other hand, is already carrying a maximum workload to support our research-active faculty and growing master's program. Because it is not feasible to add any additional workload to this position, a second staff position will be needed to support the joint doctoral program.

6.5 Required Resources

6.5.1 Faculty Lines

As shown in our most recent hiring plan (Appendix M), we expect to add one net tenure-track faculty line to support an expanded range of courses for the UNM-based PhD students in the New Mexico Joint Doctoral Program in Geography. (We additionally intend to (a) convert a Visiting Professor to an Instructor who can support the separate geospatial entrepreneurship online program, and (b) replace an Environmental Studies professor who has just gone on leave and may possibly depart UNM permanently.) The new hire will also contribute to the undergraduate curriculum, allowing us to increase the frequency of some courses, to expand the enrollment caps in others, and to resurrect some courses in our catalog that have not been taught regularly due to recent retirements that were not directly replaced.

6.5.2 Staff Lines

A program coordinator will be required to provide administrative support in the areas of student registration (admissions, enrollment, and transcription), student advising (re committee formation, program of study, and career planning), and student/faculty research support (for grantwriting, for conference travel, and for publications). This program coordinator will be housed at UNM but will provide support to all doctoral students across both campuses. Because the program coordinator will require specialized expertise in research support, it will not be an entry-level position.

6.5.3 GA/TA Lines

A minimum of six additional GA lines (3.0FTE) is requested at UNM, both to provide consistent recruitment packages for prospective students and also to provide relief for current faculty teaching workloads. As shown in the projected course rotation, we propose phasing in the six TAs over the first three years of the program. They will be assigned primarily to cover lab sections for the GIS&T courses or to support large-enrollment intro-level courses. This teaching support will improve the GES undergraduate curriculum while also allowing faculty to devote increased time to grant writing, research, and advising and mentoring of doctoral students.

GES currently has five recurring TA lines (2.5FTE) that are critical to the recruitment of competitive MS students, along with a variable number of externally-funded RA and PA packages (see Table 7.2 for exact numbers). We will reallocate three of these existing lines (1.5FTE) over the first three years to support PhD students instead of MS students. This will bring the total number of fixed TA packages for PhD students to nine (4.5 FTE), allowing us to offer three-year packages to three students per year. This matches our generalized projection for student enrollments at UNM in the program's early years, and will be augmented by the availability of externally funded RA packages. Grant-funded RA positions will be used (1) to support PhD students who have already completed their three-year funding packages, (2) to maintain current levels of MS recruitment, and (3) to support students whose professional interests are better matched with research than with teaching.

6.5.4 Faculty and Staff Development Services

The New Mexico Joint Doctoral Program in Geography will require minimal investment in faculty support beyond the standard services typically offered to new faculty in the Department of Geography & Environmental Studies, e.g. robust startup packages, conference travel funds, and campus-wide training opportunities for junior faculty. The department's anticipated increase in externally-funded research activity, however, will necessitate that staff are trained in research support activities. UNM already provides ample opportunity for this kind of training, which does not incur costs for existing staff.

6.5.5 Technology, Media, Equipment and Instructional Supplies

As discussed in the section on curriculum, effective delivery of this joint program will hinge on our ability to offer numerous courses to doctoral students at both campuses simultaneously. We will therefore need to significantly expand our engagement with distance learning resources. We intend to develop this new capacity in a phased manner, as explained in the section on Quality of Program ("Instructional Models"), relying first on a variety of existing resources and then building toward the development of specific equipment and technology resources that are tailored to support the program as it matures.

Due to the rapid pace of technological change, it is hard to predict the exact technologies that we will be using in 2018 and beyond. In general, however, we plan to use existing technologies and facilities at both UNM and NMSU in our pilot-phase testing, and we will work with Extended Learning as we develop a long-term strategy for the program's use of distance learning technologies. For the next few years, we expect that our pilot-phase testing will take advantage of existing technologies that support a few basic structural models:

1. **Videoconferencing:** At the most basic level, some of our classes will take advantage of the simple ability to connect two or more physical spaces via videolink. Both UNM and NMSU currently provide dedicated classroom spaces that are capable of videoconferencing links, and both institutions use Adobe Connect. At NMSU, the AdobeConnect software integrates with the campus Learning Management System, Canvas, which has been renewed for

at least the next 5 years. Although this software has suboptimal performance in low-bandwidth environments, we are confident that both UNM and NMSU provide the necessary facilities and support to make this a reasonable option for courses that would need to take advantage of videoconferencing as a pedagogical tool in the short term.

2. **ITV:** Although ITV is no longer a primary model for distance learning, its successor technologies are still relevant under the original model: where a “parent” class is offered at the home institution and is synchronously broadcast to facilities in other physical locations where students gather to interact with the parent class and instructor from a distance (e.g. in ITV facilities at branch campuses and community colleges). Both UNM and NMSU have ITV classrooms that can still be used for this purposes, although the structure we have envisioned would necessitate our use of these facilities for a videoconferencing arrangement, rather than a true ITV broadcast model.
3. **Broadcast to desktop:** This ITV successor technology allows not only for broadcast to existing physical facilities in other specific locations but also for broadcast directly to individual desktops, so that both instructor and students can be in any location but still participate in direct video links that facilitate teaching and learning in an enhanced digital environment. UNM is currently using Zoom cloud-based software for this purpose, and its successful implementation by Project ECHO (HSC) shows that it works well in low bandwidth environments.
4. **LMS-based systems:** Although UNM and NMSU do not currently use the same LMS software, we expect that LMS-based systems at each institution (Canvas-based Adobe Connect at NMSU and Blackboard Collaborate at UNM) will be relevant for distance learners in individual courses.

Although it is possible that UNM’s Department of Geography & Environmental Studies might eventually consider developing its own in-house facility to support distance-learning needs within the joint PhD program, we do not envision that development of costly new in-house classroom facilities is a prerequisite for establishing a healthy program. In fact, we believe that UNM’s existing plans to expand distance-learning options across campus are likely to “stay ahead” of program needs, providing relevant technical expertise, pedagogical support, and facilities planning to support a robust expansion of distance offerings over time.

6.5.6 Library Resources

The New Mexico Joint Doctoral Program in Geography can be launched without requiring the acquisition of significant new library collections. Since the proposed program’s areas of research and teaching specialization overlap with existing specializations on both faculties, the two universities’ library collections are substantially sufficient with regard to the breadth of content related to human-environment dynamics and Geographic Information Science & Technology. Future additions of new faculty may require increased collection depth in specific areas of specialization, but we do not anticipate that such needs would depart from the normal collection adjustments that typically occur when new faculty members arrive at UNM.

The addition of a PhD program will necessitate the addition of new methodological courses, however, which may require some additional library materials. Specifically, we anticipate that faculty and students will need access to materials focused on integrative research, mixed qualitative-quantitative methods, and the integration of theory and praxis in research design. Since these are generic methodological topics and are not specific to Geography & Environmental Studies, it is possible that relevant and sufficient materials are already contained in UNM's library collection. We will therefore rely on the library impact statement to clarify any need for additional acquisitions in this regard.

6.5.7 Additional and Renovated Space

Our primary space needs to support the program include: upgraded infrastructure for the Spatial Computing Lab (for instruction) and the GEM Lab (for research), additional office and research space for three new faculty members and one new staff person, and a renovation of our graduate student office space.

- Upgraded Space: The 23-seat Spatial Computing Lab is used for classroom courses in cartography and geovisualization, remote sensing and image analysis, and geographic information systems and technologies. The 6-seat GIScience for Environmental Management (GEM) Laboratory is a dedicated research facility that supports both faculty and student projects in GIS and remote sensing data processing and analysis. The GEM lab currently hosts 6 research computers, a dedicated server infrastructure that supports 40TB of Raid 5 data storage and a shared high performance data processing server, and multiple software licenses. These two labs offer a good foundation for computing needs within the proposed PhD program, but significant repairs and updates to both electrical and IT infrastructure will be required before the program launches. Existing CAT-5 wiring needs to be upgraded to CAT-6, and electrical infrastructure needs to be brought up to code.
- New Space: New offices and research spaces will be required to support our three additional faculty members and their scholarly projects. At present, we are in conversation with the designers of the new Physics, Astronomy, and Interdisciplinary Sciences (PAIS) Building, who have explicitly included GES in their preliminary space plan. The current conceptual design for PAIS includes a research cluster area that could support two faculty-led research groups. If this building is indeed constructed as currently envisioned in these early plans, the space set aside for GES will help support our faculty growth, minimizing the need for excessive expansion within our current home, Bandelier Hall. It is likely, however, that we will need to seek at least three new offices: for the third faculty member, for his/her research group, and for the new staff Program Administrator. This will be pursued through the Real Estate office at the appropriate time.
- Renovated Space: Our current graduate office suite in Bandelier East (rooms 107, 109, 111, and 111A) is in serious disrepair and must be renovated before the New Mexico Joint Doctoral Program in Geography launches. To serve the

expanded ranks of our TAs, RAs, and editorial and project assistants, the space must be reconfigured, refurnished, and infrastructurally improved. A proposal was recently submitted to GPSA to renovate this space as a "Graduate Research Commons" with a dedicated computing facility, collaborative research/meeting space, and office facility with individual desks. Although the likelihood of GPSA funding is unknown, we plan to continue seeking funding for this project to ensure that it is complete before the PhD program launches.

6.6 Use of External Facilities

Delivery of the New Mexico Joint Doctoral Program in Geography will necessarily include the use of facilities at New Mexico State University, since students will be able to take courses at either institution. Agreements regarding the two institutions' shared commitment to this program are included in the Memorandum of Understanding. Although there is some additional possibility that joint meetings of the UNM and NMSU faculties and doctoral students may take advantage of facilities external to either department, there are no current agreements in place in this regard.

7. PROJECTED COST OF THE PROGRAM

7.1 New Costs

As described in Section 6, "Institutional Readiness for the Program," most of the resources needed for the New Mexico Joint Doctoral Program in Geography are already in place. Startup costs will be required to address a few pressing facilities issues, but most of the costs of the program will be recurring costs associated with the addition of faculty, staff, GA/TA lines, student recruitment funds, and a slight increase to the department operating budget. Table 7.1 shows a projection of these costs over the first six years, broken down by category.

Table 7.1 Projected New Costs, First Six Years (existing personnel/resources not included)

Category/Item	Year 1 ¹⁵	Year 2	Year 3	Year 4	Year 5	Year 6
Faculty: One Expansion Line¹⁶						
Open-Rank Hire: Geographic Information Science (search to be conducted before program begins)						
Faculty search	\$3,000					
Startup package	\$30,000					
Salary	\$85,000	\$86,700	\$88,434	\$90,203	\$92,007	\$93,847
Fringe Benefits	\$30,260	\$30,865	\$31,483	\$32,112	\$32,754	\$33,409
Staff: Program Coordinator Line¹⁶						
Grade 10 Midpoint	\$42,494	\$43,344	\$44,211	\$45,095	\$45,997	\$46,917
Fringe Benefits	\$15,128	\$15,430	\$15,739	\$16,054	\$16,375	\$16,702
Student Funding: Stipend/Benefits for Six New GA/TA Lines (3.0FTE)¹⁷						
Funded by A&S: 1.5FTE	\$42,116	\$65,467	\$67,829	\$70,269	\$73,096	\$75,713
Funded separately: 1.5FTE		\$21,822	\$67,829	\$70,269	\$73,096	\$75,713
Other						
CAT-6 Wiring upgrade, BAE	\$25,000					
Targeted Recruitment ¹⁸	\$2,500	\$2,600	\$2,704	\$2,812	\$2,925	\$3,042
Operations Increase ¹⁹	\$2,500	\$2,600	\$2,704	\$2,812	\$2,925	\$3,042
TOTAL	\$277,998	\$268,828	\$320,933	\$329,626	\$339,175	\$348,385

7.2 New Revenue

New revenue is expected from a variety of sources. As described below, some of this new revenue is already committed, while other sources are either projected or are still in development.

¹⁵ Assumes AY2018-19 as Year 1.

¹⁶ Faculty and Staff salary projections assume 2% annual cost-of-living increase.

¹⁷ GA/TA funding package amounts are projected from current minimum stipends/benefits, with percentage increases described in Appendix R. A&S funding will be used to add two lines in the first year (1.0FTE) and a third line (0.5FTE) in the second year. Non-A&S funding will be sought to add three additional lines (1.5FTE): one in the second year and two more in the third year.

¹⁸ Cost of flying top applicants to UNM for "recruitment weekend," includes 4% inflation increase.

¹⁹ Required to cover travel costs for program coordinator and designated faculty to attend annual meetings of the program's Joint Steering Committee. Includes 4% annual inflation increase.

7.2.1 A&S Commitments

The College of Arts & Sciences has committed to expand the GES faculty size by one tenure-track line, add one staff line, and fund three GA/TA lines (1.5 FTE) of the six required. See Appendix U for the dean's commitment letter.

7.2.2 F&A Increases

Because of the broad and interdisciplinary nature of scholarship in Geography, there is high variability in individual scholars' external funding productivity. In general, GES faculty members who work in sub-fields aligned with the humanities or social sciences (e.g. Brulotte, Carr, Duvall, Hadjilambrinos, Lane, Milstein, Smith,) are expected to generate significantly less external funding than those who work in the GIS&T-related subfields (e.g. Freundsuh, Lin, Lippitt, Lippitt, Warner).

Before 2008, GES did not have a faculty member focused on GIS&T and was therefore a small producer in terms of F&A. With the hire of Paul Zandbergen in 2007, however, the department's grants activity immediately began to increase, generating important F&A revenues as well as funding lines for multiple student RAs (see Table 7.2). Dr. Zandbergen's subsequent leave from UNM (beginning in early 2012) had a quick depressive effect on F&A revenues that was not recovered until after the hire of Dr. Chris Lippitt in 2012-2013 and of Dr. Caitlin Lippitt in 2014-2015.

Table 7.2 Historical Grants Activity in GES (2007-2017)

	New Awards	Total Grant Spending	GA Lines Funded	Total F&A Generation	F&A Returned to GES Dept
FY08	1	\$97,402	4	\$17,153	\$1,503
FY09	3	\$99,672	3	\$25,215	\$3,877
FY10	3	\$145,145	5	\$38,407	\$2,041
FY11	3	\$123,045	4	\$38,101	\$4,506
FY12	2	\$156,690	4	\$49,869	\$7,705
FY13	1	\$34,562	0	\$5,480	\$767
FY14	0	\$10,865	0	\$0	\$0
FY15	2	\$145,768	3	\$41,051	\$5,988
FY16	1	\$541,716	6	\$65,562	\$9,033
FY17	6	\$251,314	8	\$42,474	\$5,054

The figures shown above for FY17 represent the minimum GES grants activity expected in any future year, given current faculty size and composition. We project growth in external funding productivity over the next five years, based on (a) the recent addition of three new faculty members in Environmental Studies who have active sponsored-research agendas, (b) the pending addition of one new faculty member in GIS&T, who will be expected to demonstrate significant research productivity, and (c) the addition of a PhD program that provides significantly increased capacity to engage in sponsored research. Table 7.3 provides a conservative projection of these increased revenues, with assumptions as shown in the bullet points below.

Table 7.3 Projected Grants Activity in GES, 2017-2023

	New Awards	Total Grant Spending	GA Lines Funded	Total F&A Generation	F&A Returned to GES Dept
FY18	4-6	\$300,000	9	\$75,000	\$4,500
FY19	4-6	\$330,000	10	\$82,500	\$4,950
FY20	4-6	\$363,000	11	\$90,750	\$5,445
FY21	4-6	\$381,150	11	\$95,288	\$5,717
FY22	4-6	\$400,208	11	\$100,052	\$6,003
FY23	4-6	\$420,218	11	\$105,054	\$6,303

- F&A generation is projected as 25% of total grant expenditures, the historical average for GES during the time period shown in Table 7.2. This is a conservative projection, given UNM's standard rate for indirect costs of 51%.
- The portion of F&A revenue returned to the department **historically has been about 12%** of total F&A generated, during the time period shown in Table 7.2. **Given recent news that A&S will change its F&A distribution model and may standardize PI returns, however, we are cutting this projection in half for future years to ensure this is a conservative projection. We have no way of knowing whether this is a realistic scenario, as the distribution model has not been announced.**
- FY18: We are currently on track to generate ~\$300K in grant spending **for FY18**. We hired a new Assistant Professor in August 2016 (Lin) and added three faculty by internal transfer (Smith, Brulotte, Milstein) between January and August 2017, but **most of them are still getting settled and are still working on proposals.**
- FY19: We project that external funding will grow by about 25% in FY18 when the new personnel begin to lands their first grants. Existing faculty members' sponsored research activities are again conservatively projected to hold steady at levels similar to the prior year.
- FY20: We project a 50% increase in sponsored research in FY19, due to the increasing maturity of the new hires and their transition to research-intensive expectations within GES.
- FY20: We project a 10% increase in FY20 due to the addition of an open-rank hire with expertise in water-related GIS&T research. (See Hiring Plan for details, appendix M.) We expect that the water-related hire will be a mature researcher who transfers external funding to UNM immediately upon arrival.
- FY21: We project another 10% increase in FY21 due to a general increase in the department's capacity to undertake sponsored research, based on addition of the new joint PhD program.
- FY22 and beyond: For purposes of budget projection beyond FY21, we assume a small 5% increase per year in sponsored research funding. **Since we have already had a single year with a higher level of grant spending than any of the years projected into the future, we assume that these are reasonably conservative projections.**

New F&A revenues will be used not only to seed new faculty research activities but also to support the PhD program in the areas of student recruitment, conference travel support, and professional development activities. Of the new costs shown in Table 7.1, new revenues from F&A will be used to cover all non-facilities items currently listed in the category of "Other" and may also be used to

fund 1.5FTE in student funding, depending on whether direct grant funding sources.

7.2.3 Course Fees

The unique delivery of core courses GEOG601 and GEOG602 will require the UNM instructor and students to travel once per semester to Las Cruces for a joint meeting with the students/instructor from NMSU, as described in Section 2 on “Program Description and Purpose.” (Students from NMSU will also travel to Albuquerque once per semester, and the funding for that travel will be handled separately by the Department of Geography at NMSU.) Funding for these costs at UNM will be covered through student course fees (estimated roughly at \$75 per student in each of these two courses) and are not included in Table 7.1 above. Other course-specific fees are similarly excluded from the budget shown, e.g. our \$30 standard fee for graduate courses taught in the Spatial Computing Lab.

Table 7.4 Six-Year Projection of New Tuition Revenue at UNM²⁰

Timeline	In-State Students ²¹		Out-of-State Students ⁴		Total Tuition
	SCH	Tuition	SCH	Tuition	
Year 1	30	\$8,094.68	15	\$13,664.43	\$21,759.11
Year 2	60	\$16,513.15	30	\$27,875.44	\$44,388.59
Year 3	75	\$21,054.27	60	\$56,865.90	\$77,920.17
Year 4	90	\$25,770.43	90	\$87,004.83	\$112,775.26
Year 5	105	\$30,666.81	120	\$118,326.57	\$148,993.38
Year 6	108	\$32,173.86	126	\$126,727.76	\$158,901.62

7.2.4 Tuition Revenue

Based on the projected enrollments outlined in Section 5, “Clientele and Projected Enrollments,” we anticipate that the New Mexico Joint Doctoral Program in Geography will generate tuition revenues as shown in Table 7.4. Please note that this table shows direct tuition dollars generated. It does not include mandatory fees, and it does not project the extent to which these tuition revenues may influence the state funding formula that determines UNM’s I&G allocation on an annual basis. Given that this formula changes based on decisions at the state level and is therefore impossible to predict from the departmental level, we have determined that it is more instructive to provide a straightforward

²⁰ See Table 5.1 for original assumptions about student credit-hour (SCH) generation at UNM.

²¹ Assumption is that 2/3 of entering students in the first two years will be in-state students, with 1/3 from out of state. In the third and subsequent years, we assume that this proportion will reverse and that 2/3 of new students will come from outside New Mexico, while 1/3 will be drawn from locations within the state.

²² Tuition projections start from the published tuition rates in 2015-2016 and apply a 2% increase per year. Year 1 in this table is assumed to be 2018-2019, thus starting with the following rates (\$269.82/SCH for in-state students and \$910.96/SCH for out-of-state students). See Appendix P for full six-year projection.

projection of total tuition generated, rather than an estimate of formula-based returns to UNM.

We have *not* projected any specific increases in undergraduate enrollments, although we expect to see substantial increases in these revenues. Due to the addition of new faculty members and PhD-level GAs who are capable of serving as instructors in their final years, we expect to expand our undergraduate curriculum by adding a number of additional courses. Although these courses will not be part of the joint PhD program, the additional tuition revenues they generate will of course be attributable directly to that program.

7.3 Overview of Financial Projections, First Six Years

The New Mexico Joint Doctoral Program in Geography will take advantage of existing resources in UNM's Department of Geography & Environmental Studies (e.g. computing facilities, faculty, and staff) while simultaneously augmenting some existing revenue streams that are actually external to the PhD program itself (e.g. by contributing to ongoing enrollment expansion at the undergraduate level). Rather than providing a budget projection that includes all of these interlinked departmental finances, however, we have instead projected only the new costs and revenues/commitments that are related to the PhD program itself.

As shown in Table 7.5, we expect that all new costs can be offset through a combination of college-level funding reallocation and by department-level F&A generation. The College of Arts & Sciences has already committed to provide funding for the search, startup, and salary expenses for the new faculty, staff, and GA lines described above and shown in Table 7.1 As described in the commitment memo by A&S Dean Mark Peceny (Appendix U), this funding will be generated through a reallocation of existing A&S resources; no new funding is required by the college or department. The department will additionally commit F&A funds for all new operational and recruitment costs, as described above, and will either use departmental F&A funds or seek external funding sources for (a) facilities upgrades and (b) additional GA lines to augment those provided by A&S, as shown in separate row in Table 7.1 that denotes addition of GA lines beyond those funded by A&S.

Table 7.5 shows that we expect the program to generate small amounts of new revenue in each of its first six years, as the combination of new A&S allocations to the department and the generation of new F&A will slightly exceed projected program costs.

Table 7.5 Six-Year Projection of Program Finances

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<i>Projected New Costs</i>						
Startup	\$58,000	\$0	\$0	\$0	\$0	\$0
Recurring	\$219,998	\$266,828	\$320,933	\$329,626	\$339,175	\$348,385
Total	\$277,998	\$268,828	\$320,933	\$329,626	\$339,175	\$348,385
<i>Projected New Revenues</i>						
A&S reallocation	\$247,998	\$241,806	\$247,696	\$253,733	\$260,229	\$266,589
F&A generation	\$75,000	\$82,500	\$90,750	\$95,288	\$100,052	\$105,054
Total	\$322,998	\$324,306	\$338,446	\$349,021	\$360,281	\$371,643
<i>Projected Balances</i>						
Revenue minus cost	\$45,000	\$55,478	\$17,513	\$19,394	\$21,106	\$23,258

Table 7.6 shows the overall financial impact to UNM in terms of program balances and tuition revenue. Please note that tuition revenues are shown here as part of the broader financial impact to UNM but are not included in the analysis of program finances in Table 7.5, because there is no direct link between tuition revenue and departmental funding.

Table 7.6 Six-Year Projection of Financial Impact to UNM

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Program balances	\$45,000	\$55,478	\$17,513	\$19,394	\$21,106	\$23,258
Tuition generated	\$21,759	\$44,389	\$77,920	\$112,775	\$148,993	\$158,902
Total	\$66,759	\$99,866	\$95,433	\$132,169	\$170,100	\$182,160

These are modest revenues, and we acknowledge that they depend largely on the A&S commitment to reallocate college funding in support of this new program. Although other UNM revenue streams could potentially be augmented by this program (e.g. increased undergraduate enrollments, as described above), the broader value of the New Mexico Joint Doctoral Program in Geography lies mainly in its ability to build research capacity in the state. By adding a top-quality program that provides integrative research training and conducts research on complex environmental and geospatial questions in partnership with numerous New Mexico entities, the program will provide its primary benefits to the state of New Mexico. The specific financial impacts of this widely distributed benefit are not accounted for in this document.

8. QUALITY OF THE PROGRAM

8.1 Overview

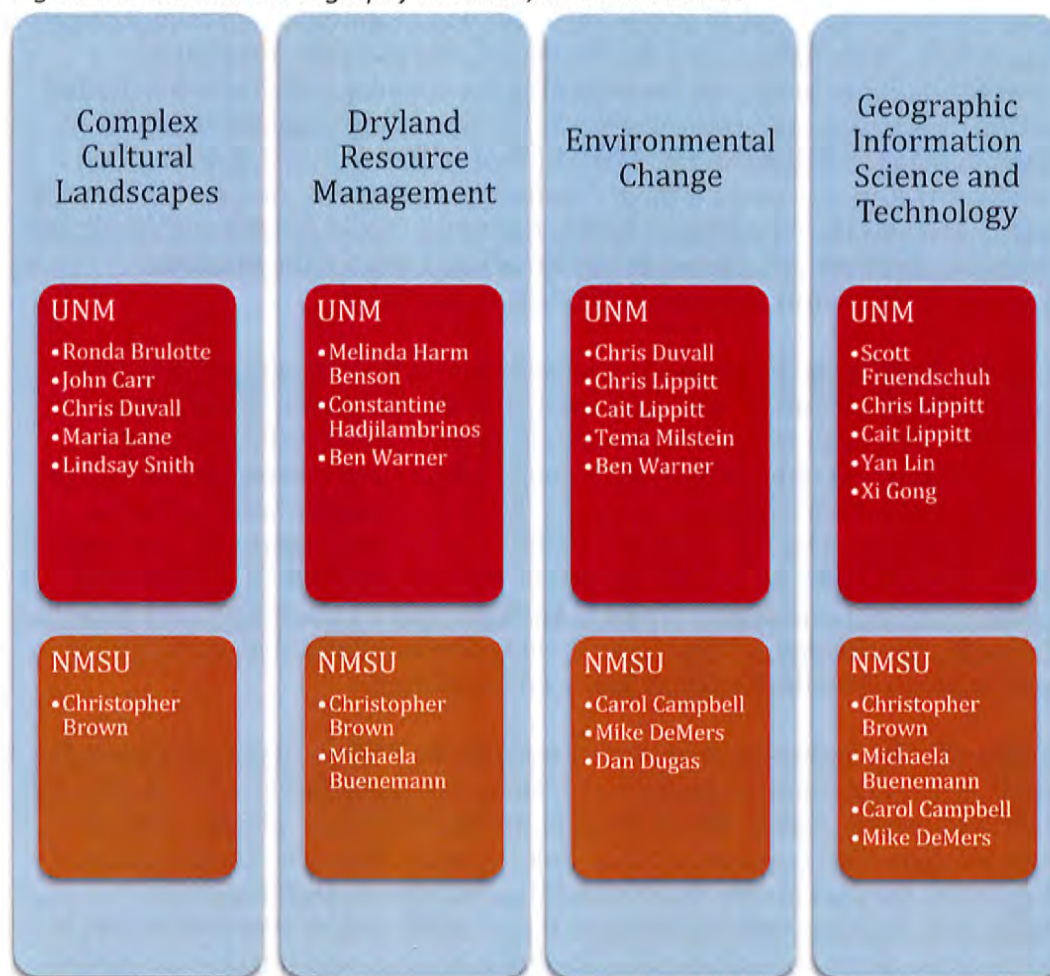
From its earliest conception, the New Mexico Joint Doctoral Program in Geography has been designed to capitalize on existing program and faculty expertise at both UNM and NMSU, in order to offer a rich, multi-campus educational experience based on an innovative integrative instructional model to highly qualified students, and animated by a robust set of programmatic goals. Due to the program's inherent focus on integrative graduate student learning that bridges applied and theoretical approaches, this instructional model will incorporate a rich set of experiences outside the classroom by design. Because the program has been structured around existing resources at both universities, the need for additional support services will be greatly reduced. Even so, in order to both attract top-quality graduate students and to support faculty as they take on the additional work inherent to a PhD program, the Joint Doctoral Program will need to be augmented by additional student recruitment and support packages, most of which will be Teaching Assistant lines.

8.2 Existing Program and Faculty Expertise at UNM

A joint PhD program capitalizes on the combined strengths of both geography departments, creating a synergy between the UNM faculty's broad expertise in environmental studies (natural resource management, policy, law, conservation, history) and in Geographic Information Science & Technology or GIS&T (GIS, remote sensing, geovisualization, spatial cognition, modeling), and NMSU's broad expertise in physical geography (biogeography, land change science, geomorphology, water, arid lands) and applications of GIS&T (education, resource management). Figure 8.1 on the following page shows how the combined strengths of the two faculties directly animate programmatic foci and thus ensure the quality of the program.

UNM's Department of Geography and Environmental Studies currently offers a Masters of Science with two concentrations: Environmental Studies and Geographic Information Science. The Department also offers a one-year graduate certificate in Law, Environment, and Geography, as well as a "shared credit" undergraduate/graduate degree program with Economics by which a student may earn an undergraduate minor in Geography, an undergraduate major in Economics, and a MS in Geography in five years. Amongst other resources, the Department of Geography and Environmental Studies has a 23-seat teaching lab, and a 6-seat graduate research lab.

Figure 8.1 Combined Geography Faculties, UNM and NMSU



8.3 UNM Core Faculty²³

Melinda Harm Benson, Associate Professor: Received her J.D. from the University of Idaho in 1998. She conducts research on environmental governance regimes — how we conceptualize, employ and protect the natural world. She is a leading scholar in the area of legal geography and has made influential contributions to a conceptual rethinking of ideas like sustainability and resilience. She has published numerous high-impact articles and is now co-authoring a book titled *The End of Sustainability* (forthcoming from University Press of Kansas). NOTE: Dr. Benson has just gone on leave, in anticipation of leaving UNM. Our hiring plan calls for a replacement hire in Environmental Studies.

²³ Refer to Appendix N for updated CVs for all core UNM faculty.

Ronda Brulotte, Associate Professor: Received her PhD in Anthropology from the University of Texas in 2006. She conducts research on tourism, critical heritage studies, materialism, and food systems. She recently completed a Fulbright Scholarship in Mexico investigating the sociologically complex field of production, marketing, and connoisseurship surrounding Oaxacan mezcal as it circulates in the global market. She is the author of *Between Art and Artifact: Archaeological Replicas and Cultural Production in Oaxaca, Mexico* (University of Texas Press) and the co-editor of *Edible Identities: Food as Cultural Heritage* (Ashgate). Dr. Brulotte also serves as the Associate Director for Academic Programs of UNM's Latin American and Iberian Institute.

John Carr, Associate Professor: Received his PhD in Geography from the University of Washington in 2007 and his J.D. from the University of Texas-Austin School of Law in 1993. His research interests include urban geography, globalization and post colonialism, legal geography, critical theory, public space and culture, and activist research methods. He is a university-wide leader in innovative pedagogy who was awarded UNM's top teaching award for pre-tenure faculty in 2013. In 2016, he is the recipient of research and teaching fellowships at the University of Tasmania in Hobart, Australia and Canterbury University in Christchurch, New Zealand. His research on geocoded data privacy and ethics has been supported by the National Science Foundation

Chris Duvall, Associate Professor: Received his PhD in Geography from the University of Wisconsin Madison in 2006. He is a biogeographer who studies the historical and contemporary distribution patterns of humans, plants, animals, and the environmental conceptions that link them together. Dr. Duvall's most recent research focuses on the Transatlantic exchange of environmental knowledge and practice, with a particular focus on the role of West Africa. He is the author of the 2015 book *Cannabis* (Reaktion books), which traces the global origin and spread of cannabis from both a biological and cultural perspective.

Scott Freundsuh, Professor: Received his PhD in Geography in 1992 from the State University of New York at Buffalo. His research focuses on cognitive science and spatial cognition as it relates to types of spatial knowledge and their structures, geographic scale, and spatial concept development and understanding. He is an active and influential scholar at the national level and served previously as a program director at the National Science Foundation. He is currently executive editor of the journal *Cartography and Geographic Information Science*, Vice President of the Coalition of Geospatial Organizations (COGO), and the Executive Director of CAGIS.

Xi Gong, Visiting Assistant Professor: Received his PhD in Geographic Information Science from Texas State University in 2016. He specializes in the spatial analysis of environmental health and has conducted a variety of studies that use data-mining techniques to examine the correlations between air pollution and health risks. NOTE: This position is not counted as one of our "core" 13 tenure-track faculty positions, but our hiring plan calls for converting

this visiting position to a continuing Instructor position, primarily to add GIScience teaching capacity and to support our planned development of an online program in Geospatial Entrepreneurship.

Constantine Hadjilambrinos, Associate Professor: Received his PhD in Urban Affairs and Public Policy from the University of Delaware 1993. He conducts research in energy resources, environmental policy, and the relationship between science, technology, and society. Dr. Hadjilambrinos is an expert on European energy policy and has held both academic and professional positions in the U.S. and abroad. Before coming to UNM, he served as the Head of Renewable Energy Policy for the New Mexico Public Regulation Commission.

Maria Lane, Associate Professor: Received her PhD in Geography from the University of Texas at Austin in 2006. She is a historical geographer who studies the scientific, legal, and political processes that influence decisions about natural resource management. An award-winning teacher at UNM, Dr. Lane employs numerous graduate students in a variety of scholarly positions, including editorial fellowships for the journal *Historical Geography*, for which she serves as editor. Dr. Lane is the author of a 2011 book *Geographies of Mars* (University of Chicago Press) that explores early thinking about natural resources on the planet Mars, and is currently writing a book about water management in New Mexico titled *Fluid Geographies* (under contract with University of Chicago Press).

Yan Lin, Assistant Professor: Received her PhD in Geographic Information Science from Texas State University in 2014. Her research and teaching specialize in health geography, spatial epidemiology, health disparities and the links between population, environment, and health. Dr. Lin has published a number of papers investigating disparities in rates of cancer diagnosis and mortality, using advanced techniques for spatial analysis of large data-sets. She collaborates actively with public health practitioners.

Caitlin Lippitt, Assistant Professor: Received her PhD from the joint program at San Diego State University and the University of California, Santa Barbara in 2013. Her research is focused on leveraging remotely sensed data to identify land cover change at multiple scales for monitoring and managing disturbance in semi-arid and arid environments. She collaborates actively with biologists and has significant research expertise in the study of landscape disturbance effects, including drought, wildfire, and invasive species

Christopher Lippitt, Associate Professor: Received his PhD from the joint program at San Diego State University and the University of California, Santa Barbara in 2010. His research is in developing methods and theory to improve the effectiveness of remote sensing and GIS technologies when applied to time-sensitive problems like disaster response, and to understand the dynamics and feedback effects within the human-environment relationship. Dr. Lippitt has a very active sponsored research program, with major grants from the National

Science Foundation and the New Mexico Department of Transportation. He is co-editor of the 2015 book *Time-Sensitive Remote Sensing* (Springer Press).

Tema Milstein, Associate Professor: Received her PhD in Communications from the University of Washington in 2007. Her research focuses on environmental communication, environmental meaning systems, nature tourism, and transformative ecopedagogy. Her recent honors include a Fulbright research award in New Zealand, a research fellow award at University of Tasmania, a grant with the U.S. Fish & Wildlife Service, and recognition by UNM as the 2015-2017 Presidential Teaching Fellow. She is editor of the book *Environmental Communication Pedagogy and Practice*, published by Routledge, and has conducted research in a wide variety of fieldsites including New Zealand, the Pacific Northwest, and Iceland.

Lindsay Smith, Assistant Professor: Received her PhD in Anthropology from Harvard University in 2008. Her interdisciplinary research focuses on migration and borderlands, drawing on expertise that spans ethnography, science and technology studies, spatial science, and medical anthropology. She is the author of *Subversive Genes: Making DNA and Human Rights in Argentina*, which is now under publication consideration with Stanford University Press. Dr. Smith manages an active sponsored-research program, using grants from the National Science Foundation and the Wenner-Gren Foundation to support extensive ethnographic fieldwork in Latin America.

Ben Warner, Assistant Professor: Received his PhD in Sustainable Development from Arizona State University in 2014. His research focuses on rural and agrarian development, environmental change adaptation, vulnerability and risk, water resources management, and sustainability education assessment & policy. Dr. Warner has published numerous journal articles focused on adaptation strategies developed by smallholder farmers and rural communities, both in Central America and the United States. His research has been funded by major grants from the National Science Foundation and the United States Department of Agriculture.

8.4 UNM Affiliated Faculty

In addition to the permanent faculty listed above, UNM's Department of Geography and Environmental Studies has close relationships with a number of scholars and researchers outside the department. The following UNM-based affiliated faculty members collaborate with GES faculty on research initiatives, offer cross-listed courses, serve on graduate student committees or otherwise participate in the scholarly life of the department.

- **Daniel D. Arreola** (Arizona State University, School of Geographical Sciences & Planning) Expertise: cultural landscapes, place-making, Mexican-American borderlands

- **Karl Benedict** (UNM College of University Libraries and Learning Sciences) Expertise: information architecture, spatial data management
- **Bob Berrens** (UNM Department of Economics, Water Resources Program) Expertise: environmental economics, water resources
- **David Correia** (UNM Department of American Studies) Expertise: environmental politics, law and violence, critical human geography, New Mexico and the U.S. Southwest
- **Jeff Erbig** (UNM Department of History) Expertise: historical GIS, history of cartography, Latin America
- **Fred Gibbs** (UNM Department of History) Expertise: interactive mapping + urban ecologies, historical GIS, food systems, public health
- **Moises Gonzalez** (UNM Community & Regional Planning Program) Expertise: spatial planning, GIS
- **Laura Harjo** (UNM Community & Regional Planning Program) Expertise: community development, GIS
- **Anne Jakle** (UNM EPSCOR Project Associate Director) Expertise: energy policy, resource management
- **Marcy Litvak** (UNM Department of Biology) Expertise: ecosystem ecology, effects of climate variability and disturbance
- **Bruce Milne** (UNM Department of Biology, Sustainability Studies Program) Expertise: ecoculture, environmental communication, environmental meaning systems, ecological identity, nature tourism, transformative ecopedagogy
- **William Pockman** (UNM Department of Biology) Expertise: ecosystem ecology, plant distributions, climate change response
- **Caroline Scruggs** (UNM Community & Regional Planning Program) Expertise: environmental policy, public health, sustainable development
- **Mark Stone** (UNM Department of Civil Engineering) Expertise: environmental flows, fluvial geomorphology, ecosystem services
- **Jennifer Thacher** (UNM Department of Economics) Expertise: environmental economics, survey valuation
- **Marygold Walsh-Dilley** (UNM Honors College) Expertise: sociology of development, food and agricultural systems, indigenous politics

8.4 Existing Program and Facilities at NMSU

NMSU's Department of Geography currently offers a Masters of Applied Geography as well as a Graduate Minor in Geographic Information Science and Technology. Amongst other resources, the Department of Geography and Environmental Studies has a 30 seat teaching lab, and a 10 seat research lab.

8.5 NMSU Core Faculty

Christopher Brown, Associate Professor: Received his PhD in Geography from San Diego State University/UC Santa Barbara in 1998. His research focuses on US-Mexico border environmental and water resource policy, specifically examining the political ecology of binational watersheds along the border and

how various institutions have coalesced to advance such policy efforts amidst relevant barriers or impediments.

Michaela Buenemann, Associate Professor: Received her PhD in Geography from the University of Oklahoma in 2007. Her research focuses on the integration of remote sensing, geographic information systems, and spatial modeling to assess the spatio-temporal dynamics of coupled human-environment systems, primarily land changes in dryland environments.

Carol Campbell, Associate Professor: Received her PhD in Geography from the University of California, Los Angeles in 2005. Her avian biogeographic research is couched in niche theory, employing remote sensing techniques for land cover quantification and change detection, and to explain responses of bird communities to biotic conditions.

Mike DeMers, Professor: Received his PhD in Geography from the University of Kansas in 1985. He conducts research in land classification, evaluation, and change analysis, and in geodesign, geogame technologies, and immersive virtual worlds as ways of both exploring geography, especially GIS&T, and creating new tools for both learning and practicing geography.

Dan Dugas, Assistant Professor: Received his PhD in Geography from the University of Oregon in 1993. His research focus is on spatial analysis of dune fields, interpretation and mapping of soils patterns for road engineering, landslide mapping, geomorphic aspects of landscape ecology, geomorphological soils mapping, analysis of spatial influences of arroyo channels on ant nesting patterns, and various geoarcheological consulting tasks.

Bob Czerniak, Professor Emeritus: Received his PhD in Geography from the University of Colorado, Boulder in 1979. He conducts research in land use, community development, urban geography and transportation planning.

8.6 Admissions Standards

The admissions standards for the New Mexico Joint Doctoral Program in Geography are comparable to similar programs, while also specifically tailored to ensure that PhD program students are both drawn to and capable of pursuing a graduate degree that is focused on integrative approaches to human/environment dynamics.

As with our peer institutions (see Table 8.1 below) the joint PhD program will require successful applicants to have a Masters Degree in a relevant field or profession, and provide letters of recommendation, academic transcripts, and a letter of intent. We will also require at least a “B” GPA for prior graduate work and at least a 150 on both Verbal and Quantitative portions of the GRE – barring extraordinary circumstances.

Beyond these requirements, we will ensure the quality of the New Mexico Joint Doctoral Program in Geography by implementing admissions standards and procedures that are designed to ensure a proper fit between students and the program resources and design.

At the time of application, potential students will identify a desired primary advisor and will apply formally to that professor's home institution. After an administrative check to ensure that candidates meet minimum requirements, the home institution will conduct a first round of admissions review and forward acceptable applications to the secondary campus. The second round of review will determine whether there is at least one sponsor at the secondary campus and will evaluate the applicants' overall fit with faculty expertise and research strengths. The final decision on admission of candidates to the program will be made by a joint review committee, and the final decision for funding will be made at the home institution, based on the funding availability and service loads of that institution's faculty.

Throughout this process, serious consideration will only be given to candidates who express an interest in integrative, multi-methodology approaches to human/environment dynamics. This focus will help ensure that faculty are able to focus on students who have been drawn to, and are served by the program's foci. And by developing cohorts who share this integrative focus, the program's quality and reputation will be continually reinforced.

Table 8.1 Admission requirements for peer Institutions in the Southwest

University	Masters Degree	GRE Scores	Transcripts	Letters of Recommendation	Letters of Intent	GPA
University of Arizona	Yes	Yes	Yes	Three	Yes	B average
Arizona State	Yes	158 Verbal 147 Quant	Yes	Three	Yes	3.0
University of Colorado	Yes	162 Verbal 159 Quant	Yes	Three	Yes	3.71
University of Denver	Yes	153 Verbal 144 Quant	Yes	Three	Yes	3.5
University of Idaho	Yes	270 Combined	Yes	Three	Yes	2.8
Texas A&M	Yes	300 Combined	Yes	Three	Yes	3.0
Texas State	Yes	270 Combined	Yes	Three	Yes	3.5
University of Texas	Yes	320 Combined	Yes	Three	Yes	3.5

8.7 Instructional Models

As discussed in earlier sections, the program will use a hybrid instructional model that combines both face-to-face courses, educational experiences shared

by students based at both campuses, and distance learning options for students on both campuses. Because our existing undergraduate and graduate programs currently rely heavily on face-to-face instruction, we will need to develop our engagement with distance learning technologies and pedagogies significantly. We intend to increase this capacity in a phased manner, as shown below, relying first on a variety of existing resources and then building toward the development of specific equipment and technology resources that are tailored to support the program as it matures.

- **Phase 1, Pilot Courses:** In the years before we admit our first cohort of doctoral students, we will pilot various approaches to grad-level distance learning through our existing UNM courses, making them available to grad students throughout New Mexico under the cross-enrollment policy. We will select these initial pilot courses based on instructor interest and distance education competency. The pilot courses will be developed with the support of New Media and Extended Learning (NMEL) at UNM and Academic Technology and Instructional Innovation and Quality (IIQ) at NMSU, with the goal of developing faculty expertise and comfort with a variety of distance-education activities and approaches that are suitable for graduate-level courses. Because our long-term objective is to develop distance courses suitable for PhD-level students, we will focus in the pilot phase on enabling robust seminar-style interaction and intensive discussion that mimics face-to-face interaction as much as possible. To this end, we expect to use videoconferencing software and classroom facilities that already exist on the UNM campus, following the lead of programmatic development that is already underway through Extended University.
- **Phase 2, Core Courses:** When the program launches, we will offer a small subset of key courses to distance learners at NMSU, including at a minimum the first-year core courses for PhD students. As discussed in the curriculum section above, we have already determined that we will offer GEOG601 and GEOG602 in novel cross-campus formats that include one face-to-face meeting per semester on each campus, which will be coordinated with a field experience in either Albuquerque or Las Cruces. We will supplement these face-to-face meetings throughout the semester with distance learning techniques that proved successful in the pilot phase. In developing these courses, we will work intensively with Extended University to identify software, equipment, and facilities that will enable us to deliver these courses in robust formats that enhance our unique joint program.
- **Phase 3, Early Expansion Courses:** After the first cohort begins, we will continue to develop distance-learning options across the joint-program curriculum. We will select these courses based both on instructor interest/ability as well as on the programmatic need to provide distance-capable courses to joint-program students in all three core program areas: human geography, physical geography, and GIS&T. In this phase, we will continue to identify successful strategies for PhD-level distance learning and will explore the potential for using distance learning technologies even for field-based courses, which we currently envision as being solely “native”

offerings at the two individual campuses. Relevant support units at both UNM and NMSU will be critical in this effort, helping us conceptualize, pilot, and implement various distance-learning strategies beyond those that are currently considered standard.

- **Phase 4, Late Expansion Courses:** Once the program is considered “mature,” with a full enrollment of at least four cohorts and at least one student completed, UNM and NMSU faculty will engage in strategic planning for facilities, technology, and equipment resources needed to deliver a joint program that best supports student success in achieving the program’s learning outcomes across the two campuses. Although we expect that the University of New Mexico will have by that time significantly expanded its own facilities and resources to support distance learning, it is also possible that we will consider a facilities augmentation within GES to support distance-capable delivery of additional courses. If we have been successful in adding numerous courses to the roster of those available to distance learners, it is possible we could cross the 50% threshold that triggers designation as a distance program. In that case, we would work with Extended University officials to declare and report on our distance-learning capacities for purposes of accreditation.

8.8 Impact on existing master’s program

The creation of the joint PhD program will put short-term pressure on the existing MS Geography program at UNM by increasing advisement loads on faculty until staffing is increased and by reducing the availability of GA packages to MS students until sponsored research grows enough to offset the diversion of internally-funded GA lines from the MS program to the PhD. Program. That said, however, the overall long-term benefits to the existing master’s program outweighs these costs. Specifically, experience from other PhD programs in Geography has established that the co-presence of doctoral and master’s-level students in shared educational settings tremendously enriches the educational experience of MS students. In addition to bringing new ideas, experiences, and knowledge to the program, PhD students inevitably “raise the bar” for all students, helping promote a culture of inquiry and excellence.

8.9 Student Experience Beyond the Classroom

Because it has been designed around integrative approaches to geography – and particularly approaches to human-environment dynamics that bridge theory and application – graduate student experience beyond the classroom will be a defining characteristic of the joint New Mexico Joint Doctoral Program in Geography. Indeed, all PhD candidates in the program will be expected to base their original dissertation research upon active, applied, real-world issues. And in order to do so, faculty will actively assist students in the program to find, connect with, and potentially work for a host of stakeholders in New Mexico and beyond in the process of conducting their research. Accordingly, students’ work in the field will blur many of the traditional lines between dissertation research, internships, and service learning. In the process of preparing students for such

engaged, integrative research, the faculty will draw upon existing relations with such stakeholders as the U.S. Forest Service, the National Park Service, the Bureau of Land Management, the US and New Mexico Departments of Transportation, the New Mexico Department of Health, the Environmental Protection Agency, and a variety of municipal organizations throughout New Mexico, while forging new relationships with a broad spectrum of organizations and actors in the Southwest.

8.9 Support for Student Success

8.9.1 Support Services

Because the program has been structured around existing resources at both universities, most student support services are already in place as part of the normal departmental services – including advising, professional development, IT support, research training, and research/conference travel. That said, UNM’s Department of Geography and Environmental Studies will need some specialized curricular additions – such as GEOG603 “Professional Geographic Practice” and GEOG590 “Qualitative Methods – in order to meet the professional development and research training needs of PhD students. Our vision for the program includes the following basic support services to ensure student success.

- Advising: Advising will be handled by existing and future faculty as part of the regular allocation of service roles, with support from a dedicated staff person who will work with students to facilitate interactions across the two institutions and faculties.
- Professional development: Professional development will occur both informally as part of the traditional advisor/advisee relationship, and formally through GEOG603 “Professional Geographic Practice.” GEOG603 will be only one of three required core courses for the PhD program. It will prepare PhD level students to enter the professional realm, whether as full time academics, researchers, policymakers and/or other types of geographic professionals. Accordingly, it will provide students an opportunity to develop the range of skills expected of geographic professionals in a variety of contexts, with a focus on “core competencies” which are required across professional contexts – including oral communication, written communication, and visual presentation. We will also develop extra-curricular professional development seminars to address the specific needs of individual student cohorts.
- IT Support: The department currently has a 23-seat teaching lab, and a 6-seat graduate research lab, both of which are maintained by a full-time network tech and lab manager. This staff position is supported with student course fees and is assigned primarily to provide student IT support. In addition, we will work closely with UNM Extended Learning to ensure that our distance-capable classes are supported with proper technology facilities.
- Research Training: A prerequisite for graduating from the New Mexico Joint Doctoral Program in Geography is demonstrated competency in

both quantitative and qualitative research methodologies. Accordingly, a full suite of both qualitative and quantitative research methodology courses will be available to all students. Moreover, every student's PhD advisor is charged with ensuring that he/she receives sufficient research training as part of the design of his or her graduate program of studies. Beyond in-class training, the PhD dissertation is designed to provide each student substantial practical experience in developing and using qualitative and quantitative research methodologies. Furthermore, we anticipate that many students will choose to integrate their own dissertation research with externally funded research initiatives in which they will participate as paid research assistants to GES faculty. This dovetailing of student-led and faculty-led research work will provide extensive experience in collaboration, working in teams, and developing project management skills.

- Research and Conference Travel: The joint program will provide a regular, competitive funding source for PhD students to travel to conduct research and engage in conference presentation. When budgets have permitted, GES has in the past supported MS students' travel to the American Association of Geographers conference and to the Southwest American Association of Geographers conference on a limited basis. With the addition of a PhD program, however, we will seek new institutional and externally-funded travel resources to make conference attendance a standard part of the PhD-student experience, given its critical importance both for research scholarship and for professional development. In addition, we will use increased F&A revenues to provide internal support for student research projects.

8.9.2 Financial Packages

The proposed New Mexico Joint Doctoral Program in Geography will aggressively support student success through student recruitment and employment. The design of the PhD program is premised on two principles:

1. The success of the program will depend on competitive funding packages to recruit high-caliber students, and
2. The program will actively seek to develop student cohorts that reflect the emerging American majority.

Accordingly, a set of new Graduate Assistantship lines will be developed at both universities – and standardized across both campuses – in order to aggressively attract highly competitive, diverse student cohorts. This effort will be complimented by travel funding to bring top prospects to visit UNM each year. In order to recruit a diverse range of qualified students who would not otherwise consider PhD studies at UNM, or even a PhD in Geography, the program will also send a faculty member to regularly promote the New Mexico Joint Doctoral Program in Geography at relevant conferences such the National Association of African American Studies & Affiliates Conference (which encompasses the National Association of Hispanic and Latino Studies, the National Association of Native American Studies, and the National Association of Asian Studies).

8.10 Assessment of Program Goals for Student Learning

The primary objective of our teaching and mentoring is to produce graduates who are well prepared for professional careers within and beyond the academy.

Broadly, we intend for all students to graduate with:

- A. Broad capability in the discipline of geography, with a critical understanding of how specific areas of theoretical, methodological, and practical expertise relate to scholarship in other areas of the discipline;
- B. Advanced competency in the design and implementation of original and significant basic and applied research;
- C. Professional knowledge skills in communication, teaching, and mentorship.

We expect students to achieve these specific learning outcomes by the time they reach degree completion:

- A.1. Students will discuss the historical development of geographic thought and critically evaluate contemporary philosophical approaches in geography
- A.2 Students will demonstrate expertise in concepts, methods, and trends in three chosen specialty areas as well as in synthesizing multi-variable human-environment interactions
- B.1 Students will design and conduct independent research for answering relevant geographic questions using appropriate quantitative and/or qualitative methods
- C.1 Students will make original and significant scholarly contributions and communicate them effectively orally and in writing both to the scientific community and the general public
- C.2 Students will demonstrate professional knowledge and skills that will allow them to enter careers in academia, government agencies, or the private sector

A detailed plan for assessment of these outcomes – including assessment measures, assessment procedures, and schedules for evaluation of assessment data/results – is included as Appendix E.

8.11 Accreditation

UNM is institutionally accredited by the Higher Learning Commission of the North Central Association and has approval to offer any degree program appropriate to UNM's mission. There are no specific accreditation or licensure requirements associated with doctoral programs in Geography.

9. ASSESSMENT OF OPERATIONS AND IMPACT

The New Mexico Joint Doctoral Program in Geography will be structured around an ongoing assessment of the operations and impact of the program.

9.1 Assessment of Programmatic Impact

The Joint Steering committee will be convened annually to perform continuous assessment of programmatic impact. The basis for annual assessment of operations and impact by the internal review committee will include:

- Student achievement of learning outcomes, as assessed in our formal program assessment (Appendix E).
- Cumulative data on PhD students' scholarly activities, including but not limited to:
 - Scholarly presentations
 - Publications
 - Other research products, including but not limited to grant applications.
- A qualitative progress report by the PhD program director on current PhD student progress towards degrees.
- Graduation rates.
- Results of an annual survey of PhD program graduates to evaluate
 - Subsequent career placement
 - Subsequent academic and professional activities, including publications

9.2 Assessment of Operations

The staff member in charge of program support will prepare an annual operational report for the program, including a report on past and projected costs and revenues from the program – based on such data as student credit hours, percentage of faculty teaching load, and hard expenses and income. The Joint Steering committee will evaluate that report at their annual meeting to determine if any administrative changes or refinements are needed.

9.3 External Review

After five years of programmatic operation, and every five years thereafter, the program will solicit an external review of programmatic operations and impact. The New Mexico Joint Doctoral Program in Geography will also be assessed within the regular cycle of Academic Program review at each institution.

10. ADMINISTRATIVE RESPONSIBILITY FOR THE PROGRAM AND INSTITUTIONAL COMMITMENT

The New Mexico Joint Doctoral Program in Geography will be administered by the faculties of both the Department of Geography and Environmental Studies at UNM and the Department of Geography at NMSU. While the faculties of both departments will share in the administration of the program, the Program Coordinator at UNM (a staff position) and the Graduate Program Directors at each campus will have special roles in administering the program. The delegation of administrative responsibilities is designed to provide each program a maximum amount of flexibility as the two departments grow and evolve, while creating a joint decision making structure for matters that impact the ongoing functioning of the joint program.

10.1 Management structure

The New Mexico Joint Doctoral Program in Geography will be managed by the Doctoral Program Steering Committee (Steering Committee), and the Steering Committee will be responsible for screening applications; making admissions decisions; reviewing and advising curriculum; handling conflicts, grievances, and appeals that cannot be resolved within the student's research committee; and maintaining communication between both institutions on relevant issues as they arise. Composition of the Committee will reflect representation of faculty from both institutions, specifically including, at a minimum, the graduate program director and at least one additional faculty member from each department. Committee membership may change annually, based on teaching assignments, interest, sabbatical leave, and other fluctuations of effort among faculty members. Meetings of the Steering Committee may occur as face-to-face meetings or via Skype or other Web-assisted technologies.

10.2 Program curriculum

Each department maintains full responsibility for its own course offerings, but both departments commit to coordinate changes that would affect the program as a whole. Specifically, a three-week notice and comment period is required for any addition, removal or modification of doctoral-level courses in either university's catalog, during which input to proposed changes are accepted from the institution not making the change. Some courses will be offered at UNM, some will be offered at NMSU, and some will be offered at distance. All proposed changes to curriculum at UNM are contingent on Faculty Senate approval notwithstanding the joint design of program

10.3 Transfer of credit policies

The New Mexico Joint Doctoral Program in Geography relies on the state's newly developed "cross enrollment" protocol, which allows students to register seamlessly for graduate courses at multiple New Mexico institutions of higher

education, in cases where a course is not offered at the home institution. Under this program, tuition is paid to the home campus, but any special fees are paid to the host institution. Student credit hours are awarded to the host institution that is actually delivering the course. This protocol will allow students in the New Mexico Joint Doctoral Program in Geography to take courses at either UNM or NMSU (as long as courses taken at the host institution are not offered at the home institution), thus facilitating the creation of a totally joint curriculum. In the event that a student desires to switch advisors within the Joint Doctoral Program, thus necessitating a change in the home institution, the registrars of the two institutions will work together to facilitate an advisor change without any prejudice against the student's standing or progress.

10.4 Admissions and Financial arrangements

At the time of application, potential students will identify a desired primary advisor and will apply formally to that professor's home institution. After an administrative check to ensure that candidates meet minimum requirements, the point of contact at that home institution will route all relevant materials to a joint review committee composed of faculty from both institutions that will make admissions decisions.

Payment of application fees will be handled via the intake portal at the home institution, and students that are admitted to and enroll in the program will handle all financial matters related to tuition, fees, financial aid, and stipend/salaries associated with graduate assistantships through the home institution. Only in the event that a student desires to switch advisers that would involve a change in the home institution would the two institutions need to discuss any cross-institutional interactions on financial matters involving student support.

As noted elsewhere, the funding for the joint program coordinator will be provided by UNM, and both institutions will benefit from and be served by this staff person. Although UNM faculty will have the primary responsibility for screening, hiring, and managing this staff person, NMSU faculty will provide input into these processes. Specifically, UNM will select finalists for the staff position and invite comment from NMSU before making any final decision. The UNM department chair will be the direct supervisor, but the Steering Committee will be asked to provide input to the official annual review process.

10.5 Faculty hiring

Each department maintains full responsibility for its own faculty hiring, but both departments commit to communicate about any searches for faculty that would be expected to participate in the joint doctoral program. Specifically, we agree that the institution planning the faculty search will provide a three-week notice and comment period to the partner institution before finalizing and posting a faculty job advertisement unless prohibited by the timeline necessary to conduct a successful hire. We also agree that upon successful completion of a faculty

search, the institution conducting the hire will notify the partner institution in a timely manner of the search results, and will initiate a discussion about the role of the new faculty member in the joint doctoral program.

10.6 Responsibility for advising students

Successful applicants to the program will research potential advisors prior to applying, establish a relationship with a likely advisor, and speak to this relationship in their application materials. During the application review process, the review committee will interact with likely advisors, ask them to review the file, and ask for a commitment to be interim advisor if the applicant is admitted to the program. The interim advisor will assist the student in assembling and finalizing a joint doctoral committee, preparing and submitting an appropriate program of study, and conducting the first semester diagnostic interview. Primary responsibility for advising rests with the joint doctoral committee chair at the home institution; the program coordinator will assist as needed.

10.7 Faculty supervision of dissertations

Upon enrollment of the student in the program, the interim advisor at the home institution will work with the student and faculty at both institutions to develop a joint doctoral committee, which will necessarily include two faculty members from each institution and one external member. We expect the external member will typically be a faculty member who is from the home institution but outside the home department. Eligibility to serve on doctoral committees is defined in the graduate catalogs at UNM and NMSU, and each institution will therefore follow its own procedures for evaluating graduate committees and qualifying “graduate” faculty. The committee formation described above is in accord with both universities’ existing requirements for committee formation.

The committee structure we propose is meant primarily to ensure that students engage with faculty from both institutions, and this will also provide the broadest umbrella for advising possible to guide the student in developing their program of study and research proposal, preparing for their qualifying exams and proposal defense, and dealing with any issues that arise in their time in the program. The joint doctoral committee discussed in the previous section will be responsible for all facets of supervising dissertation research, including:

- developing the preliminary research proposal and external funding proposals (where applicable),
- developing expertise needed to conduct the proposed research,
- preparing for comprehensive and oral exams,
- preparing for the final research proposal defense,
- conducting needed field and laboratory analysis,
- preparing for the final defense of the dissertation, and
- writing and revising the articles or other written documents that will summarize the research completed and comprise the finished product of the dissertation process.

Primary responsibility for supervising the dissertation rests with the home institution due to the primacy of the joint doctoral committee chair, but we envision a fully joint supervisory structure that ensures dissertations will be completed to meet standards at both institutions. Meetings of the joint doctoral committee will be handled both through face-to-face meetings and the use of interactive teleconferencing tools that both institutions currently support.

10.8 Program Assessment

The Steering Committee composed of faculty from both institutions will be tasked with conducting regular reviews of student learning and program quality in three distinct phases: entrance interviews, annual student reviews, and exit surveys. In general, this assessment structure is designed to evaluate both employment placement and the quality of student research products. Each academic year, the Steering Committee will synthesize the results these assessments and will share them with the entire program faculty (across both institutions). A joint faculty meeting will then be held to discuss the assessment outcomes for purposes of guiding improvements to the program or affirming successes. This “internal” review will be conducted on an annual basis, with an external review commissioned after 5 years. The New Mexico Joint Doctoral Program in Geography will additionally be assessed within the regular cycle of Academic Program Review at each institution.

10.9 Institutional Commitment

The Dean of the College of Arts & Sciences has expressed a strong commitment to the development of the New Mexico Joint Doctoral Program in Geography. (See Appendix U for his letter of support detailing specific financial commitments.) Prior to submission to the NMHED and NMGDC, documentation from the Provost’s Office will also be included to indicate the institution’s priority for this program.

11. APPENDICES

Curriculum Forms and Documentation

- A. Proposed UNM catalog language for degree program
- B. Form B curriculum proposals for program-related new courses
- C. Catalog course descriptions for all existing UNM courses in proposed program curriculum
- D. Sample syllabi for grad-level UNM courses, existing and proposed
- E. Learning assessment plan

Documentation of Employment Need and Student Demand

- F. U.S. Department of Labor documentation
 - 1. High Growth Industry Profile: Geospatial Technology, 2007
 - 2. High Growth Job Training Initiative: Geospatial Technology, 2005
 - 3. Geospatial Management Competency Model, 2012
- G. Documentation of focus group with NM geospatial industry reps
- H. Survey of Geography departments at UNM-peer, NMSU-peer and other regional institutions
- I. Survey of current graduate students in Geography, UNM
- J. List of potential employers
- K. List of similar programs, Southwest region

Department of Geography & Environmental Studies Documentation

- L. Seven-year projected course rotation for all undergraduate and graduate courses in GES
- M. GES five-year hiring plan, 2015-2020
- N. Recent CVs for all UNM faculty
- O. Table of 6-year projected graduate program cost estimates and resources
- P. Calculation worksheet for tuition revenue projections
- Q. Calculation worksheet for sponsored research revenue projections
- R. Calculation worksheet for graduate assistantship cost projections
- S. List of advisory board members

Agreements

- T. Authorization to proceed with proposal, Office of the Provost
- U. Commitment letter from Dean Peceny, UNM College of Arts & Sciences
- V. Memorandum of Understanding between UNM and NMSU
- W. Graduate Level Cross Enrollment Agreements Among Universities in New Mexico, draft 2015

Letters of Support

- X. Letters from external partners and stakeholders
 1. Carol Campbell, current Geography Department Head, NMSU
 2. Sarah Bednarz, President, American Association of Geographers
 3. Michael Solem, Director of Educational Programs, AAG
 4. Christopher Brown, then Geography Department Head, NMSU
 5. Craig Allen, Station Leader, USGS Jemez Mountains Field Station
 6. Pete McCormick, Associate Dean of Arts & Sciences and Director of Environmental Studies, Fort Lewis College
- Y. Letters from other units at the University of New Mexico
 1. College of Arts & Sciences, Tom Turner, Associate Dean, Research
 2. Department of Anthropology, Les Field, Chair
 3. Department of Biology, William Pockman, Chair
 4. Community & Regional Planning, Renia Ehrenfeucht, Chair
 5. Department of Civil Engineering, Mahmoud Taha, Chair
 6. Department of Earth & Planetary Sciences, Laura Crossey, Chair
 7. Department of Economics, Janie Chermak, Chair
 8. Extended University, Debby Knotts
 9. Latin American and Iberian Institute, Susan Tiano, Director
 10. R.W. Johnson Center for Health Policy, Gabriel Sanchez, Director
 11. Water Resources Program, Robert Berrens, Director

New Mexico Context

- Z. Formal needs assessment: New Mexico Pathways survey report
- AA. Forthcoming: Letters of support from NM institutions of higher ed

New Mexico Joint Doctoral Program in Geography

UNM Catalog language

Graduate Advisor

Varies, contact department office.

Application Deadlines

Annual: January 15.

NOTE: Early application is recommended. No new applications are accepted after January 15.

Doctor of Philosophy in Geography (Ph.D.)

The Department of Geography & Environmental Studies at UNM offers a PhD in Geography through the New Mexico Joint Doctoral Program in Geography, which is administered and delivered collaboratively by the Geography faculties at both the University of New Mexico and New Mexico State University. This innovative program focuses on integrative human-environment dynamics and is designed to recruit and train the next generation of resource managers, policy thinkers, geospatial innovators, professional scientists, and academic leaders who are needed to solve complex contemporary problems in dynamic environments. The program can be pursued with either UNM or NMSU as the home institution and does not require changing residency during the program.

Admissions

To be admitted to the New Mexico Joint Doctoral Program in Geography, applicants must have a master's degree in Geography or a related field, with demonstrated professional research capacity as a fundamental expectation. GPA and GRE scores must be submitted but will not individually determine whether an applicant will be admitted. International students are expected to demonstrate proficiency in English through the TOEFL or a phone interview. All candidates must submit three letters of reference and a letter of intent that explains the student's purpose in undertaking graduate work, details the student's research interests, and identifies a desired advisor at the primary (home) institution as well as a primary sponsor at the partner institution. Only candidates who show purpose and promise, and whose research needs can be appropriately met, are admitted by a joint committee of faculty from both UNM and NMSU.

The most competitive applicants to the New Mexico Joint Doctoral Program in Geography will show evidence of having a thesis completed or in progress in geography or related discipline. In addition, special attention will be paid to following elements of the application:

- GRE scores and grades: We neither admit or deny applicants on the basis of GRE or GPR scores; rather, we aim to consider the applicant as a whole. For guidance, our average GRE score is expected to be around 300 combined (or 1200 combined verbal and quantitative on the old scale).
- Statement: Applicants' statements should consist of an essay describing past experiences relevant to the joint doctoral program and should indicate a proposed research topic in integrative human-environment dynamics. Applicants are strongly encouraged to contact faculty with whom they share research interests, and they should explicitly identify which faculty members at each institution they would desire as sponsors in the joint program. Strong essays that provide an argument for why an applicant seeks graduate study in our program, making reference to specific faculty expertise, will be favored.
- Letters of recommendation: We encourage letters of recommendation that are provided from academic referees, rather than previous employers. Letters from supervisors at workplaces involving issues relating directly to a student's planned PhD course of study will also be welcomed.

Potential applicants are encourage to contact the graduate advisor before applying to determine which institution is the best fit for the student's "home" institution. Application is made directly to the desired home institution.

Requirements

Taking into consideration the experience and purposes of each student, individualized programs are planned to ensure broad competency in the discipline as well as research training that combines both theory and practice in the student's area of primary interest. At least 48 credit hours of course work are required for the Ph.D.:

- Required introductory graduate sequence (601, 602, 603): 9 credit hours
- Dissertation hours: minimum of 18 credit hours
- Additional coursework as determined by the student's doctoral committee to provide the student with sufficient opportunity to develop and demonstrate competency in three subject areas: human geography, physical geography, and Geographic Information Science & Technology (GIS&T). The doctoral committee will evaluate existing competencies in a first-semester diagnostic interview and will then provide individualized guidelines for the student's program of study that lead to successful demonstration of these competencies.

Additional requirements:

- Maintenance of an overall GPA of 3.0
- Completion of all core courses with a grade of B or better
- Written qualifying examination
- Oral research examination
- Completion of a written doctoral dissertation and oral defense

Comprehensive Qualifying Examination

The comprehensive qualifying examination is taken after completion of course work. It is a written examination, the primary purpose of which is to demonstrate broad competency in the three disciplinary subfields: human geography, physical geography, and GIS&T. Detailed guidelines for the comprehensive examination are available through the department.

Oral Research Examination

The oral research examination is completed after the written qualifying exam. It requires the student to defend a research proposal, demonstrate research expertise, and address any concerns identified during the evaluation of the student's written exam. Upon successful completion of this examination, the student formally advances to candidacy.

Dissertation

Due to the interdisciplinary nature of the New Mexico Joint Doctoral Program in Geography, we expect that dissertations will exhibit variable formats. In all cases, however, a dissertation must comprise a unified body of original research, as guided by the doctoral committee and advisor. After the written dissertation is submitted to the student's doctoral committee, it must be orally defended in a public presentation that constitutes the final examination for completion of the degree.

New Mexico Joint Doctoral Program in Geography

UNM Catalog language

Graduate Advisor

Varies, contact department office.

Application Deadlines

Annual: January 15.

NOTE: Early application is recommended. No new applications are accepted after January 15.

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- GRE scores and grades: We neither admit or deny applicants on the basis of GRE or GPR scores; rather, we aim to consider the applicant as a whole. For guidance, our average GRE score is expected to be around 300 combined (or 1200 combined verbal and quantitative on the old scale).
- Statement: Applicants' statements should consist of an essay describing past experiences relevant to the joint doctoral program and should indicate a proposed research topic in integrative human-environment dynamics. Applicants are strongly encouraged to contact faculty with whom they share research interests, and they should explicitly identify which faculty members at each institution they would desire as sponsors in the joint program. Strong essays that provide an argument for why an applicant seeks graduate study in our program, making reference to specific faculty expertise, will be favored.
- Letters of recommendation: We encourage letters of recommendation that are provided from academic referees, rather than previous employers. Letters from supervisors at workplaces involving issues relating directly to a student's planned PhD course of study will also be welcomed.

Potential applicants are encourage to contact the graduate advisor before applying to determine which institution is the best fit for the student's "home" institution. Application is made directly to the desired home institution.

Requirements

Taking into consideration the experience and purposes of each student, individualized programs are planned to ensure broad competency in the discipline as well as research training that combines both theory and practice in the student's area of primary interest. At least 48 credit hours of course work are required for the Ph.D.:

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- Dissertation hours: minimum of 18 credit hours
- Additional coursework as determined by the student's doctoral committee to provide the student with sufficient opportunity to develop and demonstrate competency in three subject areas: human geography, physical geography, and Geographic Information Science & Technology (GIS&T). The doctoral committee will evaluate existing competencies in a first-semester diagnostic interview and will then provide individualized guidelines for the student's program of study that lead to successful demonstration of these competencies.

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- Written qualifying examination
- Oral research examination
- Completion of a written doctoral dissertation and oral defense

Comprehensive Qualifying Examination

The comprehensive qualifying examination is taken after completion of course work. It is a written examination, the primary purpose of which is to demonstrate broad competency in the three disciplinary subfields: human geography, physical geography, and GIS&T. Detailed guidelines for the comprehensive examination are available through the department.

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The oral research examination is completed after the written qualifying exam. It requires the student to defend a research proposal, demonstrate research expertise, and address any concerns identified during the evaluation of the student's written exam. Upon successful completion of this examination, the student formally advances to candidacy.

Dissertation

Due to the interdisciplinary nature of the New Mexico Joint Doctoral Program in Geography, we expect that dissertations will exhibit variable formats. In all cases, however, a dissertation must comprise a unified body of original research, as guided by the doctoral committee and advisor. After the written dissertation is submitted to the student's doctoral committee, it must be orally defended in a public presentation that constitutes the final examination for completion of the degree.

NEW COURSE REQUEST—FORM B

- ♦ Allow at least 6 months to complete the entire approval process.
- ♦ Please refer to the Form B Instructions at www.unm.edu/~unmreg
- ♦ Four sets of forms must be collated and submitted.

Submission Date 11 / 03 / 20 15

Name of Faculty Member Initiating Request John Carr

Initiator's Position / Title Associate Professor

College Arts & Sciences

Department Geography & Environmental Studies

Phone 277-5041 Email carrj@unm.edu

ROUTING (All Four Collated Sets)

1. Department Chair
2. College or School Curricula Committee
3. College or School Faculty (if necessary)
4. College or School Dean/Dean of Instruction
5. Office of Registrar—Catalog
6. Director of Relevant Library
7. FS Graduate Committee (graduate courses)
8. FS Undergraduate Committee (undergraduate courses)
9. FS Curricula Committee
10. Associate Provost for Academic Affairs

Branches Only – course is

Type 1 ☐ Type 2 ☐ Type 3 ☐

A. A1. Attach four copies of a precise, complete catalog listing of the proposed new course following the current format used in the printed UNM catalog. The listing must include the course subject code and the course number, long title, credit hour value, and course description (no more than 35 words). To indicate graduate credit for course numbers outside of 500-699, an asterisk (*) should precede the course number.

A2. Attach four copies of a course syllabus and bibliography (include suggested course text and schedule of topics covered in the course).

B. B1. Course Subject Code GEOG B2. Course Number 601 B3. Proposed Effective Term Fall 2019

B4. Long Course Title (up to 100 letters, including spaces):

Introduction to Geographic Theory and Application

B5. Proposed Short Course Title (up to 30 letters, including spaces):

	I	N	T	R	O		G	E	O	G		T	H	E	O	R	Y		&		A	P	P	L	I	C	A	T	I	O	N
--	---	---	---	---	---	--	---	---	---	---	--	---	---	---	---	---	---	--	---	--	---	---	---	---	---	---	---	---	---	---	---

B6. College ARTS & SCIENCES B7. Department Geography & Environmental Studies B8. CIP Code _____

(assigned by Assoc. Provost for Academic Affairs)

B9. Credit Hours				
	Fixed Credit	Variable Credit		
		Low	Or / To	High
Credit Hours	3			
Lecture Hours	3			
Lab Hours	0			

B10. Repeat Rules

Is the course repeatable for credit? Yes ☐ No ☒

- The course may be repeated _____ times (exclusive of the first time).

AND / OR

- The course may be repeated for _____ hours (inclusive of the first time)

B11. Course Level (check one only): UG ☐ GR ☒ Law ☐ PharmD ☐ MedD ☐

☐ Graduate credit for course numbers outside of 500-699 (requiring an asterisk before the number)

If graduate credit is available for courses numbered outside of 500-699, complete section F1.

B12. Grade Options: The standard grading scale in the catalog will be applied to this course. Yes ☒ No ☐

If no, select the appropriate option and complete section F2.

☐ The grade scale will be exclusively CR/NC.

☐ The grade scale will be an alternative to the standard scales in the catalog.

B13. List all schedule type(s) (may be more than one):

a. Seminar b. _____ c. _____ d. _____ e. _____

C. C1. Co-requisites to this course: a. none b. c.

If this course is a new co-requisite to those listed, you must submit a Form A for each course that is affected.

Note: Please see the instructions for information on one-way vs. two-way co-requisites.

C1a. If the co-requisite course exists in another department, the co-requisite offering department must approve it as well.

Department	a.	b.	c.
Course			
Chair Name			
Chair Signature			

C2. Crosslisted courses: Complete the table, including signatures from all departments offering the crosslisted courses.

Department	a.	b.	c.	d.	e.	f.
Subject Code & Number						
Chair Name						
Chair Signature						

C3. Course Fees: Yes No ☒ If yes, attach a completed, signed *Special Course Fees Approval Form* from the office of the Associate Provost for Academic Affairs.

C4. Is this course *elective* or *required* ☒ for a degree program? If *required*, submit a **Form C** as well.

C5. Branches Only: Is this course: Occupational Technical Academic (Please check one)

D. D1. Restrictions. List any restrictions placed on students for registration in any section of this course. If none, write "None" in the box.

None

D2. Pre-requisites for Course: If the course has pre-requisites, list all of them, including course subject code and course number or test name and test score for each one. Be sure to include the appropriate conjunction (and / or) between each item and between any sets of pre-requisites. If any of the pre-requisites come from another department, have the department chair sign to acknowledge awareness of those relationships. If none, write "None" in the box.

None

For courses outside the offering department to be used as pre-requisites:

Department Chair Signature Department Chair Signature Department Chair Signature

E. E1. Does this course duplicate any content in the current UNM Catalog? Yes No ☒

If yes, complete the following table:

Department Name	Duplicate Course	Department Chair	Chair Signature	Check One:	
				AGREE TO DUPLICATE	
				DISAGREE TO DUPLICATE	
				AGREE TO DUPLICATE	
				DISAGREE TO DUPLICATE	
				AGREE TO DUPLICATE	
				DISAGREE TO DUPLICATE	

E2. Has this course been offered as a topic course? Yes No ☒

If yes, in which term(s), and to what average enrollment?

E3. Will this course replace a deleted course? Yes ☐ No ☒ If yes, which one? _____
If yes, and the deleted course is 100 or 200 level, has this change been discussed with all the branch campuses that offer this course? Yes ☐ No ☐
Provide a statement below or attach a memo explaining how this replacement will impact Branch campuses and programs.

F. F1. Justification for Graduate Credit: If the course is numbered outside of 500-699, indicate the nature of additional work to be required of graduate students.

F2. Justification for CR/NC or Alternative Grading Scale (include scale in justification):

G. G1. Budgetary and Faculty Load Implications. All new courses have such implications, even when replacing a deleted course.

a. Justification for offering the course:

b. Impact on long-range planning for unit, school / college, and university:

c. Budget and faculty load data:

G2. Relevant Library Impact Statement: Complete below or attach a signed memo.

<u>UNM Libraries</u>	
Name of Library	Name and Signature of Librarian

H. Required Signatures:

Office	Signature	Date
1. Department Chair		27 OCT 2017
2. College or School Curricula Committee		8/2/2017
3. College or School Faculty (if necessary)		
4. College or School Dean / Dean of Instruction		
5. Office of Registrar—Catalog		8/9/17
6. Director of Relevant Library		18/11/17
7. FS Graduate Committee (graduate courses)		10/05/17
8. FS Undergraduate Committee (undergraduate courses)		11-3-17
9. FS Curricula Committee		
10. Associate Provost for Academic Affairs		

After securing departmental approval, send this form and all attachments, **collated into 4 sets of documents**, to the Registrar's Catalog Office, which retains the original and returns copies to the department and college office.

For Registrar's Office Use ONLY (After approval by Faculty Senate Curricula Committee):

Entered in Banner _____ Entered in Catalog _____ Copies Mailed _____

Attributes: 1. _____ 2. _____ 3. _____ 4. _____

Grade Modes _____

APPENDIX B: NEW COURSE PROPOSALS ASSOCIATED WITH PROPOSED PROGRAM

Submitted concurrently with the Form D

The following courses are critical to the launch of the joint PhD program, and Form B proposals have therefore been submitted concurrently with this Form D.

- **GEOG601 Introduction to Geographic Theory and Application:** Overview of geographic history and philosophy, with emphasis on relationship between theory and practice. Includes virtual and in-person meetings with students from both UNM and NMSU. Prerequisite: graduate standing.
- **GEOG602 Integrative Research Design:** Introduction to research design in geography, with emphasis on the integration of qualitative and quantitative methods. Includes virtual and in-person meetings with students from both UNM and NMSU. Prerequisite: graduate standing.
- **GEOG603 Professional Geographic Practice:** This professional development course focuses on communication, ethics, grantwriting, and applied geographical work in the student's area of interest. Prerequisite: graduate standing.

Seminar: Introduction to Geographic Theory and Application

Geography 601

INSTRUCTOR: _____

Email: _____

Office: _____

Office Hours: _____

CLASS MEETINGS: _____

CREDIT HOURS: 3

COURSE DESCRIPTION: This course is intended to introduce Ph.D. and Masters level students to the history, theory, methods, and contemporary literature of Geography as a discipline. It also serves to prepare incoming students to engage in an integrative, theoretically informed and applied research project.

STUDENT LEARNING OUTCOMES

1. Students will be able to demonstrate a clear understanding of multiple themes and topics in Geography.
2. Students will be able to demonstrate a clear understanding of multiple methods suitable for geographic research
3. Students will be able to identify and summarize recent scholarship relevant to the student's own research interests.
4. Students will be able to communicate clearly and effectively in an oral format.
5. Students will be able to communicate clearly and effectively in a written format.
6. Students will be able to identify a committee chairperson who will guide her or his graduate work.
7. Students will be able to design an integrative program of studies for the remainder of her or his graduate work.

TEXTS:

The books to purchase are as follows:

EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

- 1) **Class Participation:** Because much of the learning in this course comes from thoughtful discussion, listening, and interacting around the topics of the course, you are expected to attend and to participate during each class meeting. If you are not here to be a participant along with your classmates, everyone loses. Both your

attendance and the quality of your participation will be considered in determining final grades.

- a. **Timely completion of the following weekly analysis assignments.** If you have not submitted a timely analysis, I will ask you to leave the class in which the covered readings are discussed. As mentioned below, you may opt out of this requirement once during the semester.
 - b. **Respectful dialog.** This is a non-negotiable requirement of this class. Practices to ensure this include: listening closely and respectfully; refraining from ridicule or interruption; retaining modesty and humility. I particularly stress the “golden rule”; if you introduce an author or a concept not otherwise covered in class, this is an opportunity for you to introduce helpful supplementary substance. In other words, contribute expansively in the learning experience, avoiding name- or concept-dropping. There is much to explore in the course and many arguments to be heard, so let’s work to create an environment where explorations are encouraged and enjoyable.
- 2) **Weekly Analyses:** Every week each student will compose and transmit a reaction to each week’s reading and post it to the entire class via WebCT by _____. This reaction can take many forms: a critical reaction to one or more of the readings; a set of questions to be explored in class; the isolation of a line of tension between different readings; a proposed set of connections to other readings. Other possibilities exist, and deserve to be explored, but the principal goals of the reaction are two: to develop a critical response to the readings, and to contribute to building a constructive class discussion. You may opt out of one of these papers over the course of the semester and still be allowed to attend the relevant discussion.
- 3) **Final Paper:** You must write a final paper 20-25 pages long (typed, double-spaced, normal margins, twelve-point font), not including title page and/or bibliography. I expect this paper to engage with a substantial portion of the course readings and concepts from our in-class discussions. The “big idea” is to use the resources available from this class – including the literature, in class discussions, and my knowledge and feedback – to help frame, or otherwise address a problem or project. And this is why I REQUIRE you to engage with a substantial portion of the literature from this class (even if it is not the only, or even the majority of the literature you address), so that you have the opportunity to draw on those tools to the fullest. Thus, the page limits act primarily as a guideline. Ultimately what is most important is substantially engaging with broader explanatory concepts from class. That said, I hope your work in this class will help you in your existing course of study and research. Thus the final paper is open to a wide array of topics and projects. To ensure that you are able to use this opportunity to the fullest, you are required to meet with me during my office hours to discuss your final paper topic at some point prior to the last week of classes. The final paper is due on _____.

GRADING:

Grades will be determined through a holistic evaluation of the quality, effort, and consistency of (1) required written assignments and (2) seminar/workshop participation over the course of the entire semester. You will receive feedback throughout the semester to help you modify the level of your performance according to your own expectations for the course. This feedback will be given in the form of comments on assignments. Students are encouraged to meet with me throughout the semester to discuss goals, progress, and performance.

Your paper, attendance and participation will be given the following weights in the calculation of final grades:

Participation	10% of final grade
Weekly Analyses:	40% of final grade
Final Paper:	50% of final grade
<hr/>	
TOTAL:	100%

Final Letter Grade Cutoffs:

- A: 92-100%
- A-: 90-91.9%
- B+: 88-89.9%
- B: 83-87.9%
- B-: 80-82%
- C: 70-79%
- D: 60-69%
- F: <60%

Class Schedule

UNIT 1: HISTORICAL AND THEORETICAL FOUNDATIONS

Week 1 - Introduction
READING: No reading assignment

Week 2 The History of Geographic Thought – I Pre- Modernity
READING:

Week 3 The History of Geographic Thought – II Modernity
READING:

Week 4 Positivism, the Quantitative Revolution, and Antipositivism
READING:

Week 5 Marxist Geography
READING:

Week 6 Critical/Constructivist/Post-Structural Geography
READING:

UNIT 2: CONTEMPORARY APPLICATIONS

Week 7 Cultural Geography
READING:

Week 8 Physical Geography
READING:

Week 9 Land Change Geography
READING:

Week 10 Legal Geography
READING:

Week 11 Natural Resource Management
READING:

Week 12 Urban-Rural Geography
READING:

UNIT 3: METHODOLOGIES

Week 13 Ethnography & Qualitative Methods
READING:

Week 14 GIS
READING:

Week 15 Remote Sensing
READING:

Week 16 Integrative Methodologies
READING:

POLICIES:

Ethics and Academic Dishonesty:

The course emphasizes ethical practices and perspectives. Above all, students and instructors should strive to communicate and act, both in class interactions and in assigned coursework, in a manner directed by personal integrity, honesty, and respect for self and others. Included in this focus is the need for academic honesty by students as stated by the UNM Pathfinder. Students need to do original work and properly cite sources.

Accordingly, I consider Academic Dishonesty, including plagiarism to be unacceptable. The University's official definition of Academic Dishonesty may be found at:

<http://pathfinder.unm.edu/>

This is a graduate course for students who have developed a strong set of intellectual and work skills, and who are familiar with university policy on academic dishonesty. One of the non-negotiable requirements for passing this course is turning in your own, original, non-plagiarized work for all assignments submitted and properly citing sources. If you plagiarize, you will fail this class. Additionally, plagiarism and/or other forms of academic misconduct may lead to the system of institutional penalties outlined at the above website

Late Work: Late work will not be accepted. Turn in your work in a timely manner by deadline. In addition, you will not have a chance to rewrite your work after it has been turned in. However, you are encouraged to meet with the professor in advance to discuss and ask questions about your assignments in progress.

Email responsibility: Check your UNM email account regularly, as we will use this account to keep in touch with you about course requirements or updates. If you use another email address, please set up your UNM account to forward your UNM account email to that address.

Technology: Regularly check your UNM email account as we will use this account regularly for the course. If you use another email address, please forward your UNM email to that address. Of course, turn off cell phones and do not internet surf in class.

Accommodation: In accordance with University Policy 2310 and the Americans with Disabilities Act (ADA), academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention, as he/she are not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow. Contact Accessibility Resource Center at 277-3506 for additional information.

Diversity: This course encourages different perspectives related to such factors as gender, race, nationality, ethnicity, sexual orientation, religion, and other relevant cultural identities. This

course seeks to foster understanding and inclusiveness related to such diverse perspectives and ways of communicating.

Office Hours: Office hour times and locations are subject to change. If you intend to visit me during an office hour I STRONGLY recommend that you inform me in advance to confirm time and place.

Grades: All grades assigned are final and non-negotiable. No incompletes for the semester will be given unless you can demonstrate valid and compelling reasons for your inability to complete the work. No extra-credit or make-up assignments will be offered.

NEW COURSE REQUEST—FORM B

- ◆ Allow at least 6 months to complete the entire approval process.
- ◆ Please refer to the Form B Instructions at www.unm.edu/~unmreg
- ◆ Four sets of forms must be collated and submitted.

Submission Date 11 / 09 / 20 15

Name of Faculty Member Initiating Request John Carr

Initiator's Position / Title Associate Professor

College Arts & Sciences

Department Geography & Environmental Studies

Phone 277-5041 Email carrj@unm.edu

- ROUTING (All Four Collated Sets)
1. Department Chair
 2. College or School Curricula Committee
 3. College or School Faculty (if necessary)
 4. College or School Dean/Dean of Instruction
 5. Office of Registrar—Catalog
 6. Director of Relevant Library
 7. FS Graduate Committee (graduate courses)
 8. FS Undergraduate Committee (undergraduate courses)
 9. FS Curricula Committee
 10. Associate Provost for Academic Affairs

Branches Only – course is

Type 1 ☐ Type 2 ☐ Type 3 ☐

- A. A1. Attach four copies of a precise, complete catalog listing of the proposed new course following the current format used in the printed UNM catalog. The listing must include the course subject code and the course number, long title, credit hour value, and course description (no more than 35 words). To indicate graduate credit for course numbers outside of 500-699, an asterisk (*) should precede the course number.
- A2. Attach four copies of a course syllabus and bibliography (include suggested course text and schedule of topics covered in the course).

B. B1. Course Subject Code GEOG B2. Course Number 602 B3. Proposed Effective Term Fall 2019

B4. Long Course Title (up to 100 letters, including spaces):

Integrative Research Design

B5. Proposed Short Course Title (up to 30 letters, including spaces):

	I	N	T	E	G	R	A	T	I	V	E		R	E	S	E	A	R	C	H		D	E	S	I	G	N		
--	---	---	---	---	---	---	---	---	---	---	---	--	---	---	---	---	---	---	---	---	--	---	---	---	---	---	---	--	--

B6. College ARTS & SCIENCES B7. Department Geography & Environmental Studies B8. CIP Code _____

(assigned by Assoc. Provost for Academic Affairs)

B9. Credit Hours				
	Fixed Credit	Variable Credit		
		Low	Or / To	High
Credit Hours	3			
Lecture Hours	3			
Lab Hours	0			

- B10. Repeat Rules
- Is the course repeatable for credit? Yes ☐ No ☒
- The course may be repeated _____ times (exclusive of the first time).
- AND / OR**
- The course may be repeated for _____ hours (inclusive of the first time)

- B11. Course Level (check one only): UG ☐ GR ☒ Law ☐ PharmD ☐ MedD ☐
- ☐ Graduate credit for course numbers outside of 500-699 (requiring an asterisk before the number)
- If graduate credit is available for courses numbered outside of 500-699, complete section F1.
- B12. Grade Options: The standard grading scale in the catalog will be applied to this course. Yes ☒ No ☐
- If no, select the appropriate option and complete section F2.
- ☐ The grade scale will be exclusively CR/NC.
- ☐ The grade scale will be an alternative to the standard scales in the catalog.

B13. List all schedule type(s) (may be more than one):

a. Seminar b. _____ c. _____ d. _____ e. _____

C. C1. Co-requisites to this course: a. none b. _____ c. _____

*If this course is a new co-requisite to those listed, you must submit a Form A for each course that is affected.
Note: Please see the instructions for information on one-way vs. two-way co-requisites.*

C1a. If the co-requisite course exists in another department, the co-requisite offering department must approve it as well.

Department	a.	b.	c.
Course			
Chair Name			
Chair Signature			

C2. Crosslisted courses: Complete the table, including signatures from all departments offering the crosslisted courses.

Department	a.	b.	c.	d.	e.	f.
Subject Code & Number						
Chair Name						
Chair Signature						

C3. Course Fees: Yes ☐ No ☒ If yes, attach a completed, signed *Special Course Fees Approval Form* from the office of the Associate Provost for Academic Affairs.

C4. Is this course *elective* ☐ or *required* ☒ for a degree program? If *required*, **submit a Form C** as well.

C5. Branches Only: Is this course: Occupational ☐ Technical ☐ Academic ☐ *(Please check one)*

D. D1. Restrictions. List any restrictions placed on students for registration in any section of this course. If none, write "None" in the box.

None

D2. Pre-requisites for Course: If the course has pre-requisites, list all of them, including course subject code and course number or test name and test score for each one. Be sure to include the appropriate conjunction (and / or) between each item and between any sets of pre-requisites. If any of the pre-requisites come from another department, have the department chair sign to acknowledge awareness of those relationships. If none, write "None" in the box.

GEOG601 Introduction to Geographic Theory and Application

For courses outside the offering department to be used as pre-requisites:

Department Chair Signature

Department Chair Signature

Department Chair Signature

E. E1. Does this course duplicate any content in the current UNM Catalog? Yes ☐ No ☒

If yes, complete the following table:

Department Name	Duplicate Course	Department Chair	Chair Signature	Check One:	
				AGREE TO DUPLICATE	
				DISAGREE TO DUPLICATE	
				AGREE TO DUPLICATE	
				DISAGREE TO DUPLICATE	
				AGREE TO DUPLICATE	
				DISAGREE TO DUPLICATE	

E2. Has this course been offered as a topic course? Yes ☐ No ☒
If yes, in which term(s), and to what average enrollment? _____

E3. Will this course replace a deleted course? Yes ☐ No ☒ If yes, which one? _____

If yes, and the deleted course is 100 or 200 level, has this change been discussed with all the branch campuses that offer this course? Yes ☐ No ☐

Provide a statement below or attach a memo explaining how this replacement will impact Branch campuses and programs.

F. F1. Justification for Graduate Credit: If the course is numbered outside of 500-699, indicate the nature of additional work to be required of graduate students.

F2. Justification for CR/NC or Alternative Grading Scale (include scale in justification):

G. G1. Budgetary and Faculty Load Implications. All new courses have such implications, even when replacing a deleted course.

a. Justification for offering the course:

b. Impact on long-range planning for unit, school / college, and university:


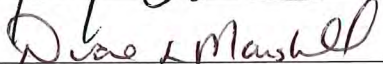




c. Budget and faculty load data:

G2. Relevant Library Impact Statement: Complete below or attach a signed memo.

Name of Library

Name and Signature of Librarian

H. Required Signatures:

Office	Signature	Date
1. Department Chair		27 Oct 2017
2. College or School Curricula Committee		8/2/2017
3. College or School Faculty (if necessary)		
4. College or School Dean / Dean of Instruction		
5. Office of Registrar—Catalog		8/9/17
6. Director of Relevant Library		8/11/17
7. FS Graduate Committee (graduate courses)		10/05/17
8. FS Undergraduate Committee (undergraduate courses)		11-3-17
9. FS Curricula Committee		
10. Associate Provost for Academic Affairs		

After securing departmental approval, send this form and all attachments, **collated into 4 sets of documents**, to the Registrar's Catalog Office, which retains the original and returns copies to the department and college office.

For Registrar's Office Use ONLY (After approval by Faculty Senate Curricula Committee):

Entered in Banner _____ Entered in Catalog _____ Copies Mailed _____

Attributes: 1. _____ 2. _____ 3. _____ 4. _____

Grade Modes _____

APPENDIX B: NEW COURSE PROPOSALS ASSOCIATED WITH PROPOSED PROGRAM

Submitted concurrently with the Form D

The following courses are critical to the launch of the joint PhD program, and Form B proposals have therefore been submitted concurrently with this Form D.

- GEOG601 Introduction to Geographic Theory and Application: Overview of geographic history and philosophy, with emphasis on relationship between theory and practice. Includes virtual and in-person meetings with students from both UNM and NMSU. Prerequisite: graduate standing.
- **GEOG602 Integrative Research Design:** Introduction to research design in geography, with emphasis on the integration of qualitative and quantitative methods. Includes virtual and in-person meetings with students from both UNM and NMSU. Prerequisite: graduate standing.
- GEOG603 Professional Geographic Practice: This professional development course focuses on communication, ethics, grantwriting, and applied geographical work in the student's area of interest. Prerequisite: graduate standing.

GEOG 602: Integrative Research Design

DRAFT SYLLABUS by Maria Lane

CR# _____ Semester _____
Schedule _____ Location _____
Instructor _____ Contact info _____

CREDIT HOURS: 3

This seminar focuses on the basic elements of research design, guiding students through the development of a formal proposal for original academic research. This course should be taken after GEOG 601 as part of the required two-course sequence for PhD students in Geography. Throughout the course, we will read, attend, discuss and critique recent research in the discipline of Geography, focusing on the choices that geographers make during the research process. The class also includes workshops on a variety of professional development topics intended to guide students toward successful completion of the PhD program and to prepare them for careers that will involve research in some capacity. Please note that the class meeting time overlaps with the speaker series in UNM’s Department of Geography & Environmental Studies, which is held every other Friday, from 3-4pm. On weeks when a speaker is scheduled, all students of GEOG602 are expected to attend the colloquium. On the off-weeks, class will conclude at 3pm.

What will you get out of this course?

By the end of this class, you will have a clear understanding of how scholars in the discipline of geography design research projects using different key concepts and theories. You will also be able to identify basic concepts and theories that are applicable for your own independent graduate-level research. The course structure is designed to provide a learning environment in which each student can achieve the following:

1. Demonstrate a clear understanding of the theory and methods currently used multiple subfields that prioritize integrative geographical research.
2. State an original research question appropriate for geographic analysis.
3. State how a research project contributes to an existing body of geographic literature.
4. Design legitimate geographic methodology suitable for answering the research question.
5. Communicate clearly and effectively in an oral format.
6. Communicate clearly and effectively in a written format.
7. Identify all of the faculty members who will serve on his or her graduate committee.

What are your responsibilities in this course?

This class is fairly demanding and requires considerable time outside of class for completing mandatory readings and assignments. It will be taught in a format that combines both seminar and workshop elements. Full participation in the seminar environment requires a thorough and critical reading of all assigned texts and an active engagement with the ideas presented by authors and fellow students. Full participation in the workshop environment requires conscientious completion of all assignments and a willingness to engage in charitable critique of your fellow students’ work.

I expect significant progress toward defining your master’s project over the course of this semester. By the end of the semester, students should be ready to present a full proposal and begin undertaking research during the third and final required core course: GEOG603 Professional Geographic Practice.

REQUIRED TEXTS

Required readings are listed in the course schedule and will be drawn from the following sources:

- Robbins, Paul (2007) *Lawn People: How Grasses, Weeds, and Chemicals Make Us Who We Are*. Philadelphia: Temple University Press.
- and numerous articles and book excerpts posted on the class UNMLearn site.

REQUIRED ASSIGNMENTS

You will demonstrate course content mastery through the following required assignments. Written assignments are always due (through UNMLearn) before the beginning of class.

Participation in Seminars and Workshops (weekly)

This includes regular attendance, active engagement with ideas presented in required readings, and respectful consideration of peers’ comments. In order to ensure that you are ready to discuss and critique an assigned text, you should identify in advance the author’s main argument, the literatures cited, the methodologies used, and the findings presented. You should also be prepared to assess the strengths and weaknesses of the author’s claims.

Attendance at Departmental Seminars (various Fridays)

In this class, you are expected to attend all public research presentations in the Department of Geography & Environmental Studies. We will use these presentations as a basis for discussion of scholarly approaches to research topics and methods, so it is critical that you attend on a regular basis. In general, colloquia are scheduled for Fridays at 3pm, with a 45-minute seminar presentation followed by questions and informal discussion.

Proposal Progress Elements (weekly)

Throughout the semester, you will be required to submit a range of assignments that lead you through the process of producing a research proposal. Although the submission requirements range widely for each week (see detailed schedule), you are expected to work consistently throughout the semester to develop a research proposal. This expectation applies equally to all students, regardless of your area of specialization or your intended research focus.

Peer Critiques (weekly and due 4/17)

In our weekly research workshops, you will frequently be asked to critique your fellow students’ work. In the week after full proposal drafts are due, you will also be assigned to provide a formal written critique of two of your classmates’ submissions. The purpose of this assignment is: (1) to broaden your perspectives on the potential strengths and weaknesses of a research proposal, and (2) to provide additional critical feedback that you can incorporate into the final proposal draft.

Final Dissertation Proposal (due 5/1)

The culmination of weekly workshops and independent work is the formal dissertation proposal, which you will submit in both oral and written formats. Your written proposal will be judged at the highest standard. This document should be suitable for immediate distribution to a dissertation committee.

As you can see in the course schedule, you are required to complete reading and written assignments every week in this course. **There is simply no way around the fact that this class requires a significant amount of work.** Please arrange your semester schedule in such a way that you can devote considerable time to this course.

GRADING

Grades will be determined through a holistic evaluation of the quality, effort, and consistency of (1) required written assignments and (2) seminar/workshop participation over the course of the entire semester. You will receive feedback throughout the semester to help you modify the level of your performance according to your own expectations for the course. This feedback will be given in the form of comments on assignments. Students are encouraged to meet with me throughout the semester to discuss goals, progress, and performance.

GRADING SCALE

1. In Class Participation 25%
2. Proposal Progress Assignments 25%
3. Peer Critiques 15%
4. Final Dissertation Proposal 35%

Final Letter Grade Cutoffs:

A: 92-100%
A-: 90-91.9%
B+: 88-89.9%
B: 83-87.9%
B-: 80-82%
C: 70-79%
D: 60-69%
F: <60%

CLASS COMMUNICATIONS

Class materials are posted on UNMLearn and will NOT be available in paper copies. To log in, go to <http://learn.unm.edu>, enter your UNM NetID/password, then click GEOG 602.

UNMLearn contains PDFs of required articles, assignment guides, and grading rubrics. You will submit all assignments through UNMLearn, using electronic forms that allow me to provide feedback visible only to you. I will also use UNMLearn to make periodic class announcements via email. Please make sure that you check your UNMLearn mail regularly, or change the settings to forward messages to the email address that you check most often.

WRITING

This course requires a significant amount of writing, and I expect every student to develop improved writing skills over the course of the semester. If this is a skill area in which you need assistance, consider using the Graduate Resource Center (GRC), which offers both online and in-person writing support and assistance. The Graduate Online Writing Lab offers a 72-hour turnaround time at <http://caps.unm.edu/writing/growl> and individual appointments are available by contacting the GRC at Mesa Vista Hall, Suite 1057 or by phone at (505) 277-1407.

COURSE OUTLINE

(see detailed schedule on following pages)

Week 1 (1/16) – Survival guide for proposal writing

Week 2 (1/23) – Academic pathways: to the degree and beyond
Week 3 (1/30) – Primer on sources: finding and organizing literature
Week 4 (2/6) – Finding research gaps in the academic literature
Week 5 (2/13) – How to write a research question
Week 6 (2/20) – Ethics in the academic workplace
Week 7 (2/27) –From research question to methodology
Week 8 (3/6) – Know your philosophy, choose your method
Week 9 (3/13) – NO CLASS: SPRING BREAK
Week 10 (3/20) – What makes research integrative
Week 11 (3/27) – Envisioning the final research product
Week 12 (4/3) – The art of proposal writing
Week 13 (4/10) – Academic peer review
Week 14 (4/17) – Proposal workshop
Week 15 (4/24) – NO CLASS: FINAL PREPARATION OF PROPOSALS
Week 16 (5/1) – Geography Research Symposium

INTRODUCTION

1/16 – Survival guide for proposal writing

Reading: syllabus

Focus: elements of the proposal

1/23 – Academic pathways: to the degree and beyond

Assignment(s) due:

#1. Annotated bibliography and analytical essay, as submitted at end of GEOG 601

#2. Confirmation of committee chair

#3. Statement of research interests

Reading: Start reading Robbins, Paul (2007) *Lawn People: How Grasses, Weeds, and Chemicals Make Us Who We Are*. Philadelphia: Temple University Press.

Colloquium: Speaker TBA, 3pm

1/30 – Primer on sources: finding and organizing literature

Assignment(s) due:

#4. List of potential committee members

Reading: Finish reading Robbins (2007) *Lawn People*.

Workshop: Indexes, databases, citation software, and more

2/6 – Finding research gaps in the academic literature

Assignment(s) due:

#5. Meet with a potential committee member

#6. Progress report on literature review

Reading:

- Pacheco, P. and R. Poccad-Chapuls (2012) The complex evolution of cattle ranching development amid market integration and policy shifts in the Brazilian Amazon. *Annals of the Association of American Geographers* 102(6): 1366-1390.
- Kitchin, R. and Dodge, M. (2007) Rethinking maps. *Progress in Human Geography* 31, 331-44.

Focus: Why literature reviews are required for original research

Colloquium: Speaker TBA, 3pm

2/13 – How to write a research question

Assignment(s) due: additional meetings as needed with potential committee members

Reading:

- Carey, M. A. French, and E. O'Brien (2012) Unintended effects of technology on climate change adaptation: An historical analysis of water conflicts below Andean glaciers. *Journal of Historical Geography* 38(2): 181-191.
- Keeling, Arn and J. Sandlos (2009) Environmental justice goes underground? Historical notes from Canada's northern mining frontier. *Environmental Justice* 2(3): 117-125.

Focus: Five elements of a good research question

2/20 – Ethics in the academic workplace

Assignment(s) due:

#7. Four potential research questions

Reading: none

Focus: guest presentations on ethics

Colloquium: Speaker TBA, 3pm

2/27 – From Research Question to Methodology

Assignment(s) due:

#8. Literature review

Reading:

- Eleanor Andrews, James McCarthy (2013) Scale, shale, and the state: political ecologies and legal geographies of shale gas development in Pennsylvania. *Journal of Environmental Studies and Sciences*, 1-10.
- Birkenholtz, Trevor (2009) Irrigated landscapes, produced scarcity, and adaptive social institutions in Rajasthan, India. *Annals of the Association of American Geographers* 99(1): 118-137.

Workshop: Ensuring that research questions are answerable

3/6 – Know your philosophy, choose your methods

Assignment(s) due:

#9. Two draft research questions

#10. Two potential methods for answering *each* question

Reading:

- Davis, Diana K. (2005) Indigenous knowledge and the desertification debate: problematising expert knowledge in North Africa. *Geoforum* 36(4): 509-524.
- Lane, S.N., N. Odoni, C. Landstroem, S. J. Whatmore, N. Ward and S. Bradley (2011) Doing flood risk science differently: An experiment in radical scientific method. *Transactions of the Institute of British Geographers* 36(1): 15-36.

Focus: Theories of knowledge and how they connect to research methodologies

Colloquium: Speaker TBA, 3pm

3/13 – NO CLASS: SPRING BREAK

3/20 – What makes research integrative?

Assignment(s) due:

#11. Select and refine final research question

#12. Outline three potential methods for answering this question

Reading:

- Lave, Rebecca, Matthew W. Wilson, Elizabeth Barron, Christine Biermann, Mark Carey, Martin Doyle, Chris Duvall, Leigh Johnson, Maria Lane, Jamie Lorimer, Nathan McClintock, Darla Munroe, Rachel Pain, James Proctor, Bruce Rhoads, Morgan M. Robertson, Jairus Rossi, Nathan F. Sayre, Gregory Simon, Marc Tadaki, and Christopher Van Dyke. 2014. “Intervention: Critical physical geography.” *The Canadian Geographer* 58(1): 1-10.
- Wilson, Matthew W. "New lines? Enacting a social history of GIS." *The Canadian Geographer/Le Géographe canadien* 59.1 (2015): 29-34.
- Simon, Gregory L. "Vulnerability-in-Production: A Spatial History of Nature, Affluence, and Fire in Oakland, California." *Annals of the Association of American Geographers* 104.6 (2014): 1199-1221.

Focus: How to integrate theories, methods, and researchers

3/27 – Envisioning the final research product

Assignment(s) due:

#13. Detailed methodological outline

Reading:

- Weeks, John R., Arthur Getis, Douglas A. Stow, Allan G. Hill, David Rain, Ryan Engstrom, Justin Stoler, Christopher Lippitt, Marta Jankowska, Anna Carla Lopez-Carr,

Lloyd Coulter & Caetlin Ofiesh (2012) Connecting the dots between health, poverty and place in Accra, Ghana. *Annals of the Association of American Geographers* 102(5): 932-941.

- Goldsberry, Kirk, Chris S. Duvall, Philip H. Howard & Joshua E. Stevens (2010) Visualizing nutritional terrain: a geospatial analysis of pedestrian produce accessibility in Lansing, Michigan, USA. *Geocarto International* 25(6): 485-499.

Focus: What do we mean by “expected results”?

Colloquium: Speaker TBA, 3pm

4/3 – The art of proposal writing

#14. Research design section for proposal

Reading:

- Scott, Heidi V. (2012) The contested spaces of the subterranean: colonial governmentality, mining, and the mita in early Spanish Peru. *Journal of Latin American Geography* 11: 7-33.
- Roth, Robin J. 2008. “Fixing” the forest: The spatiality of conservation conflict in Thailand. *Annals of the Association of American Geographers* 98(2): 373-391.

Focus: Review of proposal elements

4/10 – Academic Peer Review

Assignment(s) due:

#15. Full proposal due to peer reviewers

Reading:

- Lane, K. Maria D. (2014a) Book prospectus for University of Chicago Press: *Fluid Geographies: Settling New Mexico during the Reclamation Era*.
- Lane (2014b, 2014c, 2014d): reviewer responses and author reply

Focus: How to give and receive charitable critique

Colloquium: Speaker TBA, 3pm

4/17 – Proposal workshop

Assignment(s) due:

#16. Peer critique of assigned research proposals

#17. Full list of committee members

Reading:

- Kemp, Karen K., Kekuhi Keali'iikanaka'oleohaililani, and Matthews M. Hamabata (2011) Ha'ahonua: Using GIScience to link Hawaiian and Western knowledge about the environment. In M. Dear, J. Ketchum, S. Luria and D. Richardson, eds. *GeoHumanities: Art, history, text at the edge of place*. New York: Routledge, pp. 287-295.
- Malmberg, Bo, Eva Andersson, John Östh (2013) Segregation and urban unrest in Sweden. *Urban Geography* 34(7): 1031-1046.

Workshop: Ethics followup; Open forum on proposal issues

4/24 – NO CLASS: PROPOSAL PREPARATION

5/1 – Geography Research Symposium

Assignment(s) due:

#18. Final research proposal

#19. Paperwork for program of study

Reading: none

Workshop: In-class proposal presentations – 15 minutes each

Colloquium: Speaker TBA

ACCOMMODATION STATEMENT

Accessibility Services (Mesa Vista Hall 2021, 277-3506) provides academic support to students who have disabilities. If you think you need alternative accessible formats for undertaking and completing coursework, you should contact this service right away to assure your needs are met in a timely manner. If you need local assistance in contacting Accessibility Services, see the Bachelor and Graduate Programs office.

ACADEMIC INTEGRITY

The University of New Mexico believes that academic honesty is a foundation principle for personal and academic development. All University policies regarding academic honesty apply to this course. Academic dishonesty includes, but is not limited to, cheating or copying, plagiarism (claiming credit for the words or works of another from any type of source such as print, Internet or electronic database, or failing to cite the source), fabricating information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. The University's full statement on academic honesty and the consequences for failure to comply is available in the college catalog and in the *Pathfinder*.

NEW COURSE REQUEST—FORM B

- ♦ Allow at least 6 months to complete the entire approval process.
- ♦ Please refer to the Form B Instructions at www.unm.edu/~unmreg
- ♦ Four sets of forms must be collated and submitted.

Submission Date 11 / 03 / 2015

Name of Faculty Member Initiating Request John Carr

Initiator's Position / Title Associate Professor

College Arts & Sciences

Department Geography & Environmental Studies

Phone 277-5041 Email carrj@unm.edu

- ROUTING (All Four Collated Sets)
1. Department Chair
 2. College or School Curricula Committee
 3. College or School Faculty (if necessary)
 4. College or School Dean/Dean of Instruction
 5. Office of Registrar—Catalog
 6. Director of Relevant Library
 7. FS Graduate Committee (graduate courses)
 8. FS Undergraduate Committee (undergraduate courses)
 9. FS Curricula Committee
 10. Associate Provost for Academic Affairs

Branches Only – course is

Type 1 ☐ Type 2 ☐ Type 3 ☐

A. A1. Attach four copies of a precise, complete catalog listing of the proposed new course following the current format used in the printed UNM catalog. The listing must include the course subject code and the course number, long title, credit hour value, and course description (no more than 35 words). To indicate graduate credit for course numbers outside of 500-699, an asterisk (*) should precede the course number.

A2. Attach four copies of a course syllabus and bibliography (include suggested course text and schedule of topics covered in the course).

B. B1. Course Subject Code GEOG B2. Course Number 603 B3. Proposed Effective Term Fall 2019

B4. Long Course Title (up to 100 letters, including spaces): Professional Geographic Practice

B5. Proposed Short Course Title (up to 30 letters, including spaces):

P	R	O	F	E	O	S	I	O	N	A	L		G	E	O	G		P	R	A	C	T	I	C	E				
---	---	---	---	---	---	---	---	---	---	---	---	--	---	---	---	---	--	---	---	---	---	---	---	---	---	--	--	--	--

B6. College ARTS & SCIENCES B7. Department Geography & Environnr B8. CIP Code

(assigned by Assoc. Provost for Academic Affairs)

B9. Credit Hours				
	Fixed Credit	Variable Credit		
		Low	Or / To	High
Credit Hours	3			
Lecture Hours	3			
Lab Hours	0			

B10. Repeat Rules

Is the course repeatable for credit? Yes ☐ No ☒

- The course may be repeated _____ times (exclusive of the first time).

AND / OR

- The course may be repeated for _____ hours (inclusive of the first time)

B11. Course Level (check one only): UG ☐ GR ☒ Law ☐ PharmD ☐ MedD ☐

☐ Graduate credit for course numbers outside of 500-699 (requiring an asterisk before the number)

If graduate credit is available for courses numbered outside of 500-699, complete section F1.

B12. Grade Options: The standard grading scale in the catalog will be applied to this course. Yes ☒ No ☐

If no, select the appropriate option and complete section F2.

☐ The grade scale will be exclusively CR/NC.

☐ The grade scale will be an alternative to the standard scales in the catalog.

B13. List all schedule type(s) (may be more than one):

a. Seminar b. c. d. e.

C. C1. Co-requisites to this course: a. none b. c.

If this course is a new co-requisite to those listed, you must submit a Form A for each course that is affected.
Note: Please see the instructions for information on one-way vs. two-way co-requisites.

C1a. If the co-requisite course exists in another department, the co-requisite offering department must approve it as well.

Department	a.	b.	c.
Course			
Chair Name			
Chair Signature			

C2. Crosslisted courses: Complete the table, including signatures from all departments offering the crosslisted courses.

Department	a.	b.	c.	d.	e.	f.
Subject Code & Number						
Chair Name						
Chair Signature						

C3. Course Fees: Yes No ☒ If yes, attach a completed, signed *Special Course Fees Approval Form* from the office of the Associate Provost for Academic Affairs.

C4. Is this course *elective* or *required* ☒ for a degree program? If *required*, submit a **Form C** as well.

C5. Branches Only: Is this course: Occupational Technical Academic (Please check one)

D. D1. Restrictions. List any restrictions placed on students for registration in any section of this course. If none, write "None" in the box.
None

D2. Pre-requisites for Course: If the course has pre-requisites, list all of them, including course subject code and course number or test name and test score for each one. Be sure to include the appropriate conjunction (and / or) between each item and between any sets of pre-requisites. If any of the pre-requisites come from another department, have the department chair sign to acknowledge awareness of those relationships. If none, write "None" in the box.
GEOG601 Introduction to Geographic Theory and Application
GEOG602 Integrative Research Design

For courses outside the offering department to be used as pre-requisites:

Department Chair Signature Department Chair Signature Department Chair Signature

E. E1. Does this course duplicate any content in the current UNM Catalog? Yes No ☒

If yes, complete the following table:

Department Name	Duplicate Course	Department Chair	Chair Signature	Check One:	
				AGREE TO DUPLICATE	
				DISAGREE TO DUPLICATE	
				AGREE TO DUPLICATE	
				DISAGREE TO DUPLICATE	
				AGREE TO DUPLICATE	
				DISAGREE TO DUPLICATE	

E2. Has this course been offered as a topic course? Yes No ☒
If yes, in which term(s), and to what average enrollment?

E3. Will this course replace a deleted course? Yes ☐ No ☒ If yes, which one? _____

If yes, and the deleted course is 100 or 200 level, has this change been discussed with all the branch campuses that offer this course? Yes ☐ No ☐

Provide a statement below or attach a memo explaining how this replacement will impact Branch campuses and programs.

F. F1. Justification for Graduate Credit: If the course is numbered outside of 500-699, indicate the nature of additional work to be required of graduate students.

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a. Justification for offering the course:

b. Impact on long-range planning for unit, school / college, and university:


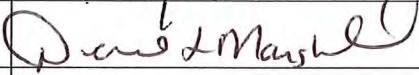

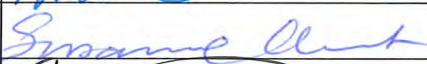

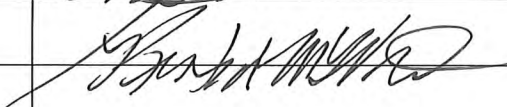
c. Budget and faculty load data:

G2. Relevant Library Impact Statement: Complete below or attach a signed memo.

Name of Library

Name and Signature of Librarian

H. Required Signatures:

Office	Signature	Date
1. Department Chair		27062017
2. College or School Curricula Committee		8/2/2017
3. College or School Faculty (if necessary)		
4. College or School Dean / Dean of Instruction		
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Attributes: 1. _____ 2. _____ 3. _____ 4. _____

Grade Modes _____

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- **GEOG603 Professional Geographic Practice:** This professional development course focuses on communication, ethics, grantwriting, and applied geographical work in the student's area of interest. Prerequisite: graduate standing.

Seminar: Professional Geographic Practice

Geography 603

INSTRUCTOR: _____

Email: _____

Office: _____

Office Hours: _____

CLASS MEETINGS: _____

CREDIT HOURS: 3

COURSE DESCRIPTION: This course is intended to prepare Ph.D. level students to enter the professional realm, whether as full time academics, researchers, policymakers and/or other types of geographic professionals. Accordingly, it seeks to provide students an opportunity to develop the range of skills expected of geographic professionals in a variety of contexts, with a focus on “core competencies” which are required across professional contexts.

STUDENT LEARNING OUTCOMES

1. Students will be able to situate their academic and research interests within the broader context of professional careers within and pertaining to the discipline of Geography.
2. Students will be able to demonstrate a clear understanding of the competencies required in a range of professional contexts within and pertaining to the discipline of Geography
3. Students will be able to develop and demonstrate competency in a variety of core professional competencies including:
 - a. communicating clearly and effectively in an oral format.
 - b. communicating clearly and effectively in a written format.
 - c. communicating clearly and effectively in an audio-visual format.
4. Students will be able to identify and explore the ethical dimensions of research, teaching, and presentation in a geographic context.

TEXTS:

The books to purchase are as follows:

EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

- 1) **Class Participation:** Because much of the learning in this course comes from thoughtful discussion, listening, and interacting around the topics of the course, you are expected to attend and to participate during each class meeting. If you are not here to be a participant along with your classmates, everyone loses. Both your

attendance and the quality of your participation will be considered in determining final grades.

- a. **Timely completion of the following weekly assignments.** If you have not submitted a timely assignment, I will ask you to leave the class for which the assignment was required. As mentioned below, you may opt out of this requirement once during the semester.
 - b. **Respectful dialog.** This is a non-negotiable requirement of this class. Practices to ensure this include: listening closely and respectfully; refraining from ridicule or interruption; retaining modesty and humility. I particularly stress the “golden rule”; if you introduce an author or a concept not otherwise covered in class, this is an opportunity for you to introduce helpful supplementary substance. In other words, contribute expansively in the learning experience, avoiding name- or concept-dropping. There is much to explore in the course and many arguments to be heard, so let’s work to create an environment where explorations are encouraged and enjoyable.
- 2) **Weekly Projects:** Every week each student will have either a reflection paper on the topics for that week’s readings, or a “professional sub-project” based on that week’s “core competency.” These assignments will take a variety of forms.
- 3) **Final Project:** You must prepare a final project with length, content, and format to be negotiated with the course instructor. At the very least, the project must involve exhibiting excellence in at least one oral, one written, and one visual “core competency” covered by the class. The final three days of the semester will be dedicated to presentation of these projects to the class as a whole.

GRADING:

Your project attendance and participation will be given the following weights in the calculation of final grades:

Participation & Weekly Analyses:	50% of final grade
Final Project:	50% of final grade
<hr/>	
TOTAL:	100%

Class Schedule

UNIT 1: GEOGRAPHIC PROFESSIONALISM

Week 1 - Introduction – A Life in Geography
READING: No reading assignment

Week 2 Geographic Careers – Opportunity and Hybridity
READING:

Week 3 Academic Pathways – Academic Publication and Research
READING:

Week 4 Academic Pathways – Teaching
READING:

Week 5 Academic Pathways – Service and Academic Professionalism
READING:

Week 6 Issues in Professional Geographic Research
READING:

Week 7 Geography, Ethics, Professionalism
READING:

UNIT 2: CORE COMPETENCIES

Week 8 Written Presentation: Context, Truth Claims, and Persuasiveness
READING:

Week 9 Written Presentation: Methodology and Data
READING:

Week 10 Visual presentation: General Principals & Audio Visual Presentation
READING:

Week 11 Visual presentation: Mapping and Perception
READING:

Week 12 Teaching and Pedagogy
READING:

Week 13 Oral Presentation – Small Groups
READING:

Week 14 Oral Presentation – Large Group
READING:

UNIT 3: PRESENTATIONS: COMPETENCIES IN PRACTICE

Week 15 FINAL PROJECT PRESENTATIONS
READING:

Week 16 FINAL PROJECT PRESENTATIONS
READING:

POLICIES:

Ethics and Academic Dishonesty:

The course emphasizes ethical practices and perspectives. Above all, students and instructors should strive to communicate and act, both in class interactions and in assigned coursework, in a manner directed by personal integrity, honesty, and respect for self and others. Included in this focus is the need for academic honesty by students as stated by the UNM Pathfinder. Students need to do original work and properly cite sources.

Accordingly, I consider Academic Dishonesty, including plagiarism to be unacceptable. The University's official definition of Academic Dishonesty may be found at:

<http://pathfinder.unm.edu/>

This is a graduate course for students who have developed a strong set of intellectual and work skills, and who are familiar with university policy on academic dishonesty. One of the non-negotiable requirements for passing this course is turning in your own, original, non-plagiarized work for all assignments submitted and properly citing sources. If you plagiarize, you will fail this class. Additionally, plagiarism and/or other forms of academic misconduct may lead to the system of institutional penalties outlined at the above website

Late Work: Late work will not be accepted. Turn in your work in a timely manner by deadline. In addition, you will not have a chance to rewrite your work after it has been turned in. However, you are encouraged to meet with the professor in advance to discuss and ask questions about your assignments in progress.

Email responsibility: Check your UNM email account regularly, as we will use this account to keep in touch with you about course requirements or updates. If you use another email address, please set up your UNM account to forward your UNM account email to that address.

Technology: Regularly check your UNM email account as we will use this account regularly for the course. If you use another email address, please forward your UNM email to that address. Of course, turn off cell phones and do not internet surf in class.

Accessibility: Accessibility Services (Mesa Vista Hall 2021, 277-3506) provides academic support to students who have disabilities. If you think you need alternative accessible formats for undertaking and completing coursework, you should contact this service right away to assure your needs are met in a timely manner. If you need local assistance in contacting Accessibility Services, see the Bachelor and Graduate Programs office.

Diversity: This course encourages different perspectives related to such factors as gender, race, nationality, ethnicity, sexual orientation, religion, and other relevant cultural identities. This course seeks to foster understanding and inclusiveness related to such diverse perspectives and ways of communicating.

Office Hours: Office hour times and locations are subject to change. If you intend to visit me during an office hour I STRONGLY recommend that you inform me in advance to confirm time and place.

Grades: All grades assigned are final and non-negotiable. No incompletes for the semester will be given unless you can demonstrate valid and compelling reasons for your inability to complete the work. No extra-credit or make-up assignments will be offered.

APPENDIX C: COURSE CATALOG DESCRIPTIONS

Core Courses Offered at UNM: Geography & Environmental Studies

- GEOG601: Overview of geographic history and philosophy, with emphasis on relationship between theory and practice. Includes virtual and in-person meetings with students from both UNM and NMSU. Prerequisite: graduate standing. [Form B under consideration.]
- GEOG602: Introduction to research design in geography, with emphasis on the integration of qualitative and quantitative methods. Includes virtual and in-person meetings with students from both UNM and NMSU. Prerequisite: graduate standing. [Form B under consideration.]
- GEOG603: This professional development course focuses on communication, ethics, grantwriting, and applied geographical work in the student's area of interest. Prerequisite: graduate standing. [Form B under consideration.]

Elective Courses Offered at UNM: Geography & Environmental Studies

- GEOG*445 Geography of New Mexico and the Southwest: This course introduces the geography of the Southwest, focusing on New Mexico. Students will conduct independent research in conjunction with a multi-day field trip. [Note: this class counts for graduate credit.]
- GEOG*450 Environmental Hazards: This course provides an introduction to environmental hazards including drought, floods, earthquakes, wildfire, and hurricanes. Geographic technologies used to map, model, analyze, and manage hazards are discussed. Disturbances related to human-environment interactions are covered. [Note: this class counts for graduate credit.]
- GEOG*481L Map Design and Geovisualization: Thematic mapping of qualitative and quantitative data, including graphic design theory and appropriate statistical and representational treatment of geospatial data. Fees required. Two hours lecture, four hours lab. Prerequisite: 281. [Note: this class counts for graduate credit.]
- GEOG514 Natural Resources Seminar: This course explores the interdisciplinary nature of natural resource challenges. Topics will vary each semester. Field trips will be included to investigate issues relevant to the class.
- GEOG515 Cultural and Political Ecology: This seminar examines case studies and recent geographical scholarship in cultural and political ecology, focusing on its relevance for resource managers and institutions.
- GEOG516 Seminar: Globalization: This seminar examines the political, cultural, and economic facets of globalization, focusing on contemporary theories of neoliberalism and post-colonialism.
- GEOG517 Legal Geography: This class provides an overview of the legal system, the ways law is spatially manifested, and the spatial vectors that animate the law.
- GEOG522 Introduction to Spatial Data Management: This course builds upon the foundations of information practice with an emphasis on spatial data. Students will survey essential methods for evaluating, accessing, organizing, storing and securing spatial data and information. [Also offered as OILS 515.]

- GEOG524 Advanced Topics in Remote Sensing: This course provides graduate students with the opportunity to explore theoretical, technical and applied advancements in remote sensing as a tool for monitoring and managing earth resources. Prerequisite: (583L or 483L) and (584L or 484L).
- GEOG525 Advanced GIScience Seminar: Examination of current trends in Geographic Information Science, including technical, social, institutional and legal issues. Restriction: permission of instructor.
- GEOG427/527 Introductory Programming for GIScience: This course is intended to provide GIS software users with an introduction to Python, the de facto programming language of the GIS community. Prerequisite: **381L or 581L.
- GEOG428/528 Advanced Programming for GIScience: This course is intended to provide advanced GIS software programing experience, with an emphasis on the creation of standalone, distributable programs in Python, the de facto programming language of the GIS community. Prerequisite: 527 or 427.
- GEOG551 Drylands: This course provides an intensive overview of the unique physical geographies of arid regions with concentrated precipitation, commonly known as drylands. The course introduces drylands bio-geographies, geomorphology, and fluvial processes.
- GEOG461/561 Environmental Management: Examination of critical issues of environmental degradation in global and local system related to: air and water pollution, soil erosion, deforestation, strip mining, over dependence on fossil fuels and improper management of toxic and other wastes. Appraisal of the conservation methods and policies applied to these issues and the outlook for the future.
- GEOG462/562 Water Resources Management: An examination of the problems and trends in the use of water resources in the United States, with emphasis on the physical and social aspects related to its management.
- GEOG463/563 Public Land Management: Defining public and private rights associated with managing natural resources is the key to many of the current controversies concerning the environment. This course looks at public land policy and policy related to other common property resources such as water, the oceans, and the coastal zone.
- GEOG464/564 Food and Natural Resources: Students gain an advanced introduction to the social and environmental effects of individual food choices, through the analysis of the sociocultural and biophysical relationships embedded in various agricultural and food production systems.
- GEOG466/566 The City: This class examines the vectors of difference - cultural, economic, political, legal and environmental - that animate urban form and life. Class involves fieldwork.
- GEOG467/567 Governing the Global Environment: The role of global and regional governmental and non-governmental organizations in environmental politics, and the process of their formation and change in response to environmental problems.
- GEOG580L Spatial Statistics: Introduces fundamental statistical and quantitative modeling techniques widely used in geography. Emphasizes geographic examples and spatial problems. Includes a lab component that covers the use of statistical software in geographic analysis. Fee required.

- GEOG483L/583L Remote Sensing Fundamentals: Introduces the concepts of remote sensing of the Earth, sensors and photographic systems used, and the basic processing and analysis required to bring the imagery into GIS. Includes a lab component. Fee required. Prerequisite: **381L or 581L.
- GEOG484L/584L Applications of Remote Sensing: Explores the utilization of remote sensing imagery through advanced processing and analysis. Covers the integration of imagery into specific research areas, including biological, geological, urban and hydrological analysis. Includes a lab component. Fee required. Prerequisite: 483L or 583L.
- GEOG485L/585L Internet Mapping: Current and emerging approaches to internet mapping, including geospatial interoperability standards, technologies, and capabilities. Includes a lab component that covers the use of various types of software and applications. Fee required. Prerequisite: **381L or 581L
- GEOG486L/586L Applications of GIS: Selected applications of Geographic Information Systems, including anthropology, business, crime, ecology, engineering, health, planning, water resources and others. Covers analytical techniques specific to selected applications. Fee required. Prerequisite: **381L or 581L.
- GEOG487L/587L Spatial Analysis and Modeling: Spatial analysis and modeling techniques using Geographic Information Systems. Includes a lab component that covers the use of GIS and other software to carry out analysis projects. Fee required. Prerequisite: 381L or 581L.
- GEOG488L/588L GIS Concepts and Techniques: Selected advanced concepts and techniques in Geographic Information Systems. Includes a lab component that provides students with the opportunity to apply concepts and techniques in a hands-on manner. Fee required. Prerequisite: **381L or 581L.
- GEOG590 Qualitative Research Methods: This course introduces students to the wide range of theory and methodology in qualitative research. Readings and exercises focus on student selection and development of appropriate methods for graduate-level research applications. [Form B submitted.]

Elective Courses Offered at UNM: related departments

- ECON540 Natural Resource, Environmental and Ecological Modeling I: Dynamic optimization and optimal control theory applications (deterministic and stochastic) and computation methods with an emphasis on renewable resources. Prerequisite: 501 and 504.
- ECON542 Topics in Environmental, Resource, and Ecological Economics: Special topics in environmental and natural resource economics. Credit can be earned more than once, as the topic and content will vary by instructor. Prerequisite: 501.
- ECON543 Natural Resource, Environmental and Ecological Modeling II: Dynamic optimization and optimal control theory applications with an emphasis on empirical. Models of natural resource utilization. Energy, minerals, fisheries, forest resources, ground- and surface water, and environmental and ecological stocks. Prerequisite: 501 and 504.

- ECON544 Environmental Economics: Causes and consequences of environmental externalities. Design and implementation of alternative policy instruments. Theory and methods to measure economic value of market and non-market environmental services. Prerequisite: 501 and 504.
- WR571 Water Resources I – Contemporary Issues: Students examine contemporary issues in water resource systems, including water quality; ecosystem health; stakeholder concerns; economics; and water supply, policy, management and allocation. Emphasis on teamwork, cooperation, and oral, written and graphic communication. [Also offered as ECON546.]
- WR572 Water Resources II – Models: Use of technical models in water resources management addresses conceptual formulation and practical application of models from administrators perspective. Lab focuses on use of graphic aids to explain technical information. [Also offered as ECON545.]
- CRP 516 The Natural History of Watersheds: A Field Approach: Taught completely in the field, we will evaluate the ecological health of three watersheds, exploring what John Muir described as the interconnectedness that ties everything together on this water planet.
- CE534 Environmental Engineering Chemistry: A comprehensive survey including acid-base and precipitation equilibria, complexation of metals, transformation occurring in the environment adsorption, ion exchange. The approach will be quantitative and aimed at developing the student's ability to predict consequences of environmental manipulation, treatment processes and phenomena observed in the field.
- CE441/541 Hydrogeology: Hydrologic and geologic factors controlling groundwater flow, including flow to wells. The hydrologic cycle; interactions between surface and subsurface hydrologic systems; regional flow systems. Groundwater geochemistry and contaminant transport. [Also offered as EPS462/562.]
- CE542 Intermediate Hydrology: Hydrometeorology, interception, depression storage, infiltration, hydrograph analysis, flood routing, urban hydrology, groundwater analysis and utilization.
- CE545 Open Channel Hydraulics: Open channel hydraulics; specific energy and specific force; steady and unsteady flow; gradually varied flow; rapidly varied flow; computation of water surface profiles.
- CE547 GIS in Water Resources Engineering: Principles and operation of geographic information systems using Arc GIS, work with surface and subsurface digital representations of the environment considering hydrologic and transportation processes. Course project is required.
- CE549 Vados Zone Hydrology: Principles and applications of water, energy and solute transport in the near-surface environment. Topics covered include moisture characteristic curves, unsaturated hydraulic conductivity, Richards equation and numerical solutions. Processes studied include infiltration, redistribution, evapotranspiration and recharge.
- CE565 Soil Behavior: Understanding of the factors that determine and control the engineering properties of soils. Soil deposits, formation and composition; properties of the clay minerals, soil structure and fabric; and deformational behavior of soils under stresses.

Core Courses Offered at NMSU: Geography

- GEOG601: Overview of geographic history and philosophy, with emphasis on relationship between theory and practice. Includes virtual and in-person meetings with students from both UNM and NMSU. Prerequisite: graduate standing.
- GEOG602: Introduction to research design in geography, with emphasis on the integration of qualitative and quantitative methods. Includes virtual and in-person meetings with students from both UNM and NMSU. Prerequisite: graduate standing.
- GEOG603: This professional development course focuses on communication, ethics, grantwriting, and applied geographical work in the student's area of interest. Prerequisite: graduate standing.

Elective Courses Offered at NMSU: Geography

- GEOG521 Application and Modeling: Group oriented class in which students conduct an applied research project in a GIS application or modeling area of choice and conduct focused library research. Taught with GEOG 492. Prerequisite(s): GEOG 481, or consent of instructor.
- GEOG551 Drylands: Nearly half the Earth's surface has dry climates. This course examines physical geographic processes associated with drylands, including the ways in which human activities have affected drylands.
- GEOG552 Landscape Ecology: Analysis of the structure, function and change of natural and anthropogenic landscapes. Patches, corridors, matrix and network, spatial organization, landscape dynamics, and role of disturbance in overall functioning of landscapes. Role of landscape heterogeneity in landscape management. Prerequisite: either GEOG 351, BIOL 301, or other basic ecology course or consent of instructor. Same as BIOL 552.
- GEOG553 Applied Geomorphology: Examination of the principle theories and concepts of landform creation; exploration of the roles of structure, processes, climate, and time in the formation of various types of landforms. Prerequisite(s): GEOG/GEOL 353 or GEOG/GEOL 111G. Restricted to: Main campus only. Crosslisted with: GEOG 353
- GEOG555 Southwest Environments: The U.S. Southwest: physical and human geography, coupled human-environment interactions, causes and consequences of environmental issues, and implications for sustainable development. Prerequisite(s): Geography 281, physical geography class, human geography class, or equivalents, or consent of instructor.
- GEOG557 Biogeography: Floristic and physiognomic characteristics of the Earth's major ecosystems and their distributions; ecosystem dynamics, evolution, and physical environment; field and laboratory techniques including remote sensing. Restricted to: Main campus only. Crosslisted with: GEOG 351
- GEOG567 Transportation Geography: Nature and distribution of land, air and water transport facilities and their importance in regional development. Prerequisite: GEOG 120G or consent of instructor.
- GEOG 571 Cartography and Geographic Information systems: Graduate level design and construction of thematic maps. Introduction to cartographic principles in lecture. Emphasis on map-making using GIS software in the labs. Taught with GEOG 381. Prerequisite(s): GEOG 281.
- GEOG572 Geodatabase Design: Graduate level introduction to designing geodatabases. The course takes you through the eleven steps of geodatabase design

divided into four stages: thematic characterization; developing the database elements, relationships and properties; capture and collection; and finally implementation and documentation. Taught with GEOG 482. Consent of instructor required. Prerequisite(s): GEOG 481.

- GEOG573 Introduction to Remote Sensing: Graduate level introduction to the theory, techniques, and applications of remote sensing. Topics include electromagnetic radiation; remote sensing systems; remote sensing of the biosphere, hydrosphere, atmosphere, lithosphere, and cultural landscapes. Course includes lectures and also labs focused on the basic analysis and interpretation of remote sensing product. Taught with GEOG 373. Prerequisite(s): GEOG 571.
- GEOG577 GIS&T: Graduate level capstone course in geospatial analysis. Demonstration of competence in the use of geospatial tools, techniques, and concepts for the solution of applied geographic problems. Software may change from semester to semester. Taught with GEOG 487. Prerequisite(s): GEOG 373 and 481.
- GEOG578 Fundamentals of GIS&T: Graduate level fundamentals of computer-based systems that organize, analyze, and present spatially referenced data. Taught with GEOG 481. Prerequisite(s): GEOG 571 or consent of instructor.
- GEOG 581 System Design for GIS&T: A critical aspect of GIS is its ability to provide the necessary products within the organization within which it is implemented. This is an in-depth analysis of currently accepted planning methodologies designed to create a successful implementation of GIS inside organizations. Taught with GEOG 441. Prerequisite(s): GEOG 481 or consent of instructor.
- GEOG582 Advanced Remote Sensing: Graduate level introduction to advanced topics in digital image processing, analysis, interpretation, and visualization. Topics include geometric and radiometric correction, image enhancement, image classification, change detection, and accuracy assessment. Lectures focus on the discussion of advanced remote sensing concepts, techniques, and applications; labs are applications-oriented. Prerequisite(s): GEOG 373/573 or consent of instructor.
- GEOG585 Advanced Spatial Analysis: Introduction to basic spatial and aspatial descriptive statistics, statistical analysis of point and area patterns, critical review of quantitative research in geography, and exploration of advanced spatial analysis routines including cluster analysis, hot/cold spot analysis, and spatially weighted regression. Prerequisite(s): STAT 251 or E ST 311; or consent of instructor.
- GEOG586 Geospatial Techniques for Natural Resource Assessments: Use of integrated geographic information science and technology (GIS&T, includes remote sensing and geographic information systems) approaches for the monitoring and assessment of environmental issues. Lectures focus on the analysis and evaluation of current uses, potentials, and challenges of GIS&T. Labs emphasize the design and implementation of an original research project that uses GIS&T to model a local or regional environmental issue. Prerequisite(s): Geography 481/521 and 373/573 or equivalents.
- GEOG583 Field Explorations in Geography: A graduate level field-based class where students complete exercises in physical, cultural, and environmental geography in the Southwest. May be offered as a two-week intensive class where students are away from Las Cruces and camping; or may be offered with weekend field trips depending on the instructor. A lab fee for transportation and other expenses is required. Prerequisite(s): Geography 281, physical geography class, human geography class, or equivalents, or consent of instructor.

- GEOG598 Climate Change and Surface Processes: Readings, discussions, lectures or laboratory studies of selected geographic themes. May be repeated for unlimited credit (previously taught at NMSU as GEOG 491: Geomorphology and Climate Change)

Elective Courses Offered at NMSU: related departments

- GEOL474 Groundwater Geology: Steady-state and transient ground-water flow in porous media: effects of lithology on hydrologic characteristics of aquifers and confining units; Darcy's Law applied to steady-state flow; distribution of hydraulic head in confined and unconfined aquifers; recharge and discharge in regional and local ground-water flow systems; ground-water surface-water interaction; steady-state and transient flow to wells; aquifer testing and evaluation of safe yields. Introduction to numerical flow modeling. Prerequisite: GEOL 111G. [This course counts for graduate credit.]
- BIOL462 Conservation Biology: Examination of the value of biological diversity, the natural processes that control biological diversity, and the ways in which human activities have resulted in the loss of biological diversity, both regionally and globally. Prerequisite(s): BIOL 301 and MATH 191. [This course counts for graduate credit.]
- BIOL507 Plant Systematics: Principles and methods, classification, and identification of representative plant families. In addition student collections will emphasize independent identification of difficult groups. Prerequisite: BIOL 110. Not open to students who have taken BIOL 312 or equivalent.
- CE452 Geohydrology: Origin, occurrence, and movement of fluids in porous media and assessment of aquifer characteristics. Development and conservation of ground water resources, design of well fields. Crosslisted with: E S452 and GEOL452. Prerequisite(s): Junior or Senior.
- CE483 Surface Water Hydrology: Hydrologic cycle and relationships between rainfall and surface water runoff. Prerequisite: C E 331 or consent of instructor.
- ES470 Environmental Impacts of Land Use: Capstone course for the environmental science major. Case studies of environmental problems impacting land. Prerequisites: E S 256, E S 462, E S 370.
- FWCE457 Ecological Biometry: Use of ecological data to test scientific hypotheses. Stochastic and statistical models for environmental data, data visualization, likelihood-based and information-based model selection. Emphasis on open-source software tools. Prerequisite(s): MATH 142G or 191G, A ST 311, FWCE 301.
- FWCE462 Conservation Biology: An examination of the patterns of biological diversity, the processes that generate and maintain it, as well as the forces that are eroding it. Aspects will include the value of biodiversity, factors driving extinction, national and international law and policy. Prerequisite(s): BIOL 111G and BIOL 111L. Pre/Corequisite(s): FWCE 301.
- FWCE540 Wildlife Habitat Relationships: The study of wildlife-habitat relationships primarily seeks to describe how the distribution and abundance of resources used for food, cover and security, and constraints on the use of these resources influence the distribution of animals. This course will cover aspects of animal behavior related to how animals select habitat, theoretical models of habitat selection, the influence of inter- and intra-specific interactions on habitat selection, habitat quality, study designs for wildlife-habitat studies, modeling habitat selection and data analyses.
- SUR461 Introduction to Satellite Geodesy: Overview of astronomy concepts, summary of celestial mechanics, history of satellite positioning, modern positioning techniques, impact of

gravity, review of geodetic standards and specifications, logistics of GPS data collection.
GPS data processing, network adjustments, and evaluation of spatial data accuracy.
Prerequisite(s): SUR 361 and (MATH 280 or MATH 480).

GEOG 445: Geography of New Mexico and the Southwest

CR# 43683, Fall 2012
T/TH 9:30-10:45am, Castetter Hall 57
Dr. Maria Lane, mdlane@unm.edu
Department of Geography & Environmental Studies
Office: 224 Bandelier West, 277-4075
Office hours: Tues 1-2:30pm & Thurs 11am-1pm

The American Southwest is many things to many people. Originally home to some of the oldest urban settlements in North America, this arid region has undergone successive phases of conquest, colonialism, and economic development to become one of today's most complex (and most misunderstood) American cultural landscapes.

This course examines the changing historical, economic, and cultural geography of the American Southwest through the lens of human-environment interaction, focusing particularly on New Mexico. Over the course of the semester, students will learn how to apply several basic techniques of geographic analysis. They will use these techniques to conduct original field research here in Albuquerque, analyzing how various parts of the city have responded in unique ways to the broad trends affecting the Southwest as a whole.

What will you get out of this course?

By the end of the class, you will have a firm grasp of human-environment relationships within the Southwest. You will also be capable of conducting fieldwork and geographical analysis within this region. The course structure is designed to provide a learning environment in which each student can achieve the following:

1. Identify on a map the basic environmental and cultural features of the American Southwest.
2. Explain prominent environmental and cultural patterns in the Southwest using core geographic concepts.
3. Analyze the relationships influencing human-environment interaction in different times and places in the Southwest.
4. Implement basic field research techniques for a Southwestern field site.
5. Analyze field data and assess its value and limitations.

What are your responsibilities in this course?

This upper-level course requires students to do substantial independent work and to take responsibility for their own progress. Students are expected to read assigned texts carefully, to attend and participate in all class activities, to complete all writing assignments on time, and to become active contributors to their field research groups.

FORMAT AND ATTENDANCE

You will achieve the five learning outcomes listed on page 1 by participating in a variety of learning activities, including reading articles and book chapters, working with maps, completing in-class assignments, writing several original analytical papers, and working in groups to plan and implement original research. Lecture presentations will be only one part of how you learn the content and techniques of this class. On most days, significant class time will be spent on activities designed to help you master material with the support of the instructor and your classmates. For this reason, it is extremely important that you attend all class sessions. **If you will not be able to attend class regularly, you should not enroll in this course.**

REQUIRED TEXTS

Required reading assignments for each week will be posted in WebCT and are drawn from the following sources:

- *Southwest: Three Peoples in Geographical Change 1600-1970*, by D.W. Meinig.
- *Dreaming of Sheep in Navajo Country*, by Marsha L. Weisiger
- Additional readings posted in WebCT.

Reserve copies of *Southwest* are and *Dreaming of Sheep in Navajo Country* are on reserve in Zimmerman Library. The reading assignments for each unit are listed in the weekly modules on WebCT, along with a reading guide for each day.

CLASS COMMUNICATIONS

Class materials are posted on WebCT and will NOT be available in paper copies. To log in, go to <http://vista.unm.edu>, enter your UNM NetID/password, then click GEOG 445.

WebCT contains PDFs of required articles, reading guides, assignment details, grading rubrics, and student grades. You will submit your written papers through WebCT, using electronic forms that allow me to provide feedback visible only to you. I will also use WebCT to make periodic class announcements via email. Please make sure that you check your WebCT mail regularly, or change the settings to forward messages to the email address that you check most often.

INSTRUCTOR CONTACT

In upper-division courses with significant levels of independent work, it is important for students to consult with the instructor regularly. See the first page of the syllabus for my office hours. If your schedule does not permit you to visit during office hours, please email me to set an appointment. Note: Whenever you email me, you MUST include “GEOG445” in the subject line of your email, and you must sign your email with your full name. This will prevent the problem of your email getting caught in my junkmail filter.

REQUIRED ASSIGNMENTS AND ACTIVITIES

You will demonstrate course content mastery through the following required assignments and activities.

Assignments and Quizzes (daily)

This class involves a number of in-class assignments, group activities, and occasional unannounced reading quizzes. These are designed to provide opportunities for you to learn geographical concepts and techniques in an environment where you can take advantage of instructor support and peer assistance. Because these activities are fundamental to how you will learn in this course, in-class assignments constitute a substantial part of your overall grade. In order to earn the maximum “in-class” points, you must attend, participate in and contribute to all in-class activities.

Short Essay Assignments (due throughout October and November)

Before you begin working on your major analytical paper for the class, you will complete a series of short weekly essays on various topics. These weekly essays will help you develop your writing skills and hone your analytical techniques, using feedback from the instructor to improve your performance. These short essays will count toward your overall assignments/quizzes score.

Midterm Exam (October 2)

The first third of the class focuses on basic geographic details about the physical and historical geography of the Southwest. You will demonstrate your mastery of this content through a midterm examination that includes multiple-choice questions, map identifications, and essays. A review sheet will be provided on WebCT, and the exam will be discussed extensively in class ahead of time. Makeup exams will be offered only for emergency situations and at the instructor’s discretion.

Analytical Paper (draft due December 4; final version due December 6)

The final section of the course focuses on the geographic analysis of environmental and urban issues in various Southwestern locations. You will demonstrate mastery of geographic analysis through an original essay paper (1,500-2,000 words). An essay prompt and grading rubric will be provided on WebCT, and the assignment will be discussed extensively in class.

Fieldwork Report & Presentation (presentations November 8 & 13; papers due November 13)

The final element of the course is a field research project that you will conduct in a group with other students. Each group will be assigned a field site in Albuquerque, with individual group members responsible for specific types of data-gathering at each site. You will conduct your fieldwork together, as a group, during the weekend of October 27/28 (with followup fieldwork expected for the following weekend of November 3/4) and will then work collaboratively to develop an analytical report and presentation over the following two weeks. Detailed instructions and grading rubrics will be provided on WebCT for both the independent and group-based elements of this assignment. This will also be discussed extensively in class. Note that the course schedule provides for group meetings during regular class time.

OPTIONAL FINAL EXAM

The final exam in this class is optional. If you choose to take the final exam and earn a better score than the midterm, I will replace your original score. The final exam will cover the exact same material as the midterm and will use the same format, but the questions will be different. Makeups will NOT be offered for this optional exam, for any reason.

GRADING

Your mastery of course content and concepts will be evaluated scored using the following breakdown:

	% of Grade	Description	Dates
Assignments, Quizzes & Short Essays	30%	Individual and group activities, in-class and at home	Daily
Midterm Exam*	25%	Covers physical and historical geography	Tuesday, Oct 2
Analytical Paper	20%	Original paper on urban / environmental issues	Thursday, Dec 6
Field Report	15%	Individual report on fieldwork	Tuesday, Nov 13
Field Presentation	10%	Group presentation on fieldwork	Thursday, Nov 8 or Tuesday, Nov 13

* This score can be improved by taking the optional final exam, see above.

COURSE SCHEDULE

Individual reading assignments and detailed assignment guides will be posted in WebCT. For each week, you will open the online module to access all relevant materials.

UNIT 1: Introduction

- Week 1 8/21 Course Welcome and Intro
 8/23 Defining the Region

UNIT 2: Physical Geography

- Week 2 8/28 Topography
 8/30 Climate
Week 3 9/4 Water
 9/6 Vegetation

UNIT 3: Historical Geography

- Week 4 9/11 Precolonial Geography
 9/13 Colonial Spanish Transitions I
Week 5 9/18 Colonial Spanish Transitions II
 9/20 Colonial Mexican Transitions
Week 6 9/25 Anglo Territorial Transitions
 9/27 An American Century

TUESDAY, OCTOBER 2: MIDTERM EXAM

UNIT 4: Economic and Urban Issues

- Week 7 10/4 Albuquerque and surroundings
 10/9 El Paso and surroundings
 10/11 NO CLASS: FALL BREAK
Week 8 10/16 Tucson and surroundings
 10/18 Phoenix and surroundings

UNIT 5: Field Research

- Week 9 10/23 In-class preparation for Albuquerque neighborhood research
 10/25 In-class preparation for Albuquerque neighborhood research
 ((10/27&10/28: FIELDWORK IN GROUPS, exact times TBD))
Week 10 10/30 In-class groupwork: field data analysis
 11/1 In-class groupwork: field data analysis
 ((11/3&11/4: FOLLOWUP FIELDWORK IN GROUPS, exact times TBD))
Week 11 11/6 In-class groupwork: field data analysis
 11/8 Final group presentations
 11/13 Final group presentations // **Final reports due at beginning of class**

UNIT 6: Human-Environment Interactions

- Week 12 11/15 Pastoralism and its origins
 11/20 Navajo-Anglo conflicts in the grasslands
 11/22 NO CLASS: THANKSGIVING HOLIDAY
Week 13 11/27 Interpreting environmental conflict
 11/29 Interpreting cultural conflict
Week 14 12/4 Peer review workshop // **Full draft of paper due at beginning of class**
 12/6 Semester wrap-up // **Final papers due at beginning of class**

TUESDAY, DECEMBER 11, 7:30-9:30AM: OPTIONAL FINAL EXAM

ACADEMIC ASSISTANCE

Because 20% of your grade in this class comes from an essay assignment, I encourage you to take advantage of the options offered by the Center for Academic Program Support (CAPS). CAPS provides academic assistance free-of-charge to UNM students enrolled in undergraduate courses on the Albuquerque campus. The CAPS Writing Center offers one-on-one peer tutoring for students at any stage of the writing process, from generation and organizing ideas to revising essays and improving grammatical skills. Individual appointments for writing tutoring may be made in person at CAPS (Third Floor of Zimmerman Library) or by phoning 277-7205.

ACADEMIC INTEGRITY

Intellectual integrity is expected in all work. Although this course features numerous peer instruction activities and encourages collaboration and group learning, written essays are expected to be the independent work of each individual student.

Using someone else's language, ideas, or other original material without acknowledgement constitutes plagiarism. This includes, but is not limited to, purchasing a paper and submitting it as one's own; "recycling" someone else's paper; cutting and pasting from the Web; paraphrasing someone else's ideas without acknowledgement; or copying phrases, sentences or passages without quotation marks and/or without acknowledgement. Anyone who is caught plagiarizing will receive an F in the course and will be referred to the Dean of Students Office.

Map Design and Geovisualization
Geography *481L
Scott M. Freunds Schuh

Objectives

Mapping is crucial to understanding spatial distributions, and in this course, you will learn how to create maps. There are two components to creating an effective thematic map: appropriate treatment of the data to be mapped, and appropriate graphic emphasis within the map. You will learn about mapping techniques and about map and graphic design. You will gain hands-on experience producing maps. Principles you learn in class will be applied in the labs to deepen your understanding of the course material and build technical expertise. You will also be coached in the gentle art of constructive criticism—you will be critiquing your classmates’ maps as part of your grade.

Your maps will be drawn using *Adobe Illustrator* illustration software. In addition, for the choropleth, proportional symbol and cartogram map exercises, you will be using *Microsoft Excel* for data handling and analysis. Finally, you will be using *Komposer* to create a personal web page where you will publish your maps.

Text

Dent, B. D., J. Torguson and T. Hodler, 2008. *Cartography: Thematic Map Design* (6th ed.), McGraw Hill.
(Though not required, and good tutorial text on Abode Illustrator would be helpful.)

Timetable

GEOG 481L lecture meets Mondays and Wednesdays from 9am to 10am, and lab meets immediately after lecture from 10am till noon.

Office

I have two offices in Bandelier West — 103 (Dept Chair Office) and 222 (my research office). My email address is sfreunds@unm.edu. In case of an **emergency**, you can call my office at 277-0058 (e.g., emergency = you will miss an exam). For all other communication, you are welcome and strongly encouraged to stop by my office, or see me before or after class.

Grading Notes 1&2

Grades are (typically) assigned as follows: A (85% and above), B (75 to 85%), C (65 to 75%), D (55 to 65%), F (below 55%). This grading scale may be adjusted depending on overall class grades. Course grades will be based on exams (35%), map critiques (5%) and labs (60%) as follows:

Exam 1	20%
Exam 2	15%
Map Critiques	5%
Labs	
ex1	5%
ex 2	10%
ex 3	5%
ex 4	10%
ex 5	10%
ex 6	10%
ex 7	10%

NOTE¹: I do not give make-up exams, nor accept late assignments. (all lab assignments are due at the start of lab period unless otherwise specified)

NOTE²: Attendance in class and lab is absolutely mandatory. You are responsible for all information given in lecture AND lab (lecture content, announcements, changes in lab assignments, etc.). If you miss a lecture or lab, it is your responsibility to find out from your classmates (**not me!**) what you missed.

Preliminary Course Outline

Lecture	Topic	Lab (all assignments are due at the start of lab)
Week 1 19-23	introduction to course (Chs. 1, 2, 3, 4) review generalization (Ch. 1) map design/map organization (Ch. 12)	Illustrator Tutorial, begin ex 1: balance, layout, design
Week 2 26-30	map organization/visual hierarchy ex. typography (Ch. 13)	begin ex 2: typography <u>ex 1 due Wednesday</u>
Week 3 3-6	typography (cont.) <u>(no class Monday)</u> <u>critique ex 1 due, in-class critiques</u>	work on ex 2
Week 4 9-13	symbolization & color (Ch. 4 & Ch. 14)	<u>compilation worksheets ex 2 due for OK</u> work on ex 2
Week 5 16-20	TBD <u>critique ex 2 due, in-class critiques</u>	<u>ex 2 due</u> Watch Komposer Tutorials on YouTube
Week 6 23-27	web pages (Ch. 16)	begin ex 3: making a web page
Week 7 30-4	<u>exam 1 (no class Monday)</u> proportional symbols (Ch. 8)	begin ex 4: proportional symbol
Week 8 7-11	review exam 1 <u>critique ex 3 due, in-class critiques</u> choropleth maps (Ch. 6)	<u>ex 3 due</u> (basic webpage layout)
Week 9 14-18	in-class exercise, data classing (Ch. 6)	begin ex 5, choropleth maps
Week 10 21-25	isarithm maps (Ch. 9) <u>critique ex 4 due, in-class critiques</u>	<u>ex 4 due</u> ; work on ex 5
Week 11 28 - 1	No class - At CaGIS/ASPRS conf.	work on ex 5
Week 12 4-8	dynamic maps/animation (Ch. 11) dot maps (Ch. 7) talk about ex 7	<u>ex 5 due</u> ; begin ex 6: isarithms work on ex 6
Week 13 11-15	<u>critique ex 5 due</u> cartograms (Ch. 10)	work on ex 6 <u>ideas for ex 7 due</u>
Week 14 18-22	<u>critique ex 6 due</u> digital data maps vs. GISs	<u>ex 6 due</u> , work on ex 7
Week 15 25-29	odds and ends	
Week 16 2-6	course summary Exam 2 on Wednesday	<u>ex 7 due</u>

Other Potential Readings: (just in case the Dent/Torguson/Hodler book does not fulfill your hunger for knowledge)

Bugayevskiy, L.M. and Snyder, J.P. (1995) *Map Projections*. Bristol, PA: Taylor and Francis.

Campbell, J. (2001) *Map Use and Analysis (4th ed.)*, McGraw Hill.

Clarke, K. C. (1995) *Analytical and Computer Cartography (2nd ed.)*, Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Cromley, R. G. (1992) *Digital Cartography*, Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Keates, J. S. (1980) *Cartographic Design and Production*, New York, NY: Longman Group Limited.

MacEachren, A. (1995) *How Maps Work*. New York, NY: Guilford Press.

MacEachren, A. (1994) *Some Truth With Maps: A Primer on Symbolization and Design*, Washington, D.C.: Association of American Geographers.

Kimerling, J.A., Muehrcke, P. C. and Muehrcke, J. O. (1992) *Map Use: Reading, Analysis and Interpretation (5th ed.)*, Madison, Wisconsin: JP Publications.

Monmonier, M., 1993, *Mapping it Out: Expository Cartography for the Humanities and Social Sciences*, Chicago: The University of Chicago Press.

Monmonier, M. and Schnell, G.A. (1988), *Map Appreciation*, Englewood Cliffs, NJ: Prentice Hall.

Peterson, M., 1995, *Interactive and Animated Cartography*. Englewood Cliffs, NJ: Prentice Hall.

Robinson, A. H., R. D. Sale, J. L. Morrison, P. C. Muehrcke, A. J. Kimerling, and S. C. Guphill, 1995, *Elements of Cartography (6th ed.)*, New York, NY: John Wiley & Sons.

Slocum, T.A., McMaster, R.B., Kessler, F.C. and Howard, H.H. (2005) *Thematic Cartography and Geographic Visualization*. Englewood Cliffs, NJ: Prentice Hall

GEOG 514.011/ LAW-593-018
Fall 2014
Natural Resources Management Seminar
Wednesdays from 3:00-5:30 pm; TBD

Instructor: Melinda Harm Benson
Associate Professor, Department of Geography and Environmental Studies
Office Hours: T/H 1:30-2:30 p.m., W 1:00-3:00 and by appointment
Bandelier Hall West Room 223
Email: mhbenson@unm.edu

Readings: Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World. Stuart F. Chapin, Gary Kofinas, Carl Folke (Eds.) (Springer: 2009)

Knowledge and Environmental Policy Re-Imagining the Boundaries of Science and Politics. William Ascher, Toddi Steelman and Robert Healy (MIT Press: 2010)

Resilience Practice: Building Capacity to Absorb Disturbance and Maintain Function. Brian Walker and David Salt (Island Press 2012).

All other readings will be provided via an online platform.

Description: This course is a discussion-based seminar exploring the interdisciplinary nature of contemporary natural resource challenges. Topics covered will vary each semester but will focus on the intersection of law with other disciplines in the arena of natural resource management.

The year's course will focus on natural resource issues related to resilience theory and adaptive management. Adaptive management is quickly emerging as a growing trend in environmental governance because it recognizes that our understanding of natural systems is constantly evolving and reflects a willingness to test our assumptions about social-ecological systems in order to adapt and learn. This shifts the environmental governance paradigm by creating a new relationship between environmental science and social institutions—one that embraces uncertainty and possesses the necessary flexibility to incorporate that uncertainty into management actions involving both social and ecological systems.

Students will provide presentations based on their own research related to relevant case studies and will have the option of either (1) preparing a manuscript-length paper related to this research or (2) taking a “take-home” final exam as part of the course assessment. Field trips may be included to investigate local issues relevant to the class.

Objectives: This course contributes to the Geography Department's mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. Our goals for the M.S. degree program are as follows:

A. Students will learn to conduct legitimate and original research on geographical topics.

- B. Students will develop an ability to communicate clearly and effectively.
- C. Students will prepare themselves for professional careers in Geography.

Student Learning Outcomes (SLOs) for this Degree Program related to those goals are:

- A.1. Students will be able to state an original research question appropriate for geographic analysis.
- A.2. Students will be able to state how a research project contributes to an existing body of geographic literature.
- A.3. Students will be able to design legitimate geographic methodology.
- A.4. Students will be able to implement legitimate geographic methodology.
- A.5. Students will be able to explain and assess the results of original geographic research.
- B.1. Students will be able to communicate clearly and effectively in a written format.
- B.2. Students will be able to communicate clearly and effectively in an oral format.
- C.1. Students will be able to enter professional positions or Ph.D. programs related to geography or environmental management.

Core concepts and themes in the program are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

Place and regions. A spatially literate student knows and understands: a. the physical and human characteristics of place; b. that people create regions to interpret earth's complexity; and c. how culture and experience influence people's perceptions of places and regions. Examples of concepts useful in understanding place and region include: regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems, and etc.

Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

Human Systems. A spatially literate student knows and understands: a. the characteristics, distribution, and migration of human populations on the earth's surface; b. the characteristics, distribution, and complexity of earth's cultural mosaics; c. the patterns networks and economic interdependence on the earth's surface; d. the processes patterns and functions of human settlement; and e. how the forces of cooperation and conflict among people influence the division and control of earth's surface. Examples of concepts useful in understanding human systems include: location, scale, spatial change and spread, spatial association, perception, and etc.

Spatial Representation. A spatially literate student knows and understands: a. how to use maps and other geographic representations, tools and technologies to acquire, process and report information from a spatial perspective; and b. how to use mental maps to organize information about people, places, and environments in a spatial context. Tools used include: GIS, remote sensing, GPS, and etc.

Geographic Analysis. A spatially literate student knows and understands: a. how to analyze the spatial organization of people, places, and environments on the earth’s surface; and b. how to apply geography to interpret the past and present, and to plan for the future. Methods used for spatial representation are a cornerstone of geographic analysis. In addition, broad concepts useful in analysis include: Location (distribution, density, pattern, clustering, and dispersion); Scale (distance, hierarchies, and changes in scale and interpretation); Spatial change and spread (diffusion and dispersion, spatial flows, and regional evolution); Perception; Place (regions, regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems); Spatial association/interaction (proximity and adjacency, distance decay, and geographic features as points, networks or regions, site, situation); and Spatial alignment, orientation, and direction.

Prerequisites: None; however, some familiarity in environmental/natural resource management needed.

Grading:	Attendance and Participation	25%
	Reading Reaction Papers	25%
	Project Presentation/Class Facilitation	25%
	Final Exam OR Case study Manuscript	25%

Grading will be on a straight scale:
A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%.

Course Organization and Assignments

Attendance and Participation

This course requires active participation from all class members. You will be expected to share your thoughts and ideas with the class. Good participation is a matter of both quality and quantity. More information on what constitutes “quality” participation will be provided in class. Attendance is required, and a student with more than two absences may be dropped from the course at the instructor’s discretion. Being late to class is the equivalent of ½ of an absence.

Reading Reflections

Please come to each class with your reactions to the week’s reading assignments. This is your opportunity to demonstrate that you have read and thought about the assigned text for the day. Unless you are given specific guidance for the week’s reaction paper, please organize your reaction with three sections (clearly label them with headings). 1) Summary: provide a two-three sentence summary for each of the readings—distilling the author’s thesis to its essence; (2) General reaction and application. Briefly share your general reaction to the readings. You might address such things as whether you liked the reading, and why or why not. What ideas stood out to you? What did it make you think about? Apply the reading material to the course’s main theme and/or other readings and discussions related to the course. This is your opportunity to demonstrate your ability to tie the concepts discussed in the reading to contemporary natural resource issues;

3) Discussion Leads. Finally, provide ***at least three questions*** that can facilitate our class discussion—critical points you want the class to engage and so forth. This way, everyone should have several items to help initiate discussion in class.

These weekly assignment will be approximately **one page, single spaced**. **You will need to bring a copy to class** in order to facilitate discussion.

Project Presentation/Class Facilitation

Students will be independently investigating an issue/case study relevant to the course and presenting those findings in class. More information on this assignment will be provided later in a separate handout.

Final Exam OR Case study Manuscript

Students will have the option of either taking a cumulative take-home exam at the end of the course OR writing up some aspect of their case study research. More information regarding these options will be provided in a separate handout.

A note about late assignments

To do well in this course, you must turn in your assignments on time. Late assignments will be penalized by reducing the maximum points achievable by twenty percent (20%) for each day the assignment is late. **Late Reading Reflection assignments will not be accepted.**

A note about field trips.

One or more field trips may take place during the semester. These are required, but alternative assignments will be provided for you if you are unable to attend.

Student Support

If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation to, the Information Accessibility Resource Center: <http://as2.unm.edu>; (505) 277-3506.

Student Code of Conduct

Students should exhibit respectful classroom values and behavior by:

- engaging in appropriate communication, interaction and preparedness;
- demonstrating trust, respect and civility;
- approaching course content as important and necessary;
- meeting all deadlines for assignments and team member obligations;
- turning off cell phones in class;
- avoiding unnecessary talking; and
- not reading outside material or doing other work during class.

Students should contribute to a positive learning environment by:

- arriving, attending and departing class in a respectful manner;
- taking responsibility for team and individual assignments; and
- developing cooperative relationships with other students and faculty.

Students should support a professional learning environment by:

- avoiding inappropriate language;
- refraining from unrealistic expectations in dealing with administration, faculty and staff; and
- communicating with the instructor if changes could be made to improve the learning environment.

Students must uphold the academic integrity standards of the University of New Mexico.

Academic integrity is conceptualized as doing and taking responsibility for one's own work. This includes individual assignments and, for group assignments, the assumption of responsibility for work that is turned in as the "work product" of a team. Each team member is equally responsible for the work presented as the output of that team's effort. For more information on UNM's standards for academic integrity, see the policy on academic dishonesty at <http://www.unm.edu/~sac/policies.html#academicdishonesty>.

Tentative Course Schedule as of September 12, 2013

Subject to change at instructor's discretion. ALWAYS check the lecture from the previous class regarding class assignments.

Date:	Topic:	Readings:	Descriptions, deadlines, etc.
August 20	Introduction to resilience thinking; complexity theory and challenges facing social-ecological systems	Walker and Salt (2012) pp 1-25; Supp. Benson and Craig (2014)	Welcome and introductions; discuss case study requirement; introduction to conceptual framework for resilience; facing the challenge: the end of sustainability
August 27	Introduction to resilience thinking, part 2	Finish Walker and Salt (2012)	Resilience theory 101
September 3	Integrating resilience into governance	Folke (2005); Chapin, et al., pp. 77-102; Supp. Benson and Garmestani (2011)	Adaptive governance and institutional challenges and resilience theory; case study topic discussion
September 10	Introduction to adaptive management	Williams, et al. (2009); Williams and Brown (2014)	Overview of adaptive management as vehicle for resilience theory, the U.S. Department of Interior's approach; case study selections
September 17	Adaptive management and its implementation	Nie and Courtney (2011); Stern et al. (2011); Macdonald and Styles (2014)	How does adaptive management interface with current management approaches?
September 24	Policy and Epistemology	Ascher, et al. (2010)	The role of knowledge in environmental governance
October 1	Resilience Practice	Resilience Alliance Workbook; + selected basin assessments from Adaptive Water Governance Workgroup	Assessing resilience—conducting case studies in resilience thinking and adaptive management; case study updates
October 8	Resilience case study: New Mexico's Middle Rio Grande	Benson et al. (in press); Runge (2011); skim AM plan for ESA Collaborative Program	Introduction to Middle Rio Grande; guest speakers-- Dagmar Llewellyn, U.S. Bureau of Reclamation, Mark Stone and Ryan Morrison, UNM College of Engineering
October 15	Resilience and its	Davidson (2010);	Resilience and its critics; can this ecological concept

	critics	MacKinnon and Derickson (2012); Brown (2013); Nadasdy (2007)	be applied to social systems?
October 22	Case study: Forest Systems	Chapin, et al pp. 149-170; TBD	TBD
October 29	Case study: Drylands	Chapin, et al pp. 171-196; TBD	TBD
November 5	Case study: Freshwater systems	Chapin, et al pp. 197-220; TBD	TBD
November 12	Case Study: Oceans and Estuaries	Chapin, et al pp. 221-258; TBD	TBD
November 19	Case study: Food Production and Resilience	Chapin, et al., pp. 259-280; TBD	TBD
November 26	Case study: Resilient Cities	Chapin, et al., pp. 281-294; TBD	TBD
December 3	N.A.	N.A.	Course wrap; evaluations, etc.; Take home exam OR case study manuscript due.

Geog 515: Cultural and Political Ecology

Instructor: Chris Duvall

Office: 220 Bandelier West

Mail box: 111 Bandelier West

Classroom: 104 Bandelier West

Office hours: M & T 1:00-2:30 p.m., or by appointment

Class meetings: W, 5:30–8:30 p.m.

E-mail: duvall@unm.edu

Spring 2014

Course description:

This course examines the theoretical approaches of cultural and political ecology, focusing spatially on the Atlantic World. The theoretical focus on cultural and political ecology gives training in an important field in geography, and provides a means of linking the diverse disciplinary perspectives adopted in the course. The Atlantic World is an instructive zone for learning how social and cultural processes can influence human–environment interactions, because environmental transformations in this broad region have been produced through processes such as cultural diffusion, economic development, labor control, and racism.

You will be able to conduct research on topics of your choice to complete the assignments for this course, as long as the theoretical approach in your research is rooted in cultural and political ecology.

This is a graduate-level course, and the course activities and assignments are designed to improve your skills in academic research, writing, and presentation. You are expected to complete significant independent research and writing for this course.

Learning objectives for Geog 515:

- If you successfully complete this course, you will able to:
- 1) Explain the approaches of cultural ecology and political ecology in the analysis of human-environment interactions.
 - 2) Summarize the geographic processes that have affected African-descent (and other minority) populations in the Americas, including the environments these peoples have experienced.
 - 3) Develop cultural-ecological and political-ecological arguments to explain human-environment interactions.
 - 4) Conduct independent research on human-environment interaction, and communicate research findings in written and graphic formats.
 - 5) Communicate academic arguments and research findings in oral formats.

Required books:

You are expected to bring required readings to class every time we meet. We will use the following books in approximately the order listed below. In addition to these books, we will use a few additional readings that I will provide as PDFs.

- Robbins (2012) *Political Ecology*. 2nd edition. Blackwell.
- Carney & Rosomoff (2009) *In the Shadow of Slavery: Africa’s Botanical Legacy in the Atlantic World*. University of California Press.
- Telles (2004) *Race in Another America: The Significance of Skin Color in Brazil*. Princeton University Press.
- Vale (1982) *Plants and People*. Association of American Geographers.

Assignments and grading:

All students are REQUIRED to complete the following assignments:

Scored item	Percent of total	Points
Attendance (percent of actual meetings attended)	10%	100
Participation (bringing reading materials to class, and discussing them)	10%	100
Weekly assignments (reading/writing work to prepare before or during class)	22.5%	225
Topical and theoretical bibliography (first step of research paper)	10%	100
Argumentative essay (first complete draft of research paper)	22.5%	225
Research slides (to present research paper briefly in class)	5%	50
Argumentative essay (final, revised draft of research paper)	20%	200
SEMESTER TOTAL	100%	1000

Final grades will be assigned based on the following scale:

A+	≥97% of total possible points		
A	≥93% of total possible points	C	70-77% of total possible points
B+	88-93% of total possible points	D+	65-70% of total possible points
B	81-88% of total possible points	D	60-65% of total possible points
C+	77-81% of total possible points	F	<60% of total possible points

I may adjust these score ranges downward if necessary.

Due dates and deadlines:

Exams, assignments, and other activities are due as indicated in the course calendar (below). Extensions to assignment due dates or alternate dates for exams or other activities will be granted only if a student can provide proof that an unforeseen, unpreventable situation has prevented him/her from completing and/or turning in an assignment, exam, or other activity on the scheduled due date. Any request for an extension to an assignment due date or an alternate date for an exam or other activity must be made more than 24 hours before the beginning of class on the due date for which an extension is sought, unless there is a verifiable emergency that occurs during this 24-hour period.

The major assignment for this course is a research paper. I split this assignment into three separate parts: a research bibliography, a first complete draft of the research paper, and the final draft of the research paper. Students who fail to turn in any of these three parts will receive no credit for any part submitted. I may accept late assignments depending upon individual circumstances. However, in the case of the first complete draft of the research paper, I will not score any assignments received more than one week past the due date indicated on the course calendar. The purpose of requiring a first draft and a final draft is to require revision, which is a strong way to improve writing skills. If a student submits a first draft more than one week late, I will provide feedback on the draft in order to enable revision, and award 70% of the points possible for the assignment.

Any complaints about a score or requests for reevaluation of any assignment, exam, or other activity must be made less than one week after the score in question has been made available. Any such complaint or request must be made in writing, and provide an explanation why the score in question is incorrect or inaccurate. Scores will be made available only to each student him/herself, during regularly scheduled class meetings or another pre-planned meeting time. If a student who eventually wishes to raise a complaint about or request a reevaluation of an assignment, exam, or other activity misses class when the score in question is made available, no extension of time to complain about the score or request a reevaluation will be granted, unless the student: a) misses class due to a verifiable emergency that occurs less than 24 hours before the beginning of class, or b) can show that the score in question is truly erroneous. If one of these conditions is met, the student will have one week from receipt of a score to complain about the score or request a reevaluation. No scores will be made available by telephone or e-mail; scores will be provided only in person and only to a student him/herself.

Communication policies and practices:

Communication is a key to success in this, and other, courses. For this course, there are several guidelines for communication all of us must follow.

First, no comments will be tolerated that are offensive, derogatory, or disparaging to any identifiable group of people. If you have any questions about appropriate ways to express yourself when discussing course material (or other topics), please ask me for guidance.

Second, *let me know as soon as possible* when you have a question about course requirements, or if there is something that is hindering your performance in class. I want you to succeed in this course (and in your others too), and it is easiest for me to help if we have some time to find a solution. *Last-minute questions/requests/comments often arrive too late for me to offer help, so please plan ahead.*

Third, I prefer to communicate in person—we can cover a lot more in a two-minute conversation than in a series of e-mails. Ask questions during, before, or after class, or come see me during my office hours. If these times don’t work for you, contact me by e-mail to schedule a different time to meet.

When communicating by e-mail, there are two things you must remember. First, I will respond only to messages sent from ‘unm.edu’ e-mail addresses, except in the case of emergencies. Many messages sent to me via gmail.com, yahoo.com, hotmail.com, and other web-based e-mail services are sent to the trash by my spam filter.

To eliminate the possibility that any of your messages are filtered out, you must use your unnm.edu e-mail account. Second, I expect that all messages to me use a professional writing style, which means:

- Every message has a subject line (e.g. “Geog 515”, “Question on class”, “Absent next week”)
- Every message has a greeting (e.g. “Hey Chris:”, “Dear Professor:”, “Hi Dr. Duvall:”)
- Every message is signed (e.g. “See you in class, Tammy”, “Cheers, Billy”, “Sincerely, Pat”)
- Every message uses proper spelling and punctuation (e.g. “you”, NOT “u”; “for”, NOT “4”; etc.)
- Every message has a professional, respectful tone

These expectations are not firm rules but I expect you to put some effort into practicing to communicate in the way you will be required in most jobs you will have after graduation.

- Finally, please follow these suggestions when communicating with me:
- If you have a **question during class**, please raise your hand and ask me during class, or approach me immediately afterwards. If you have a question, other students probably share it, so your asking will help others in the class too.
 - If you have a **question/comment about course content**, assignments, exams, readings, or other course material, please either talk to me in person, or send me an e-mail message. I will respond to you directly and might also give my response to the entire class—without identifying you in any way—because other students probably have similar questions/comments.
 - If you have a **schedule conflict** that means you will miss an assignment due date, exam, or other activity, please *PLAN AHEAD and tell me as soon as possible*. I will work with you to resolve the conflict.
 - If you have an **emergency** that affects your performance in this course, please let me know as soon as possible. I will work with you to resolve the situation. *Emergencies are rare and I trust that people tell me they have an emergency only when this is true.*

Academic integrity:

UNM has strict and explicit regulations governing academic integrity, which are posted on the Internet in the *University Catalog* (<http://www.unm.edu/%7Eunmreg/catalog.htm>). **Cheating by presenting someone else’s work as your own is not tolerable in this course or anywhere at UNM.** For more information on the importance of academic integrity at UNM, see the *UNM Faculty Handbook* (<http://www.unm.edu/~handbook/D100.html>), the UNM Dean of Students web site (<http://www.unm.edu/~dosojacademichonesty.html>), and the *UNM Pathfinder* section on student conduct (<http://pathfinder.unm.edu/policies.htm#studentcode>). If you are uncertain what is meant by “academic integrity”, including “plagiarism”, please consult the UNM Department of English information sheet (http://www.unm.edu/~english/Resources/pdf/Academic_Integrity_students.pdf), or the list of Internet resources provided by the UNM-Valencia Teaching & Learning Center (http://www.unm.edu/~tlc/contents/web_resources/integrity.html).

Please take the time to read and understand UNM’s policies governing academic integrity. *I strictly enforce these policies when grading student work.* **In this course, a student will receive zero points for any exam, assignment, or activity in which any portion violates UNM’s regulations governing academic integrity, regardless of when I discover the violation.** Additionally, a student who violates these regulations may receive a failing grade for the course, and be reported to his/her academic dean, which may lead to expulsion.

COURSE CALENDAR

Date	Meeting topics:	Do these readings <i>before</i> class, and bring copies of the readings <i>to</i> class:
Jan. 22	<ul style="list-style-type: none">• Course introduction• Topical vs. theoretical	
Jan. 29	<ul style="list-style-type: none">• Cultural ecology	<ul style="list-style-type: none">• Grossman, L. (1977) Man-environment relationships in anthropology and geography. <i>Annals of the Association of American Geographers</i> 67: 126-144.• Denevan, W. M. (1983) Adaptation, variation, and cultural geography. <i>Professional Geographer</i> 35: 399-407.

Date	Meeting topics:	Do these readings <i>before</i> class, and bring copies of the readings <i>to</i> class:
Feb. 5	<ul style="list-style-type: none"> Cultural ecology? 	<ul style="list-style-type: none"> Vale, <i>Plants and people</i>
Feb. 12	<ul style="list-style-type: none"> Cultural ecology? 	<ul style="list-style-type: none"> Grossman, L. (1981) The cultural ecology of economic development. <i>Annals of the Association of American Geographers</i> 71: 220-236. Denevan, W. M. (1992) The pristine myth: the landscape of the Americas in 1492. <i>Annals of the Association of American Geographers</i> 82: 369-385. Brookfield, H. C. & C. Padoch (1994) Appreciating agrodiversity: a look at the dynamism and diversity of indigenous farming practices. <i>Environment</i>, 36: 7-11, 37-45.
Feb. 19	<ul style="list-style-type: none"> Political ecology 	<ul style="list-style-type: none"> Robbins, <i>Political Ecology</i>
Feb. 26	<ul style="list-style-type: none"> Political ecology 	<ul style="list-style-type: none"> Robbins, <i>Political Ecology</i>
Mar. 5	<ul style="list-style-type: none"> History, science, and knowledge Bibliography due 	<ul style="list-style-type: none"> Davis, M. (2004) The political ecology of famine: The origins of the Third World. In <i>Liberation ecologies: Environment, development, social movements</i> (2nd ed.), eds. R. Peet & M. Watts: 48-63. London: Routledge. Fairhead, J. & M. Leach. (1996) Rethinking the forest-savanna mosaic: colonial science and its relics in West Africa. In <i>The lie of the land: challenging received wisdom on the African environment</i>, eds. M. Leach & R. Mearns: 105-121. Oxford, UK: James Currey. Schiebinger, L. (2005) Agnotology and exotic abortifacients: The cultural production of ignorance in the eighteenth-century Atlantic World. <i>Proceedings of the American Philosophical Society</i> 149: 316-343.
Mar. 12	<ul style="list-style-type: none"> Subsistence and subalterity 	<ul style="list-style-type: none"> Carney & Rosomoff, <i>In the Shadow of Slavery</i>
Mar. 19		NO CLASS — — Spring Break!
Mar. 26	<ul style="list-style-type: none"> Race 	<ul style="list-style-type: none"> Telles, <i>Race in another America</i>
Apr. 2	<ul style="list-style-type: none"> Identity/ Identification First draft of essay due via e-mail 	<ul style="list-style-type: none"> Hames, R. (2007) The ecologically noble savage debate. <i>Annual Review of Anthropology</i> 36: 177–90. Farfán-Santos, E. (2009) <i>Quilombolismo</i>: Fighting and dying for rights. <i>TransScript</i> 1: 131-153.
Apr. 9	<ul style="list-style-type: none"> Labor 	<ul style="list-style-type: none"> Fenoaltea, S. (1984) Slavery and supervision in comparative perspective: A model. <i>Journal of Economic History</i> 44: 635-668. Scott, J.C. (1989) Everyday forms of resistance. In <i>Everyday forms of peasant resistance</i>, ed. F.D. Colburn: 3-33. Armonk, NY: M.E. Sharpe. González, M.J. (1995) Resistance among Asian plantation workers in Peru 1870-1920. In <i>From chattel slaves to wage slaves: The dynamics of labour bargaining in the Americas</i>, ed. M. Turner: 201-223. London: James Currey.
Apr. 16	<ul style="list-style-type: none"> Plants 	<ul style="list-style-type: none"> Robbins, P. and J. Sharp (2003) Producing and consuming chemicals: The moral economy of the American lawn. <i>Economic Geography</i> 79(4): 425-451. Maranz, S. (2009) Tree mortality in the African Sahel indicates an anthropogenic ecosystem displaced by climate change. <i>Journal of Biogeography</i>, 36, 1181-1193. Head, L. and J. Atchison (2009) Cultural ecology: emerging human-plant geographies. <i>Progress in Human Geography</i> 33(2): 236-245.

Date	Meeting topics:	Do these readings <i>before</i> class, and bring copies of the readings <i>to</i> class:
Apr. 23	<ul style="list-style-type: none">• Drugs	<ul style="list-style-type: none">• Kepe, T. (2003) Cannabis sativa and rural livelihoods in South Africa: Politics of cultivation, trade and value in Pondoland. <i>Development Southern Africa</i> 20: 605-615.• Steinberg, M.J. and K. Mathewson (2008) Landscapes of drugs and war: Intersections of drugs and conflict. In <i>The geography of war and peace</i>, ed. C. Flint: 242-258. Oxford, UK: Oxford University Press.• Campos, I. (2010) Degeneration and the origins of Mexico's War on Drugs. <i>Mexican Studies/Estudios Mexicanos</i> 26(2): 379-408.
Apr. 30	<ul style="list-style-type: none">• Food	<ul style="list-style-type: none">• Guthman, J. (2011) Excess production or over-production?: US farm policy, global warming, and the bizarre attribution of obesity. In <i>Global political ecology</i>, ed. R. Peet, P. Robbins, and M.J. Watts: 51-67. Oxford, UK: Oxford University Press.• Guthman, J. (2012) Opening up the black box of the body in geographical obesity research: Toward a critical political ecology of fat. <i>Annals of the Association of American Geographers</i>, 102: 951-957.• Boyd, M. (2001) Making meat: Science, technology, and American poultry production. <i>Technology and Culture</i> 42: 631-664.• Sano, Y., et al. (2011) Understanding food insecurity among Latino immigrant families in rural America. <i>Journal of Family and Economic Issues</i>, 32, 111-123.
May 7	<ul style="list-style-type: none">• Research presentations• Presentation slides due in class today	COURSE EVALUATIONS IN CLASS

Ideally, you will turn in the complete, final draft of your argumentative essay in class on May 5.

If not, the final draft is due by e-mail or in my mailbox/office **no later than 9:45 p.m. on Wednesday, May 14.**

Seminar: Globalization

Geography 516

Fall 2012

INSTRUCTOR:

John Carr – carrj@unm.edu

Office: Bandalier West Room 201

Office Hours:

Tuesdays 12:15-1:15

Thursdays 10:00-11:00

CLASS MEETINGS:

Tuesday 3:15-5:45

Bandalier West 104

COURSE DESCRIPTION:

While state, cultural, and economic projects have always been largely intertwined, mutually constitutive, and fundamentally inseparable, the current age has heralded an intensification of economic, social, and political flows across the globe, all often lumped under the rubric of “globalization.” While this term encompasses a broad, complex, and often contradictory set of dynamics, two major schools of critique have attempted to address the ways these contemporary dynamics impose hardship, injustice, and violence upon people around the world. The first of these seeks to expose the abuses and contradictions posed by the adoption of neoliberal political and economic policies by “core” countries (i.e. the U.S., France, U.K., Germany) and many transnational organizations. The second of these critiques is concerned with the ways that past colonial relationships between these same “core” nations and the global South are currently impacting former colonies.

This class seeks to explore the ways that the dynamics of neoliberalism and post-colonialism have developed, and their relations to discourses and practices of globalization. This will require several steps. While there is much that is new in the dynamics that have been lumped together under the globalization label, there is also much that is old, much of it traceable to the enlightenment, and subsequent articulations of liberalism. Thus, we will start by exploring classical economic and political liberalism, discussing how it impacted the colonial project, early forms of “globalized” post-enlightenment economics, and the cultural discourses underlying these projects. We will then move to contemporary works that both reproduce and seek to analyze the discourse of “globalization,” before turning to authors who focus more specifically on the roles of neoliberalism and post-colonialism in a globalized world.

STUDENT LEARNING OUTCOMES

- A.1. Students will be able to explain and assess the results of original research from a variety of social science fields, especially geography.
- A.2. Students will develop an understanding for contemporary theories and critiques of globalization, neoliberalism, and post-colonialism

- B.1. Students will be able to communicate clearly and effectively in a written format.
- C. 1. Students will be able to enter professional positions or Ph.D. programs related to geography and/or the study of economic, political, and/or cultural dimensions of globalization.

TEXTS: There are two sets of required texts: those you must purchase (at the campus bookstore, through amazon.com or abebooks.com, etc.) and those for the third class period which will be made available to you on-line via WebCT and the UNM library electronic reserve system.

The password for e-reserves for this class is: lobo516

The books to purchase are as follows:

- Edward Said, *Orientalism*. Vintage; 1st Vintage Books Ed edition. **ISBN-13:** 978-0394740676
- Uday Singh Mehta, *Liberalism and Empire : A Study in Nineteenth-Century British Liberal Thought*. University Of Chicago Press. **ISBN-13:** 978-0226518824
- Mona Domosh, *American Commodities in an Age of Empire*. Routledge. **ISBN-13:** 978-0415945721
- Thomas Friedman, *The World is Flat 3.0: A Brief History of the Twenty-first Century* . Picador. **ISBN-13:** 978-0312425074
- David Harvey – *A Brief History of Neoliberalism.*: Oxford University Press, USA. **ISBN-13:** 978-0199283279
- Saskia Sassen, *Territory, Authority, Rights*. Princeton University Press. **ISBN-13:** 978-0-691-09538-736
- Aihwa Ong, *Neoliberalism as Exception: Mutations in Citizenship and Sovereignty*. Duke University Press. **ISBN-13:** 978-0822337485
- Stephen Flusty, *De-Coca-Colonization: Making the Globe from the Inside Out*. Routledge. **ISBN-13:** 978-0415945387
- Frantz Fanon, *The Wretched of the Earth*. Grove Press. **ISBN-13:** 978-0802141323
- Carla Freeman, *High Tech and High Heels In the Global Economy: Women, work and pink-collar identities in the Caribbean*. Duke University Press. **ISBN-13:** 978-0822324393
- James Ferguson, *Global Shadows: Africa in the Neoliberal World Order*. Duke University Press. **ISBN-13:** 978-0822337171.
- Mike Davis, *Planet of Slums*. Verso. **ISBN- 13:** 978-1844670222
- Derek Gregory, *The Colonial Present: Afghanistan, Palestine, Iraq*. Wiley-Blackwell. **ISBN-13:** 978-1577180906.
- Ananya Roy, *Poverty Capital: Microfinance and the Making of Development*. Routledge. **ISBN- 13:** 978-0415876735

EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

- 1) **Class Participation:** Because much of the learning in this course comes from thoughtful discussion, listening, and interacting around the topics of the course, you are expected to attend and to participate during each class meeting. If you are

not here to be a participant along with your classmates, everyone loses. Both your attendance and the quality of your participation will be considered in determining final grades. *PLEASE NOTE: YOUR PARTICIPATION EACH WEEK IS CONTINGENT UPON YOUR COMPLIANCE WITH THE FOLLOWING REQUIREMENTS:*

- a. **Timely completion of the following weekly analysis assignments.** If you have not submitted a timely analysis, I will ask you to leave the class in which the covered readings are discussed. As mentioned below, you may opt out of this requirement once during the semester.
 - b. **Respectful dialog.** This is a non-negotiable requirement of this class. Practices to ensure this include: listening closely and respectfully; refraining from ridicule or interruption; retaining modesty and humility. I particularly stress the “golden rule”; if you introduce an author or a concept not otherwise covered in class, this is an opportunity for you to introduce helpful supplementary substance. In other words, contribute expansively in the learning experience, avoiding name- or concept-dropping. There is much to explore in the course and many arguments to be heard, so let’s work to create an environment where explorations are encouraged and enjoyable.
- 2) **Weekly Analyses:** Every week each student will compose and transmit a reaction to each week’s reading and post it to the entire class via WebCT by **9:00 AM on Monday**. This reaction can take many forms: a critical reaction to one or more of the readings; a set of questions to be explored in class; the isolation of a line of tension between different readings; a proposed set of connections to other readings. Other possibilities exist, and deserve to be explored, but the principal goals of the reaction are two: to develop a critical response to the readings, and to contribute to building a constructive class discussion. You may opt out of one of these papers over the course of the semester and still be allowed to attend the relevant discussion.
- 3) **Final Paper:** You must write a final paper 20-25 pages long (typed, double-spaced, normal margins, twelve-point font), not including title page and/or bibliography. I expect this paper to engage with a substantial portion of the course readings and concepts from our in-class discussions. The “big idea” is to use the resources available from this class – including the literature, in class discussions, and my knowledge and feedback – to help frame, or otherwise address a problem or project. And this is why I REQUIRE you to engage with a substantial portion of the literature from this class (even if it is not the only, or even the majority of the literature you address), so that you have the opportunity to draw on those tools to the fullest. Thus, the page limits act primarily as a guideline. Ultimately what is most important is substantially engaging with broader explanatory concepts from class. That said, I hope your work in this class will help you in your existing course of study and research. Thus the final paper is open to a wide array of topics and projects. To ensure that you are able to use this opportunity to the fullest, you are required to meet with me during my office hours to discuss your final paper topic at some point prior to the last week of

classes. The final paper is due in my department mailbox by 12:00PM on Wednesday, December 19th.

GRADING:

Your paper, exams, attendance and participation will be given the following weights in the calculation of final grades:

Participation & Weekly Analyses:	50% of final grade
Final Paper:	50% of final grade
<hr/>	
TOTAL:	100%

Class Schedule

1 - August 21 Introduction
READING: No reading assignment

UNIT 1: LIBERALISM, CULTURE, AND COLONIZATION

2 – August 28 Cultural Frameworks for the Colonial Project
READING: - Edward Said, *Orientalism*

3 – September 4 Classical Liberalism
READING: - John Locke, Second Treatise of Government (Selections)
 - J.S. Mill, “On Liberty” (selections)
 - Adam Smith, *The Wealth of Nations* (selections)
 - C.B. MacPherson, “The Political Theory of Possessive Individualism” (Selections)

4 – September 11 Liberalism and Colonialism
READING: - Uday Singh Mehta, *Liberalism and Empire*

5 – September 18 American Empire and Economic Policy
READING: - Mona Domosh, *American Commodities in an Age of Empire*

UNIT 2: DISCOURSES OF GLOBALIZATION AND NEOLIBERAL THOUGHT/PRACTICE

6 – September 25 The Case for Globalization
READING: -Thomas Friedman, *The World is Flat* pp. 3-437, 533-604

7 – October 2 What Is Neo in Neoliberalism?
READING: - David Harvey – *A Brief History of Neoliberalism*

- 8 – October 9 Complicating Neoliberalism I
 READING: - Stephen Flusty, *De-Coca-Colonization*
- 9 – October 16 Complicating Neoliberalism II
 READING: - Aihwa Ong, *Neoliberalism as Exception: Mutations in Citizenship and Sovereignty*
- 10 – October 23 Reevaluating Neoliberalism and Globalization
 READING: - Saskia Sassen, *Territory-Authority-Rights*

UNIT 3: POSTCOLONIALISM

- 11 – October 30 The Roots of PostColonialism
 READING: Frantz Fanon, *The Wretched of the Earth*
- 12 – November 6 Globalization, Post-Colonialism and Gender
 READING: Carla Freeman, *High Tech in High Heels*
- 13 – November 13 Globalization, Post-Colonialism and the “Problem” of Africa
 READING: James Ferguson, *Global Shadows: Africa in the Neoliberal World Order*
- 14 – November 20 The Post-Colonial City, Mega-Slum as Neoliberal Urban Form
 READING: Mike Davis: *Planet of Slums*
- 15 – November 27 Post-Colonialism and the American Adventure in the Middle-East
 READING: - Derek Gregory, *The Colonial Present*
- 16 – December 4 Post-Colonialism, Development, and Microfinance – What Lies Beyond Neoliberalism?
 READING: - Ananya Roy, *Poverty Capital*

POLICIES:

Ethics and Academic Dishonesty:

The course emphasizes ethical practices and perspectives. Above all, students and instructors should strive to communicate and act, both in class interactions and in assigned coursework, in a manner directed by personal integrity, honesty, and respect for self and others. Included in this focus is the need for academic honesty by students as stated by the UNM Pathfinder. Students need to do original work and properly cite sources.

Accordingly, I consider Academic Dishonesty, including plagiarism to be unacceptable. The University’s official definition of Academic Dishonesty may be found at:

<http://pathfinder.unm.edu/>

This is a graduate course for students who have developed a strong set of intellectual and work skills, and who are familiar with university policy on academic dishonesty. One of the non-negotiable requirements for passing this course is turning in your own, original, non-plagiarized work for all assignments submitted and properly citing sources. If you plagiarize, you will fail this class. Additionally, plagiarism and/or other forms of academic misconduct may lead to the system of institutional penalties outlined at the above website

Late Work: Late work will not be accepted. Turn in your work in a timely manner by deadline. In addition, you will not have a chance to rewrite your work after it has been turned in. However, you are encouraged to meet with the professor in advance to discuss and ask questions about your assignments in progress.

Email responsibility: Check your UNM email account regularly, as we will use this account to keep in touch with you about course requirements or updates. If you use another email address, please set up your UNM account to forward your UNM account email to that address.

Technology: Regularly check your UNM email account as we will use this account regularly for the course. If you use another email address, please forward your UNM email to that address. Of course, turn off cell phones and do not internet surf in class.

ADA Accessibility: Qualified students with disabilities needing appropriate academic adjustments should contact me as soon as possible to ensure your needs are met in a timely manner. Handouts are available in alternative accessible formats upon request.

Diversity: This course encourages different perspectives related to such factors as gender, race, nationality, ethnicity, sexual orientation, religion, and other relevant cultural identities. This course seeks to foster understanding and inclusiveness related to such diverse perspectives and ways of communicating.

Office Hours: Office hour times and locations are subject to change. If you intend to visit me during an office hour I STRONGLY recommend that you inform me in advance to confirm time and place.

Grades: All grades assigned are final and non-negotiable. No incompletes for the semester will be given unless you can demonstrate valid and compelling reasons for your inability to complete the work. No extra-credit or make-up assignments will be offered.

Law and Geography

Geography 517

Spring 2014

INSTRUCTOR:

John Carr – carrj@unm.edu

Office: Bandalier West Room 201

Office Hours:

Monday 1:00-3:00

CLASS MEETINGS:

Thursday 6:00-8:30

Bandalier West 104

Description:

Much of the law is either implicitly or explicitly spatial – including concepts of property, jurisdiction, zoning, trespass, the regulation of public parks and sidewalks, and natural resources and environmental regulations. Law is constructed in a formal language, but it is practiced daily in ways that affect how landscapes are constructed and experienced. In some fashion, law has helped build every landscape that you and I observe and inhabit. Similarly, landscapes shape how law is understood and enacted; law works differently in different places. Notwithstanding the essential spatiality of the law and the enduring impact of law on human activity in space, an emerging body of literature is only now beginning to examine the ways that law impacts our understandings of, and experiences with space, and vice versa.

This class seeks to provide an overview of both the legal system and the mechanisms and doctrines through which law is spatially manifested, as well as the growing literature addressing the links between law and geography. This will require several steps. The class will examine the dominant philosophical approaches to understanding the project of law, including critical legal studies. The remainder of the course will then focus on a succession of topics and case study investigations into how different approaches to understanding the law can drive differing interpretations of the interconnections between law and geography.

Objectives:

This course contributes to the Geography Department's mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. Our goals for the M.S. degree program are as follows:

- A. Students will learn to conduct legitimate and original research on geographical topics.
- B. Students will develop an ability to communicate clearly and effectively.
- C. Students will prepare themselves for professional careers in Geography.

Student Learning Outcomes (SLOs) for this Degree Program related to those goals are:

- A.1. Students will be able to state an original research question appropriate for geographic analysis.
- A.2. Students will be able to state how a research project contributes to an existing body of geographic literature.
- A.3. Students will be able to design legitimate geographic methodology.
- A.4. Students will be able to implement legitimate geographic methodology.
- A.5. Students will be able to explain and assess the results of original geographic research.
- B.1. Students will be able to communicate clearly and effectively in a written format.
- B.2. Students will be able to communicate clearly and effectively in an oral format.
- C.1. Students will be able to enter professional positions or Ph.D. programs related to geography or environmental management.

Core concepts and themes

in the program are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

Place and regions. A spatially literate student knows and understands: a. the physical and human characteristics of place; b. that people create regions to interpret earth's complexity; and c. how culture and experience influence people's perceptions of places and regions. Examples of concepts useful in understanding place and region include: regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems, and etc.

Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

Human Systems. A spatially literate student knows and understands: a. the characteristics, distribution, and migration of human populations on the earth's surface; b. the characteristics, distribution, and complexity of earth's cultural mosaics; c. the patterns networks and economic interdependence on the earth's surface; d. the processes patterns and functions of human settlement; and e. how the forces of cooperation and conflict among people influence the division and control of earth's surface. Examples of concepts useful in understanding human systems include: location, scale, spatial change and spread, spatial association, perception, and etc.

Spatial Representation. A spatially literate student knows and understands: a. how to use maps and other geographic representations, tools and technologies to acquire, process and report information from a spatial perspective; and b. how to use mental maps to organize information about people, places, and environments in a spatial context. Tools used include: GIS, remote sensing, GPS, and etc.

Geographic Analysis. A spatially literate student knows and understands: a. how to analyze the spatial organization of people, places, and environments on the earth's surface; and b. how to apply geography to interpret the past and present, and to plan for the future. Methods used for spatial representation are a cornerstone of geographic analysis. In addition, broad concepts useful

in analysis include: Location (distribution, density, pattern, clustering, and dispersion); Scale (distance, hierarchies, and changes in scale and interpretation); Spatial change and spread (diffusion and dispersion, spatial flows, and regional evolution); Perception; Place (regions, regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems); Spatial association/interaction (proximity and adjacency, distance decay, and geographic features as points, networks or regions, site, situation); and Spatial alignment, orientation, and direction.

In this course, students will achieve the following outcomes.

- Students will be able to explain and assess the results of original research from a variety of social science fields, especially legal geography.
- Students will develop an understanding for contemporary theories and critiques of the legal system.
- Students will learn how to employ investigative practices in legal geography (how to read a case, gain access to government documents, and situate legal events within various contexts, etc.).
- Students will be able to communicate clearly and effectively in a written format.
- Students will be able to enter professional positions or Ph.D. programs related to geography and/or the study of law.

Prerequisites: None

TEXTS: The following texts will be available at the UNM bookstore. All articles and book chapters will be available on-line through the Learn-UNM portal.

Books:

- Foucault, Michel (1977), *Discipline and Punish: The Birth of the Prison* Vintage
- Merry, Sally Engle (2000) *Colonizing Hawai'i: The Cultural Power of Law* Princeton
- Uday Singh Mehta (1999) *Liberalism and Empire: A Study in Nineteenth-Century British Liberal Thought* University of Chicago
- Nicole Graham (2011) *Landscape: Property, Environment, Law* Routledge
- Catherine Kellogg (2010) *Law's Trace: From Hegel to Derrida* Routledge
- Edward Mussawir (2011) *Jurisdiction and Deleuze* Routledge
- Steve Herbert (1996) *Policing Space: Territoriality and the Los Angeles Police Department* Univ Of Minnesota Press
- Katherine Beckett & Steve Herbert (2011) *Banished: The New Social Control in Urban America* Oxford University Press
- Braverman et. al. eds (2014) *The Expanding Spaces of Law: A Timely Legal Geography* Stanford Law Books
- David Delaney (2011) *The Spatial, the Legal and the Pragmatics of World-Making* *Nomospheric Investigations* Routledge

EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

- 1) **Class Participation:** Because much of the learning in this course comes from thoughtful discussion, listening, and interacting around the topics of the course, you are expected to attend and to participate during each class meeting. If you are not here to be a participant along with your classmates, everyone loses. Both your attendance and the quality of your participation will be considered in determining final grades. *PLEASE NOTE: YOUR PARTICIPATION EACH WEEK IS CONTINGENT UPON YOUR COMPLIANCE WITH THE FOLLOWING REQUIREMENTS:*
 - a. **Timely completion of the following weekly analysis assignments.** If you have not submitted a timely analysis, I will ask you to leave the class in which the covered readings are discussed. As mentioned below, you may opt out of this requirement once during the semester.
 - b. **Respectful dialog.** This is a non-negotiable requirement of this class. Practices to ensure this include: listening closely and respectfully; refraining from ridicule or interruption; retaining modesty and humility. I particularly stress the “golden rule”; if you introduce an author or a concept not otherwise covered in class, this is an opportunity for you to introduce helpful supplementary substance. In other words, contribute expansively in the learning experience, avoiding name- or concept-dropping. There is much to explore in the course and many arguments to be heard, so let’s work to create an environment where explorations are encouraged and enjoyable.
- 2) **Weekly Analyses:** Every week each student will compose and transmit a reaction to each week’s readings and post it to the entire class via the “Discussion Boards” tab (Under “Course Tools) in Learn UNM by **9:00 AM on Thursday**. This reaction serves the purposes of: helping you to keep up with the weekly reading assignments, forcing you to summarize each article succinctly: giving quieter students ‘voice’ and – most importantly – prodding you to come to terms with what you have read. Feel free to discuss whatever you wish in them, but you should go beyond mere summarization. You should try to draw out larger themes of consensus and debate, and work towards seeing the relevance of what you are reading to your own interests and career. Your reflections should be around 2 pages. You may opt out of one of these papers over the course of the semester and still be allowed to attend the relevant discussion.
- 3) **Final paper:** Students will be conducting an investigation into a “legal geography” of interest to them that they will share with the class. More will be provided in a separate handout.

GRADING:

Your paper, exams, attendance and participation will be given the following weights in the calculation of final grades:

Participation:	33% of final grade
Weekly Analyses:	33% of final grade
Final paper:	34% of final grade
<hr/>	
TOTAL:	100%

Class Schedule

- 1 - August 21

Introduction – What is Law? What is the Legal System?
READING: No reading assignment
- 2 – August 28

Classical Liberalism
READING:
 - John Locke, Second Treatise of Government (Selections)
 - J.S. Mill, “On Liberty” (selections)
 - Adam Smith, *The Wealth of Nations* (selections)
 - C.B. MacPherson, “The Political Theory of Possessive Individualism” (Selections)
- 3 – September 4

Law, Governance, Control
READING:
 - Foucault, Michel (1977), *Discipline and Punish: The Birth of the Prison*
- 4 – September 11

Law and the Colonial Experience
READING:
 - Merry, Sally Engle (2000) *Colonizing Hawai'i: The Cultural Power of Law*
- 5 – September 18

Liberalism and Colonialism II
READING:
 - Uday Singh Mehta (1999) *Liberalism and Empire: A Study in Nineteenth-Century British Liberal Thought*
- 6 – September 25

Natural Resources & Environmental Regulation
READING:
 - Nicole Graham (2011) *Landscape: Property, Environment, Law*

- 7 – October 2 Law's Project
 READING: Catherine Kellogg (2010) *Law's Trace: From Hegel to Derrida*
- 8 – October 9 Law's Spatiality
 READING:
 - Edward Mussawir (2011) *Jurisdiction and Deleuze*
- 9 – October 16 Property, Modernism, Space
 READING:
 - Nicholas Blomley, (1998) "Landscapes of Property" *Law and Society Review*.
 - Nicholas Blomley, (2007) 'Making private property: enclosure, common right and the work of hedges', *Rural History*. 18, 1, 1-21
 - Mitchell, T. (2002). "Principles true in Every Country," in, *Rule of Experts: Egypt, Techno-Politics, Modernity*. Berkeley: University of California Press. P. 54-79
 - Petchesky, Rosalind Pollack, "The Body as Property: A Feminist Re-Vision." In *Concieving the New World Order: The Global Politics of Reproduction*. Faye D. Ginsburg and Rayna Rapp, eds. U. California Press (1995)
- 10 – October 23 NO CLASS – SWAAG Conference
- 11 – October 30 Urban Geography and Policing
 READING:
 - Steve Herbert (1996) *Policing Space: Territoriality and the Los Angeles Police Department*
- 12 – November 6 Urban Geography and Spatial Control
 READING:
 - Katherine Beckett & Steve Herbert (2011) *Banished: The New Social Control in Urban America*
- 13 – November 13 Contemporary Issues – Expanding spaces of Law
 READING:
 - Braverman et. al. eds (2014) *The Expanding Spaces of Law: A Timely Legal Geography*
 - Chapters 1 & TBA

14 – November 20 The Meaning of Legal Geography Revisited

READING:

- David Delaney (2011) *The Spatial, the Legal and the Pragmatics of World-Making Nomospheric Investigations*

15 – November 27 NO CLASS – Thanksgiving break

16 – December 4 Wrap Up & Presentation of Final Project

READING:

- No Reading Assigned

POLICIES:

Ethics and Academic Dishonesty:

The course emphasizes ethical practices and perspectives. Above all, students and instructors should strive to communicate and act, both in class interactions and in assigned coursework, in a manner directed by personal integrity, honesty, and respect for self and others. Included in this focus is the need for academic honesty by students as stated by the UNM Pathfinder. Students need to do original work and properly cite sources.

Accordingly, I consider Academic Dishonesty, including plagiarism to be unacceptable. The University's official definition of Academic Dishonesty may be found at:

<http://pathfinder.unm.edu/>

This is a graduate course for students who have developed a strong set of intellectual and work skills, and who are familiar with university policy on academic dishonesty. One of the non-negotiable requirements for passing this course is turning in your own, original, non-plagiarized work for all assignments submitted and properly citing sources. If you plagiarize, you will fail this class. Additionally, plagiarism and/or other forms of academic misconduct may lead to the system of institutional penalties outlined at the above website

Late Work: Late work will not be accepted. Turn in your work in a timely manner by deadline. In addition, you will not have a chance to rewrite your work after it has been turned in. However, you are encouraged to meet with the professor in advance to discuss and ask questions about your assignments in progress.

Email responsibility: Check your UNM email account regularly, as we will use this account to keep in touch with you about course requirements or updates. If you use another email address, please set up your UNM account to forward your UNM account email to that address.

Technology: Regularly check your UNM email account as we will use this account regularly for the course. If you use another email address, please forward your UNM email to that address. Of course, turn off cell phones and do not internet surf in class.

ADA Accessibility: Qualified students with disabilities needing appropriate academic adjustments should contact me as soon as possible to ensure your needs are met in a timely manner. Handouts are available in alternative accessible formats upon request.

Diversity: This course encourages different perspectives related to such factors as gender, race, nationality, ethnicity, sexual orientation, religion, and other relevant cultural identities. This course seeks to foster understanding and inclusiveness related to such diverse perspectives and ways of communicating.

Office Hours: Office hour times and locations are subject to change. If you intend to visit me during an office hour I STRONGLY recommend that you inform me in advance to confirm time and place.

Grades: All grades assigned are final and non-negotiable. No incompletes for the semester will be given unless you can demonstrate valid and compelling reasons for your inability to complete the work. No extra-credit or make-up assignments will be offered.

Geography 525 – GIScience Seminar
Spring 2014
Meeting time, location: F 3-5:30, BandE-106
Office hours: Tu & Th 2:30-3:30 or by appt.

Christopher Lippitt (Chris)
Email: clippitt@unm.edu
Office: Bandelier West – 215

COURSE SYLLABUS

Objectives: To (1) develop an understanding of the state of Geographic Information Science and (2) to develop professional research and writing skills.

Grade Basis: Class participation	25%
Annotated Bibliographies	15%
Article Rankings	15%
Writing Assignments	25%
Peer Reviews	20%

Required Text: None

Grades:
The final class grade will be based on the cumulative point total for the class, weighted as outlined above . Final grade decisions will be based on a flexible curve. The instructor reserves the option to raise a grade by one half to a whole grade based on consistent improvement in performance. Late assignments will be accepted within one week of the due date for 1/2 credit.

Annotated Bibliographies: Each week, students will be expected to produce 1 1-page annotated bibliography using the following format:

- Title
- Abstract
- Citation
- Summary of its impact on the debate

Article Rankings: During the first 8 weeks of the semester, students will present their article, how it affects the debate, and lead a discussion of the implications of that article each week. Once discussion has ceased, all students will be asked to rank the relevance of that article to the debate to produce an aggregate score of relevance. The aggregate relevance score of each student will determine the ‘Article Ranking’ portion of their grade. The rubric for ranking is:

- 1: Directly Addresses the Debate, had strong influence on my opinion
- 2: Peripheral to the debate, but had a strong influence on my opinion
- 3: Peripheral to the debate and had a minimal influence on my opinion
- 4: Seemingly unrelated or irrelevant to the debate

Peer Reviews: Students will have their work reviewed by peers and each student will review their peer’s work. Peer reviews are intended to be helpful to the author, constructive in their approach and tone, and thorough. To receive full credit, reviews must meet these criteria and thoroughly address errors in logic, grammar, spelling, sentence structure, ease of reading, and citation.

Class Schedule:

Note: This schedule is tentative, approximate, and subject to change.

Week	
1-8	Each student will present an article each week. The impact of the article on the Systems/Science debate will be discussed and then ranked by each student.
9	Spring Break
10	Each student will bring 10 copies of a draft outline and problem statement of a publication on the debate to class. All students will evaluate and rank all other student’s outlines. We will collectively produce a master outline based on synthesis of student outlines and sections will be assigned to each student.
11	First section drafts due. All students will review and edit 2 of their peers sections in class and those revisions will be discussed/presented to the class.
12-13	Iterative revisions based on peer feedback
14	Draft Conclusion due. All students will review and edit 2 of their peers sections in class and those revisions will be discussed/presented to the class.
15	Final Draft of Problem Statement, assigned section, and Conclusions due
16	Debrief and journal target discussion

GEOG 461/561 –Environmental Management
Fall 2021
3 credits; T/R
3:15 pm - 5:45 pm; Mitchell Hall Room 206

Instructor: Melinda Harm Benson
Assistant Professor, Department of Geography and Environmental Studies
Bandelier Hall West Room 223
Office Hours: T/R 12:30-1:30 p.m., W: 1:00-2:00 p.m. and by appointment
Email: mhbenson@unm.edu

Readings: Jim Salzman and Barton H. Thompson Jr. (2010). Environmental Law and Policy 3rd ed.

All other readings will be provided on WebCT.

Description: This course will examine and discuss the nature of environmental management issues and challenges. Students will apply their critical thinking skills to a variety of environmental policy approaches and apply those skills to contemporary environmental and natural resource problems.

Objectives: This course contributes to the Geography Department's mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. The Geography Department has broad learning goals for students in its BA degree, which this course contributes to most directly. The goals are:

- A. Students will develop an ability to see meaning in the arrangement of things in space.
- B. Students will develop an ability to see relationships between people, places, and the environment.
- C. Students will become geographical problem solvers capable of using qualitative, quantitative and/or spatial methods of analysis.
- D. Students will become clear and effective communicators.

Effective written and oral communication is a key part of a good education (Goal D). Written communication will be evaluated through student problem-based work assignments, etc. Oral communication will be evaluated through class discussion and presentations. Writing assignments will also be used to evaluate student's abilities to analyze geographic problems (Goal C). A spatially literate student (Goal A, B and C) will know and understand the following core concepts and themes used in geography. Core concepts and themes are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

Place and regions. A spatially literate student knows and understands: a. the physical and human characteristics of place; b. that people create regions to interpret earth's complexity; and c. how culture and experience influence people's perceptions of places and regions. Examples of concepts useful in understanding place and region include: regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems, and etc.

Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

Human Systems. A spatially literate student knows and understands: a. the characteristics, distribution, and migration of human populations on the earth's surface; b. the characteristics, distribution, and complexity of earth's cultural mosaics; c. the patterns networks and economic interdependence on the earth's surface; d. the processes patterns and functions of human settlement; and e. how the forces of cooperation and conflict among people influence the division and control of earth's surface. Examples of concepts useful in understanding human systems include: location, scale, spatial change and spread, spatial association, perception, and etc.

Spatial Representation. A spatially literate student knows and understands: a. how to use maps and other geographic representations, tools and technologies to acquire, process and report information from a spatial perspective; and b. how to use mental maps to organize information about people, places, and environments in a spatial context. Tools used include: GIS, remote sensing, GPS, and etc.

Geographic Analysis. A spatially literate student knows and understands: a. how to analyze the spatial organization of people, places, and environments on the earth's surface; and b. how to apply geography to interpret the past and present, and to plan for the future. Methods used for spatial representation are a cornerstone of geographic analysis. In addition, broad concepts useful in analysis include: Location (distribution, density, pattern, clustering, and dispersion); Scale (distance, hierarchies, and changes in scale and interpretation); Spatial change and spread (diffusion and dispersion, spatial flows, and regional evolution); Perception; Place (regions, regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems); Spatial association/interaction (proximity and adjacency, distance decay, and geographic features as points, networks or regions, site, situation); and Spatial alignment, orientation, and direction.

For this course, a smaller subset of these themes and concepts is relevant. These themes will be a central part of the course. Student knowledge and understanding of these themes and concepts will be evaluated through the quality of their participation, problem-based work assignments and reading reactions, case studies, and examinations. Students will be:

- learning about current environmental management concepts and approaches;
- gaining a basic understanding of how environmental management schemes are created and enforced;
- learning about different types of contemporary environmental management challenges (e.g., resource consumption and waste, biodiversity loss, climate change, etc.);

- applying existing environmental management concepts and approaches to contemporary environmental management challenges and identifying the strength and weaknesses of various environmental management schemes; and
- increasing critical thinking while investigating and discussing environmental management challenges.

Prerequisites: None

Grading:	Attendance and Participation	25%
	Learning Activity Assignments	25%
	Case Study ¹	25%
	Exams	25%

Grading will be on a straight scale:
A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%.

Course Organization and Assignments

Attendance and Participation

This course requires active participation from all class members. You will be expected to share your thoughts and ideas with the class. Good participation is a matter of both quality and quantity. More information on what constitutes “quality” participation will be provided in class. Attendance is required, and a student with more than four absences may be dropped from the course at the instructor’s discretion. Being late to class is the equivalent of ½ of an absence.

Discussions using WebCt will also provide a basis for class participation. After class, each student will post one (1) discussion question/comment AND will respond to at least one (1) question/comment posted by another student regarding the week’s material. Discussion threads will generally be open from Thursday-Tuesday between classes.

Learning Activity Assignments

The focus of this class is to examine how, on a practical level, environmental management is achieved. It is therefore essential that students learn how to apply what they are learning to problem-based scenarios. Class assignments will include both in class and outside activities. Learning activities (LAs) are designed to prepare students for discussion and to actively engage the material.

Case Study

Students will conduct their own research on a contemporary environmental management challenge in the United States. More information on this assignment will be provided in a separate handout.

Exam

There will be a both a midterm and a comprehensive final exam. Each student will be allowed to bring a typed, summary course outline to each exam as a reference guide. More information regarding how to develop and use an outline will be provided in class.

¹ For graduate students, this will include an in-class participation.

A note about late assignments

To do well in this course, you must turn in your assignments on time. Late assignments will be penalized by reducing the maximum points achievable by twenty percent (20%) for each day the assignment is late. For this reason, the WebCT will generally lock an assignment five days after deadline. If you need an extension, please make sure to request it in advance.

A note about field trips

There may be field trips during the semester. While attendance is required, an alternative assignment will be provided for you if you are unable to attend and if the field trip takes place outside of regularly scheduled class time.

Student Support

If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation to, the Information Accessibility Resource Center: <http://as2.unm.edu>; (505) 277-3506.

Student Code of Conduct

1. Students should exhibit respectful classroom values and behavior by:
 - engaging in appropriate communication, interaction and preparedness;
 - demonstrating trust, respect and civility;
 - approaching course content as important and necessary;
 - meeting all deadlines for assignments and team member obligations;
 - turning off cell phones in class;
 - avoiding unnecessary talking; and
 - not reading outside material or doing other work during class.
2. Students should contribute to a positive learning environment by:
 - arriving, attending and departing class in a respectful manner;
 - taking responsibility for team and individual assignments; and
 - developing cooperative relationships with other students and faculty.
3. Students should support a professional learning environment by:
 - avoiding inappropriate language;
 - refraining from unrealistic expectations in dealing with administration, faculty and staff; and
 - communicating with the instructor if changes could be made to improve the learning environment.
4. Students must uphold the academic integrity standards expected by the University of New Mexico. Academic integrity is conceptualized as doing and taking responsibility for one's own work. This includes individual assignments and, for group assignments, the assumption is that all worked turned in is the "work product" of the team. Each team member is equally responsible for the work presented as the output of that team's effort. For more information on UNM's standards for academic integrity, see the policy on academic dishonesty at <http://www.unm.edu/~sac/policies.html#academicdishonesty>.

Date:	Unit:	Readings:	Topics/Activities/Deadlines:
Week 1: August 22	Introduction	Salzman & Thompson 1-13	Welcome and introduction; syllabus review; history of environmental protection; Rio+ 20—where do we go from here?
Week 2: August 29	Strategies and Approaches	Salzman & Thompson 14-87; Extinction of the American Passenger Pigeon (1936); Hill (2000). Supp./561: Hill interview (2012).	Introduction to concepts in environmental management; the management toolkit—the five “Ps of environmental management approaches; using the toolkit—the basics of implementation and enforcement
Week 3: September 5	Strategies and Approaches; begin Air Quality	Salzman & Thompson 87-112; skim Albuquerque-Bernalillo County (2006). Supp./561: Reed and Bruyneel (2010)	Wrap up strategies and approaches; Introduction to the Clean Air Act (CAA); scales of governance and the role of federalism; discussion regarding case study requirement and finding case study topic ideas
Week 4: September 12	Air Quality and begin Climate	Salzman & Thompson 113-141; surf EPA’s climate website (and, if necessary IPCC (2007)); Supp./561: Moritz (2012); MacDonald (2010)	Ozone depletion and lessons learned, climate change policy approaches and pollution trading schemes
Week 5: September 19	Climate	Copenhagen Accord (2009); UNDP (2010); Dimitrov (2010); Adger and Barnett (2009) Reese (2012); Supp./561: Van Rijswick and Salet (2012)	International agreements: the Copenhagen Accord—from government to governance? Climate change mitigation and adaptation efforts across scales of governance; in class activity regarding how to make an outline
Week 6: September 26	Resource Consumption	S&T pp. 198-220; Wackernagel, et al (1999); Jacobs (2011); Supp./561: Correia (2012); Klinsky et al (2009)	Carbon footprint/ecological footprinting as a management tool—what do we manage? The End of Sustainability; case study topics due
Week 7: October 3	Research Skills	N.A.	Research day with librarian Anne Schultz; Location: room 253 at Centennial library ; in class time to work on outlines in preparation for midterm exam
Week 8: October 10	Toxics and Waste Management	N/A	Midterm exam ; in-class midterm assessment; case study draft bibliography-to-date due

Week 9: October 17	Toxics and Waste Management	S&T pp. 198-220 Supp./561: Scruggs et al. (20xx)	Introduction to toxics, role of risk assessment, etc.; the Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (“Superfund”); discuss midterm exam
Week 10: October 24	Water Supply	Utton Center (2012); surf ABWUA’s website regarding local conservation measures	Overview of water allocation in the American West, local water conservation measures; guest speaker Katherine Yuhas, conservation director for the Albuquerque Bernalillo County Water Utility Authority (confirmed)
Week 11: October 31	Water Quality	Salzman & Thompson 146-171; Craig and Noto (review NM section (2012)); Supp./561: U.S. Air Force (2011)	Introduction to Clean Water Act Col. Jeff Lanning from Kirtland Air Force Base and Bruce Thomson, Civilian Co-Chair of the Citizens Advisory Board and Director of UNM Water Resources Program (invited)
Week 12: November 7	Wetlands and Biodiversity	Salzman & Thompson 265-301; Howell (2011); Supp./561.: Daily (1997)	Wetlands protection, introduction to the Endangered Species Act, ecosystem services and a policy orientation
Week 13: November 14	Biodiversity	Ruhl 2008; Supp./561: Benson 20xx)	Biodiversity and climate change—environmental management and the “no analog” future
Week 14: November 21	Field Trip!	N.A.	Optional case study deadline
Week 15: November 28	National Environmental Policy Act	Salzman & Thompson 321-334; Haugrud (2009); Mandelker (2009) Boling (2009); Supp./561: Benson and Garmestani (2011)	Introduction to the National Environmental Policy Act (NEPA) and the future of NEPA
Week 16: December 5	Course wrap	N.A.	What is the future of environmental management? Course evaluations; final exam review, etc.; case study due
Final Exam	N/A	N/A	Please consult the registrar for time and location

GEOG 462/562 – Water Resources Management

Fall 2014

11:00-12:15pm 3 credits; MECH 208

Instructor: Melinda Harm Benson
Associate Professor, Department of Geography & Environmental Studies
Bandelier Hall West Room 223
Office Hours: T/H 1:30-2:30 p.m., W 1:00-3:00 and by appointment
Email: mhbenson@unm.edu

Readings: Sandra Postel and Brian Richter. 2003. Rivers for Life: Managing Water for People and Nature

All other readings will be available through an online platform.

Description: This course will examine and discuss the nature of water management challenges. Students will apply their critical thinking skills to a variety of policy approaches and apply those skills to contemporary environmental and natural resource problems.

Objectives: This course contributes to the Geography Department's mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. The Geography Department has broad learning goals for students in its BA degree which this course contributes to most directly. The goals are:

- A. Students will develop an ability to see meaning in the arrangement of things in space.
- B. Students will develop an ability to see relationships between people, places, and the environment.
- C. Students will become geographical problem solvers capable of using qualitative, quantitative and/or spatial methods of analysis.
- D. Students will become clear and effective communicators.

Effective written and oral communication is a key part of a good education (Goal D). Written communication will be evaluated through student problem-based work assignments and the case study paper. Oral communication will be evaluated through class discussion and case study presentations. The case study paper will also be used to evaluate student's abilities to analyze geographic problems (Goal C). A spatially literate student (Goal A, B and C) will know and understand the following core concepts and themes used in geography. Core concepts and themes are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

Place and regions. A spatially literate student knows and understands: a. the physical and human characteristics of place; b. that people create regions to interpret earth's complexity; and c. how culture and experience influence people's perceptions of places and regions. Examples of concepts useful in understanding place and region include: regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems, and etc.

Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

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Our own watershed will serve as a laboratory in which we investigate the multiple governance challenges involved in the realm of water resources. We will focus not

only on what current policies *are* currently but also what can and *should* be policies and approaches in the future. Most of the case studies will focus on domestic issues, but international challenges and topics may be introduced where appropriate.

Key concepts discussed in this course will include: weather v. climate, climate mitigation v. adaptation, the hydro-*social* cycle, virtual water, ecosystem services and payments for ecosystem services, conservation reliant species, etc.

Prerequisites: None

Grading:	Attendance and Participation	25%
	Reading Reflections/Learning Activities	25 %
	Unit Assessments	25%
	Final exam OR policy paper	25% ¹

Grading will be on a straight scale:
A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%.

Course Organization and Assignments

Attendance and Participation

This course requires active participation from all class members. You will be expected to share your thoughts and ideas with the class. Good participation is a matter of both quality and quantity. More information on what constitutes “quality” participation will be provided in class. Attendance is required, and a student with more than four absences may be dropped from the course at the instructor’s discretion. **Being late to class is the equivalent of ½ of an absence.** Students can enhance their participation with active engagement of online opportunities, including blogs and discussion boards.

Reading Reflections and Learning Activities

Reading reflections and learning activities are designed to prepare students for in-class time and gain a deeper understanding of the course material. More information regarding these assignments will be provided in class. Examples include: bringing discussion questions to class, in-class writing assignments, etc. Often these will be due prior to class and must be uploaded on the UNM Learn on-line course platform. Because the point of these assignments is to prepare you for class, **late reading reflections and learning activities will not be accepted.** Graduate students are

¹ Note: graduate students are required to take the policy paper option and will provide an in-class presentation related to his or her research.

expected to review supplemental materials and initiate class discussion based on these materials.

Unit Assessment and Final Exam

There will be exams that will require students to demonstrate their mastery of the course material and ability to integrate and apply the course themes and approaches. More information on the exams will be provided.

A note about late assignments

To do well in this course, you must turn in your assignments on time. Late assignments will be penalized by reducing the maximum points achievable by twenty percent (20%) for each day the assignment is late. **Late reading reflections and learning activities will not be accepted.**

A note about field trips

As you can see from the course schedule, there are field trips that will take place during the semester. If you are unable to attend a field trip outside of class time, an alternative assignment will be provided for you.

Student Support

If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation to, the Information Accessibility Resource Center: <http://as2.unm.edu>; (505) 277-3506.

Student Code of Conduct

1. Students should exhibit respectful classroom values and behavior by:
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 - avoiding unnecessary talking; and
 - not reading outside material or doing other work during class.

2. Students should contribute to a positive learning environment by:
 - arriving, attending and departing class in a respectful manner;
 - taking responsibility for team and individual assignments; and
 - developing cooperative relationships with other students and faculty.
3. Students should support a professional learning environment by:
 - avoiding inappropriate language;
 - refraining from unrealistic expectations in dealing with administration, faculty and staff; and
 - communicating with the instructor if changes could be made to improve the learning environment.
4. Students must uphold the academic integrity standards expected by the University of New Mexico. Academic integrity is conceptualized as doing and taking responsibility for one's own work. This includes individual assignments and, for group assignments, the assumption of responsibility for work that is turned in as the "work product" of a team. Each team member is equally responsible for the work presented as the output of that team's effort. For more information on UNM's standards for academic integrity, see the policy on academic dishonesty at <http://www.unm.edu/~sac/policies.html#academicdishonesty>.

Tentative class schedule: subject to change at the instructor's discretion; ALWAYS check previous class lecture for updated information regarding reading assignments and deadlines.			
Date:	Topic:	Readings:	Description:
In this class, we first explore how water is allocated. Once allocated, how do we use it? Once we use it (or impact it by some other activity), what are environmental implications? There are three units: (1) supply and allocation (2) uses (3) implications. For each, we will briefly examine broader issues and then focus mainly on issues related to New Mexico. There will be an in class assessment after each unit.			
Unit I: Supply and Allocation			
August 19	Introduction	N.A.	Welcome, introductions; syllabus review
August 21	Introduction	Milly et al, 2008); Gleick (2010); Swyngedouw (2009)	Drought, climate and the end of stationarity; hydro-social cycle
August 26	Water supply and allocation: allocation strategies	Utton Center chs. 1-3; Cech (2010) ch 8	Water supply and allocation in the West, i.e., the prior appropriation doctrine
August 28	Water supply and allocation: the role of history and culture	Utton Center, chs 4, 5, (select from 20-22);	Water culture; tribal water issues and acequias; film: <i>Neustras Acequias</i>
September 2	Water supply and allocation: the federal role	Graff 1999; Cech 294-337	Water projects and the federal role—the Bureau of Reclamation and U.S. Army Corps, etc.
September 4	Water supply and allocation: integrating science	TBD	Role of Science in Policy with Dr. Ryan Morrison, College of Engineering (confirmed)
September 9	Water supply and allocation: across jurisdictional boundaries	Utton Center ch. 25-26	Interstate compacts and international agreements; Arizona Water Settlements Act—water project for the Gila? Amy Haas, New Mexico Interstate Stream Commission (confirmed)

September 11	Water supply and allocation: more on compact agreements	TBD	More interstate compacts; San-Juan Chama Diversion projects
September 16	Water supply and allocation	N.A.	Review of Unit I
September 18	Water supply and allocation	N.A.	Unit I Summary and Assessment
September 23	Water uses: groundwater and domestic wells	Utton Center ch. 6, 12	Groundwater issues, domestic wells
Unit II: Water uses			
September 25	Rivers for Life: Managing Water For People And Nature	Postel and Richter (2003)	Author meets reader: guest Sandra Postel (confirmed)
September 30	Water and land use	Ainsfield (2010) ch 10; Lovell (2011); Gallegos (2004); Hoekstra and Mekonnen (2012)	Introduction to water uses, review Unit I assessment results; Agricultural uses for water; virtual water
October 2	Water and land use	Utton Center ch 15, 16	GIS tools water rights transfers from agriculture to municipal use; guest Veronica Chavez, Office of the State Engineer (confirmed)
October 7	Water use and households	Utton Center ch. 7-8 Bates et al (2011); surf ABQUA website	Water conservation; guest speaker; Katherine Yuhas, conservation officer, ABQUA (confirmed)
October 9	N.A.	N.A.	Fall Break!
October 14	Water uses: keeping water instream	Benson et. al (2013); supp. Petts (2009	Environmental flows—the San Juan Chama Optimization project—meet the project team (Steve Harris, Rio Grande Restoration (confirmed)

October 16	Water uses: industrial	Fleck (2010); Ainsfield (2010) ch 11; supp: review Proposed Intel-ISC Water Rights Agreement site	Water for industry; Intel settlement, etc.
October 21	Water uses: energy development	TBD	Oil and gas industry, fracking fluids, etc.; Unit II review
October 23	N.A.	N.A.	No class BUT SWAAG conference October 23-25 (for extra credit, attend one paper session during the conference and write a 200 word summary)
October 28	Water uses	N.A.	Unit II Assessment; in class review of assessment
Unit III: challenges and implication of water and land use practices			
October 30	Use implications and challenges: water quality	Salzman and Thompson (2010) ch 5; Utton Center ch. 14	Protecting water quality—a federalist approach
November 4	Use implications and challenges: toxics	TBD	Groundwater contamination and superfund sites
November 6	Use implications and challenges: municipal wastewater	Cech (2010) ch 11	Wastewater treatment
Friday! November 7	Use implications and challenges: municipal waste water	N.A.	Field trip! Southside Reclamation plant (3:30-5:00pm)
November 11	Use implications and challenges: flooding and stormwater	Peterson (1992); TBD	Stormwater and flood control; Albuquerque Metropolitan Arroyo Flood Control Authority; Bruce Thomson, AMAFCA board member (confirmed)
November 13	Use implications and challenges: wetlands	Hough and Robertson	Wetlands protection: Clean Water Act section 404; emerging, innovative

	protection	(2009); Daily (1997)	approaches and payments for “ecosystem services”
Saturday! November 15	Use implications and challenges: stormwater runoff and wetlands protection	N.A.	Field trip! Valle de Oro National Wildlife Refuge with Jennifer Owen-White, Refuge Manager (9-11am)
November 18	Use implications and challenges: biodiversity	Cech (2010) ch 12	ESA basics; local endangered species issues: the Rio Grande Silvery Minnow and Southwestern Willow Flycatcher
November 20	Use implications and challenges: biodiversity	USFWS (2011); Scott et al (2005); TBD	Endangered Species Act continued; candidate species and conservation reliant species
November 25	Water and privatization	N.A.	Film <i>Thirst: Fighting the Corporate Theft of Our Water</i>
November 27	N.A.	N.A.	Thanksgiving Break!
December 3	Use implications and challenges	N.A.	Unit 3 Summary and Assessment
December 5	Course wrap up	N.A.	Synthesis of course material and concepts—what does the future hold for water resources management? Review of Unit III assessment, evaluations; etc.
TBD	N.A.	N.A.	Optional paper OR final exam

Spring 2014
GEOG 463/563 –Public Land Management
3 credits; Wednesday
3:00-5:30 p.m.; Dane Smith Hall 333

Instructor: Melinda Harm Benson
Assistant Professor, Department of Geography and Environmental Studies
Office Hours: T/H 11:30-12:30, W 1:30-2:00 and by appointment
Bandelier Hall West Room 223
Email: mhbenson@unm.edu

Readings: Dyan Zaslowsky and Tom H. Watkins. 1994. These American Lands: Parks, Wilderness, and the Public Lands: Revised and Expanded Edition

Martin Nie. 2008. The Governance of Western Public Lands: Mapping Its Present and Future.

Joseph Sax. 1980. Mountains without Handrails: Reflections on the National Parks.

All other readings will be available through online platform.

Recommended/Required for 563:

Bob Keiter. 2013. To Conserve Unimpaired: The Evolution of the National Park Idea

Char Miller 2012. Public Lands, Public Debates: A Century of Controversy

Description: This course will examine and discuss the nature of public land management issues and challenges. Students will apply their critical thinking skills to a variety of policy approaches and apply those skills to contemporary environmental and natural resource problems.

Objectives: This course contributes to the Geography Department's mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. The Geography Department has broad learning goals for students in its BA degree which this course contributes to most directly. The goals are:

A. Students will develop an ability to see meaning in the arrangement of things in space.

B. Students will develop an ability to see relationships between people, places, and the environment.

C. Students will become geographical problem solvers capable of using qualitative, quantitative and/or spatial methods of analysis.

D. Students will become clear and effective communicators.

Effective written and oral communication is a key part of a good education (Goal D). Written communication will be evaluated through student problem-based work assignments and the case study paper. Oral communication will be evaluated through class

discussion and case study presentations. The case study paper will also be used to evaluate student's abilities to analyze geographic problems (Goal C). A spatially literate student (Goal A, B and C) will know and understand the following core concepts and themes used in geography. Core concepts and themes are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

Place and regions. A spatially literate student knows and understands: a. the physical and human characteristics of place; b. that people create regions to interpret earth's complexity; and c. how culture and experience influence people's perceptions of places and regions. Examples of concepts useful in understanding place and region include: regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems, and etc.

Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

Human Systems. A spatially literate student knows and understands: a. the characteristics, distribution, and migration of human populations on the earth's surface; b. the characteristics, distribution, and complexity of earth's cultural mosaics; c. the patterns networks and economic interdependence on the earth's surface; d. the processes patterns and functions of human settlement; and e. how the forces of cooperation and conflict among people influence the division and control of earth's surface. Examples of concepts useful in understanding human systems include: location, scale, spatial change and spread, spatial association, perception, and etc.

Spatial Representation. A spatially literate student knows and understands: a. how to use maps and other geographic representations, tools and technologies to acquire, process and report information from a spatial perspective; and b. how to use mental maps to organize information about people, places, and environments in a spatial context. Tools used include: GIS, remote sensing, GPS, and etc.

Geographic Analysis. A spatially literate student knows and understands: a. how to analyze the spatial organization of people, places, and environments on the earth's surface; and b. how to apply geography to interpret the past and present, and to plan for the future. Methods used for spatial representation are a cornerstone of geographic analysis. In addition, broad concepts useful in analysis include: Location (distribution, density, pattern, clustering, and dispersion); Scale (distance, hierarchies, and changes in scale and interpretation); Spatial change and spread (diffusion and dispersion, spatial flows, and regional evolution); Perception; Place (regions, regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems); Spatial association/interaction (proximity and adjacency, distance decay, and geographic features as points, networks or regions, site, situation); and Spatial alignment, orientation, and direction.

For this course, a smaller subset of these themes and concepts is relevant. These themes will be a central part of the course. Student knowledge and understanding of these themes and concepts will be evaluated through the quality of their participation, problem-based

work assignments and reading reactions, case studies, and mid-term and final examinations. Students will:

- learn the history of public lands and their development in the United States;
- gain a basic understanding of the current types of public land designations, including Bureau of Land Management lands, U.S. Forest Service Lands, National Parks, etc.;
- explore current public land management challenges facing New Mexico and other states, including protection of biodiversity, oil and gas development, grazing, and recreational use; and
- increase critical thinking skills and challenge common assumptions with regard to natural resource problems.

Prerequisites: None

Grading:	Attendance and Participation	33%
	Reading Reflection Assignments ¹	33%
	Case Study Paper ²	34%

Grading will be on a straight scale:

A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%.

Course Organization and Assignments

Attendance and Participation

This course requires active participation from all class members. You will be expected to share your thoughts and ideas with the class. Good participation is a matter of both quality and quantity. More information on what constitutes “quality” participation will be provided in class. Attendance is required. Student with more than **two absences** will result in a grade reduction, and students may be dropped from the course at the instructor’s discretion if they miss more than three classes.

Reading Reflection Assignments, etc.

Reading reaction assignments are designed to prepare students for engaged discussion. More information regarding these assignments will be provided in class. Examples include: bringing discussion questions to class, in-class writing assignments, etc. Graduate students are expected to review supplemental materials and initiate class discussion based on these materials. **Students must bring a physical copy of the day’s assignment AND at least three discussion questions for each class to hand in at the end of class.**

Case Study

Each student will conduct their own research on a contemporary public land management challenge. More information on this assignment will be provided in a separate handout.

A note about late assignments

To do well in this course, you must turn in your assignments on time. Late assignments will be penalized by reducing the maximum points achievable by twenty percent (20%) for each day the assignment is late. Extensions will be granted on a limited basis and must be

¹ For graduate students, this will include a book review. More information will be provided.

² For graduate students, this will also include an in class presentation.

Course syllabus-- subject to change at Instructor's discretion

requested well in advance of the deadline. **Late reading reflections will not be accepted.**

A note about field trips

As you can see from the course schedule, there are field trips that will take place during the semester. If you are unable to attend, alternative assignments will be provided for you.

Student Support

If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation to, the Information Accessibility Resource Center: <http://as2.unm.edu>; (505) 277-3506.

Student Code of Conduct

1. Students should exhibit respectful classroom values and behavior by:
 - engaging in appropriate communication, interaction and preparedness;
 - demonstrating trust, respect and civility;
 - approaching course content as important and necessary;
 - meeting all deadlines for assignments and team member obligations;
 - turning off cell phones in class;
 - avoiding unnecessary talking; and
 - not reading outside material or doing other work during class.
2. Students should contribute to a positive learning environment by:
 - arriving, attending and departing class in a respectful manner;
 - taking responsibility for team and individual assignments; and
 - developing cooperative relationships with other students and faculty.
3. Students should support a professional learning environment by:
 - avoiding inappropriate language;
 - refraining from unrealistic expectations in dealing with administration, faculty and staff; and
 - communicating with the instructor if changes could be made to improve the learning environment.
4. Students must uphold the academic integrity standards expected by the University of New Mexico. Academic integrity is conceptualized as doing and taking responsibility for one's own work. This includes individual assignments and, for group assignments, the assumption of responsibility for work that is turned in as the "work product" of a team. Each team member is equally responsible for the work presented as the output of that team's effort. For more information on UNM's standards for academic integrity, see the policy on academic dishonesty at <http://www.unm.edu/~sac/policies.html#academicdishonesty>.

Geog 464/564: Food and Natural Resources

Instructor: Chris Duvall

Office: 220 Bandelier West

Mail box: 111 Bandelier West

E-mail: duvall@unm.edu

Fall 2014

Office hours: Wed 2-3:30 pm, Thurs 2-3:00 pm or by appointment

Class meetings: Tues-Thurs, 12:30–1:45 pm

Classroom: 224 Dane Smith Hall

Course description:

This course provides an advanced introduction to the environmental meanings of food. Human activities have altered all of the Earth’s ecosystems. Yet humans are also components of ecosystems, because we are entirely reliant upon plants, animals, fungi, and bacteria for food. Food is a direct and ubiquitous connection all humans share with the Earth’s biophysical environment. Every day, everyone makes choices about which foods to eat, how to prepare and eat these foods, and how to dispose associated wastes. Cumulatively, our daily food choices have profound ecological effects for Earth’s natural environments, and also link us to farmers and other people around the world. This course examines both why we eat what we eat, and how our food choices affect other people and places around the world.

Learning objectives for undergraduate and graduate students:

- 1) Describe causes of spatial, temporal, and cultural variation in modern or historic diets.
- 2) Explain how and why food has been used to produce differences between people based on race, gender, ethnicity, class, birthplace, and other factors.
- 3) Identify common food plants, and summarize the cultural histories of these plants.
- 4) Explain effects of the prevailing global food system on natural and human resources.
- 5) Summarize concerns about the future of the global food system, and assess the likelihood of possible changes.
- 6) Describe and assess personal values associated with food choice.
- 7) Discuss and analyze academic and popular media about food.
- 8) Communicate about agricultural and food systems in oral formats.

Additional learning objectives for graduate students:

- 9) Conduct independent research on agricultural and food systems.
- 10) Communicate research findings in a written format.

Course materials:

- There are four REQUIRED books for this class, listed below in the order we will use them:
- Millstone, E. (2011) *The Atlas of Food*. [earlier editions of this book are acceptable]
 - Clapp, J. (2012) *Food*.
 - Guthman, J. (2011) *Weighing In*.
 - Belasco, W. (2006) *Meals to Come: A History of the Future of Food*.

These books are available at the university bookstore, though you may be able to find cheaper copies online.

You will also be REQUIRED to read several academic journal articles and book chapters in addition to these books. These articles and chapters will be provided via UNM Learn, or provided to you in class. **BRING REQUIRED READING MATERIALS TO CLASS EVERY DAY.**

This class is open to undergraduate and graduate students, but with different requirements for undergraduate and graduate students. *In order to pass this course, you must complete all required assignments.*

REQUIRED ASSIGNMENTS FOR UNDERGRADS	Percent of total	Points	REQUIRED ASSIGNMENTS FOR GRAD STUDENTS	Percent of total	Points
Attendance and participation (percent of meetings attended)	25%	250	Attendance and participation (percent of meetings attended)	17.86%	250
Food journal	18.75%	187.5	Food journal	12.5%	175
Food diversity exam	18.75%	187.5	Food diversity exam	12.5%	175
Food system exam	18.75%	187.5	Food system exam	12.5%	175
Future of food exam	18.75%	187.5	Future of food exam	12.5%	175
			Proposal for writing assignment	7.14%	100
			First draft of writing assignment	12.5%	175
			Final draft of writing assignment	12.5%	175
SEMESTER TOTAL	100%	1000	SEMESTER TOTAL	100%	1400

Final grades will be assigned based on the following scale:

A+	≥97% of total possible points		
A	≥93% of total possible points	C	70-77% of total possible points
B+	88-93% of total possible points	D+	65-70% of total possible points
B	81-88% of total possible points	D	60-65% of total possible points
C+	77-81% of total possible points	F	<60% of total possible points

I may adjust these score ranges downward if necessary.

Exams, assignments, and other activities are due as indicated in the course calendar (below). Extensions to assignment due dates or alternate dates for exams or other activities will be granted only if a student can provide proof that an unforeseen, unpreventable situation has prevented him/her from completing and/or turning in an assignment, exam, or other activity on the scheduled due date. Any request for an extension to an assignment due date or an alternate date for an exam or other activity must be made more than 24 hours before the beginning of class on the due date for which an extension is sought, unless there is a verifiable emergency that occurs during this 24-hour period.

I take attendance for this course as a measure of participation in the course, because participation is an important component of learning. Attendance is a measure of two types of participation: 1) listening to lectures I will deliver during class meetings, and 2) interacting with other students in discussions and activities during class meetings. I will take attendance for each class meeting, and will award attendance points for the semester based on the percent of class meetings attended. Pre-arranged absences and emergency absences will dropped from the number of possible class meetings for a student, which increases the mathematical value of all other class meetings for that student. If a student has more than five pre-arranged or emergency absences, the maximum percent of attendance points that will be awarded is 90%; if a student has more than 10 pre-arranged or emergency absences, the maximum percent will be 75%.

Learning Support:

Accessibility Services (Mesa Vista Hall 2021, 277-3506) provides academic support to students who have disabilities. If you think you need alternative accessible formats for undertaking and completing coursework, you should contact this service right away to assure your needs are met in a timely manner.

Communication policies and practices:

Communication is a key to success in this, and other, courses. For this course, there are several guidelines for communication all of us must follow.

First, no comments will be tolerated that are offensive, derogatory, or disparaging to any identifiable group of people. If you have any questions about appropriate ways to express yourself when discussing course material (or other topics), please ask me for guidance. If you have concerns about how another student expresses him/herself in class, please let me know.

Second, during lecture no activities will be tolerated that distract other people in the classroom. We in this class share a single room where all activities should be directed toward learning. If you are distracting others with your behavior, I will let you know by asking you to change your behavior. If you wonder whether any particular activity may be distracting, please ask me for guidance. If another student is distracting you in class, please let me know.

Third, *let me know as soon as possible* when you have a question, or if there is something that is hindering you in class. I want you to succeed in this course (and in your others too), and it is easiest for me to help if we have some time to find a solution. *Last-minute questions/requests/comments often arrive too late for me to offer help, so please plan ahead.* If you have a schedule conflict that means you will miss an assignment due date, exam, or other activity, please *PLAN AHEAD and tell me as soon as possible*. I will work with you to resolve the conflict. If you have an emergency that affects your performance in this course, please let me know as soon as possible. I will work with you to resolve the situation. *Emergencies are rare and I trust that people tell me they have an emergency only when this is true.*

Fourth, *when communicating by e-mail*, please use your ‘unm.edu’ e-mail address. Many messages sent to me via gmail.com, yahoo.com, and other web-based e-mail services are sent to the trash by my spam filter. To eliminate the possibility that any of your messages are filtered out, use your unm.edu e-mail account. Also, I expect that all e-mail messages use a professional writing style, which means: using a subject line; signing your name at the end of the message; using proper spelling and punctuation (you’re not texting!); and using a professional, respectful tone.

Academic integrity:

UNM has strict and explicit regulations governing academic integrity, which are posted on the Internet in the *University Catalog* (<http://www.unm.edu/%7Eunmreg/catalog.htm>). **Cheating by presenting someone else’s work as your own is not tolerable in this course or anywhere at UNM.** For more information on the importance of academic integrity at UNM, see the *UNM Faculty Handbook* (<http://www.unm.edu/~handbook/D100.html>), the UNM Dean of

Students web site (http://www.unm.edu/~doso/ja_academichonesty.html), and the *UNM Pathfinder* section on student conduct (<http://pathfinder.unm.edu/policies.htm#studentcode>). If you are uncertain what is meant by “academic integrity”, including “plagiarism”, please consult the UNM Department of English information sheet (http://www.unm.edu/~english/Resources/pdf/Academic_Integrity_students.pdf), or the list of Internet resources provided by the UNM-Valencia Teaching & Learning Center (http://www.unm.edu/~tlc/contents/web_resources/integrity.html).

Please take the time to read and understand UNM’s policies governing academic integrity. *I strictly enforce these policies when grading student work.* **In this course, a student will receive zero points for any exam, assignment, or activity in which any portion violates UNM’s regulations governing academic integrity, regardless of when I discover the violation.** Additionally, a student who violates these regulations may receive a failing grade for the course, and be reported to the Dean of Students, which may lead to expulsion.

COURSE CALENDAR

All readings that are not from the required textbooks will be posted either on the public Internet, or through the UNM library’s electronic reserves system. Every day in class we will discuss the required readings for the day—**bring the readings to class!** Additionally, on some days I have other activities planned, which I indicate below.

Part 1: Overview and introduction

August 19: Course overview, syllabus, and survey

August 21: Why food and natural resources?

- **In class:** Review grad writing assignment
- **Required reading:** Millstone, *Atlas of Food* (Entire book!)

When reading this book, please compile: 1) a list of key or unfamiliar terms (such as ‘food security’), and 2) a list of key issues or topics regarding food that are most important to you. In class, we will discuss your lists and develop a master list that we will use throughout the semester. We will refer to the Millstone book throughout the semester.

Part 2: Why do people eat what they eat? Natural, cultural, and political ecologies of food

August 26: Why do people eat what they eat?

- **In class:** Food culture self-assessment; review food journal assignment
- **Required readings:**
Caplan 1996. Why do people eat what they do? Approaches to food and diet from a social science perspective. *Clinical Child Psychology and Psychiatry* 1(2): 213-227.
Menzel & D’Aluisio, *What I Eat*, pp. 7-21, and 328-329
- **Recommended readings:**
Jones 2000. What’s disgusting, why, and what does it matter? *Journal of Folklore Research* 37(1): 53-71.

August 28: Evolutionary ecology of food

- **Required readings:**
Menzel & D’Aluisio, *What I Eat*, pp. 22-121
- **Recommended readings:**
Chen 2006. Born to run. *Discover* 28 May. Online: http://discovermagazine.com/2006/may/tramps-like-us/article_print
Cordain et al. 2005. Origins and evolution of the Western diet. *American Journal of Clinical Nutrition* 81: 341-354.
Diamond 1987. The worst mistake in the history of the human race. *Discover* May: 64-66.
Diamond 2002. Evolution, consequences, and future of animal and plant domestication. *Nature* 418: 700-707.
Goff & Klee 2006. Plant volatile compounds: Sensory cues for health and nutritional value? *Science* 311: 815-819.
Krebs 2009. The gourmet ape: Evolution and human food preferences. *American Journal of Clinical Nutrition* 90S: 707S-711S.
Pimentel & Pimentel 2008. Chapters 3-6 (pp. 17-56) in *Food, Energy, and Society*, 3rd ed. Boca Raton, FL: CRC Press.
Stini 1988. Food, seasonality, and human evolution. In *Coping with Uncertainty in Food Supply* (de Garine & Harrison, eds.): 32-51. Oxford, UK: Clarendon Press.

September 2: Food cultures

- Required readings:
Menzel & D’Aluisio, *What I Eat*, pp. 122-203
- Recommended readings:
Allen & Baines. 2002. Manipulating the symbolic acceptance of meat to encourage greater acceptance of fruits and vegetables and less proclivity for red and white meat. *Appetite* 38: 118-130.
Alvarez 2007. The march of empire: Mangos, avocados, and the politics of transfer. *Gastronomica* 7(2): 28-33.
Carney 2000. The African origins of Carolina rice culture. *Ecumene* 7(2): 125-149.
Diamond 2003. The double puzzle of diabetes. *Nature* 423(5 June): 599-602.
de Garine 2001. Views about food prejudice and stereotypes. *Social Science Information* 40(3): 487-507.
Gade 1975. Horsemeat as human food in France. *Ecology of Food and Nutrition* 5(2): 1-11.
Harris 2008. The abominable pig. In *Food and culture: A reader* (Counihan & van Esterik, eds.): 54-66. New York & London: Routledge.
Mayer 1997. Historical changes in the mineral content of fruits and vegetables. *British Food Journal* 99(6): 207-211.
Meyer-Rochow 2009. Food taboos: their origins and purposes. *Journal of Ethnobiology and Ethnomedicine* 5: 18. URL: <http://www.ethnobiomed.com/content/5/1/18>.
van der Veen 2003. When is food a luxury? *World Archaeology* 34(3): 405-427.

September 4: Food, drugs, and beliefs

- Required readings:
Menzel & D’Aluisio, *What I Eat*, pp. 204-325
- Recommended readings:
Anderson 1987. Why is humoral medicine so popular? *Social Science Medicine* 25(4): 331-337.
Bordo 2008. Anorexia nervosa: Psychopathology as the crystallization of culture. In *Food and culture: A reader* (Counihan & van Esterik, eds.): 162-186. New York & London: Routledge.
Bruch 2008. Anorexia nervosa and its differential diagnosis. In *Food and culture: A reader* (Counihan & van Esterik, eds.): 104-117. New York & London: Routledge.
Dudley 2002. Fermenting fruit and the historical ecology of ethanol ingestion: Is alcoholism in modern humans an evolutionary hangover? *Addiction* 97: 381-388.
Singer 1989. Animal liberation or animal rights? *The Monist* 70(1): 3-14.
Steinbeck 1963 [1932]. Chapter IX. In *The Pastures of Heaven* (by J. Steinbeck): 155-176. New York: Viking Press.

September 9: **FOOD JOURNAL ASSIGNMENT DUE! E-mail your assignment before the end of the day.**

Anything submitted after September 9 will be late!

- UNDERGRADS: No class meeting today. Use your time to get started on the Food Diversity readings.
- GRAD STUDENTS: PROPOSAL DUE TODAY! We will meet in class to discuss your writing assignment. Bring to class your proposed topic for your encyclopedia entry, and the preliminary list of references you have identified.

Part 3: Food diversity

September 11: Food diversity: Domestication

- Required readings:
Gepts 2004. Crop domestication as a long-term selection experiment. *Plant Breeding Reviews* 24(2): 1-44.
Juniper 2007. The mysterious origin of the sweet apple. *American Scientist* 95(1): 44-51.
- Recommended readings:
Liu 2003. Health benefits of fruit and vegetables are from additive and synergistic combinations of phytochemicals. *American Journal of Clinical Nutrition* 78: 517S-520S.
Paris 1989. Historical records, origins, and development of the edible cultivar groups of *Cucurbita pepo* (Cucurbitaceae). *Economic Botany* 43(4): 423-443.
Perrier et al. 2011. Multidisciplinary perspectives on banana (*Musa* spp.) domestication. *Proceedings of the National Academy of Sciences* 108(28): 11311-11318.

September 16: Food diversity, part 1

- Required reading: Vaughn & Geissler, *Oxford Book of Food Plants*, pp. 2-55, and 124-129
- In class: We will review the assigned reading. Bring your book to class!

September 18: Food diversity, part 2

- Required reading: Vaughn & Geissler, *Oxford Book of Food Plants*, pp. 56-123
- In class: We will review the assigned reading. Bring your book to class!

September 23: Food diversity, part 3

- Required reading: Vaughn & Geissler, *Oxford Book of Food Plants*, pp. 130-209
- In class: We will review the assigned reading. Bring your book to class!

September 25: FOOD DIVERSITY EXAM TODAY!

- This will be a machine-graded exam (including multiple choice, true-false, and matching questions). The questions will test basic, factual knowledge of domestication and food plants.

Part 4: The prevailing global food system

September 30: Globalized food

- Required reading: Clapp, *Food*, Chapters 1-2

October 2: Whose priorities?

- Required reading: Clapp, *Food*, Chapters 3-4

October 7: Food, finance, and commodities

- Required reading: Clapp, *Food*, Chapters 5-6

October 9: **NO CLASS — FALL BREAK!**

October 14: Spare time for the Clapp book

- In class: We will complete our discussion of the Clapp book today.

October 16: Obesity?

- Required reading: Guthman, *Weighing In*, Chapters 1-3

October 21: What causes obesity?

- Required reading: Guthman, *Weighing In*, Chapters 4-5

October 23: What might solve obesity?

- Required reading: Guthman, *Weighing In*, Chapters 6-7

October 28: Whose food?

- Required reading: Guthman, *Weighing In*, Chapters 8-9

October 30: Spare time for the Guthman book

- In class: We will complete our discussion of the Guthman book today.

November 4: FOOD SYSTEM EXAM

- This will be a machine-graded exam (including multiple choice, true-false, and matching questions). The questions will test: 1) basic, factual knowledge of the global food system; 2) conceptual understanding of the energy-balance model and associated arguments regarding diet-related health; and 3) conceptual understanding of Guthman's arguments regarding diet-related health.

November 6:

- UNDERGRADS: No class meeting today. Use your time to start reading Belasco, *Meals To Come*.
- GRAD STUDENTS: **YOUR FIRST DRAFT IS DUE TODAY.** Bring a printed copy to class, and be prepared to discuss your research and writing, and to review the research and writing of other students.

Part 5: The future of food

November 11: Views of the future

- Required reading: Belasco, *Meals To Come*, Preface and Chapter 1

November 13: The cupboard is bare: Discourse and arguments

- Required reading: Belasco, *Meals To Come*, Chapters 2-3

November 18: Utopian and dystopian visions

- Required reading: Belasco, *Meals To Come*, Chapters 4-5

November 20: Future scenarios

- Recommended reading: Belasco, *Meals To Come*, Chapters 6-8

November 25: Spare time for the Belasco book

- In class: We will complete our discussion of the Belasco book today.

November 27: **NO CLASS – THANKSGIVING BREAK**

December 2: Food in 2050

- COURSE EVALUATIONS IN CLASS TODAY
- In class: Analyzing predictions and discourse

December 4: Food in 2050

- In class: Analyzing predictions and discourse

The FUTURE OF FOOD EXAM is scheduled for Thursday, December 12, 10:00 a.m. to 12:00 p.m.

This will be a blue-book exam, in which you will be asked to evaluate discourse about the future of food, and to summarize and explain the three views presented in the Belasco book.

GRAD STUDENTS: You *should* turn in the final draft of your research paper on December 4, but you *must* turn in the final draft of your research paper in **no later than 10:00 a.m., Thursday, December 12.**

The City as Human Environment

Geography 466-566 - Spring 2013

Tuesday/Thursday 11:00AM-12:15PM

Bandelier West 104

INSTRUCTOR:

John Carr, J.D., Ph.D. carrj@unm

Office Hours: Tuesdays 1:00-2:00PM, Thursdays 10:00-11:00AM

Office: Geography 201

COURSE DESCRIPTION:

This course provides an overview of the cultural, economic, political, legal and environmental vectors that animate urban form and life, with an emphasis on the ways that issues of difference are reinforced, frustrated, and/or complicated within the trans-border setting of the Southwest. Subject areas include migration, race, gentrification, neoliberalism, and urban ecology.

STUDENT LEARNING OUTCOMES

- A1. Students will be able to explain the way that different vectors of difference animate urban form and life using core geographic concepts.
- B1. Students will be able to analyze the relationships that influence human-environment interaction in a specific location at a specific time, namely the contemporary Southwest city.
- C1. Students will be able to identify the geographic contexts of the urban Southwest relevant to inquiries into those environments.

TEXTS:

- Course pack available through "UNM Learn" web portal and also available through on-line text reserves. The password for online text reserves is: Lobo466

400 LEVEL EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

- 1) **Attendance & Participation:** This course will be conducted as a seminar, which means that we will engage in collective discussion of the issues at hand. That means that students are expected to do the reading *before* each class session, and to come to class prepared to ask questions and offer commentary. In particular, you will be asked to **contribute constructively** to group discussions, which will take place during most class sessions. Given the importance of preparation and discussion, class participation will comprise a significant component of your final grade.
 - a. **FIELD TRIP:** One of the non-negotiable requirements of this class will be attendance during a one-day field trip to Santa Fe on Saturday, March 30.
- 2) **Response Papers:** you are required to hand in a brief, **one page (maximum)** reflection paper analyzing and discussing the assigned readings. Students signed up for 500 level credit will have a maximum of **two pages**. Specifically, you are to address the following four items in each response paper:

- 1. What is the **puzzle** the author is addressing? (the larger question/debate he or she is engaging?)
- 2. What is the **main argument** of the paper or book? (his/her main response to that large puzzle?)
- 3. What is the **main factual support** that the author relies upon in making that argument? How does he/she construct the argument? What are some examples/cases she provides, or the logic he employs?
- 4. In what ways do you find the author’s argument **convincing** (what are the author’s strengths) or **unconvincing** (what are the author’s weaknesses?)? How do you evaluate this piece in the larger context of themes we have been discussing in this course?

For classes where two readings have been assigned, I will let you know whether you should focus on one or both readings. The purpose of this assignment is threefold. First, it is intended to engage you with the readings in a meaningful manner. Second, it is intended to prepare you for in-class discussions and exercises. And third, it is intended to help develop the skills of critical textual analysis and terse written presentation of that analysis. Accordingly, you will be graded on the thoroughness with which you support your critique, and NOT on the position you adopt OR on your emotional attachment to that position. Said another way, we will be evaluating your ability to discern and assess an author’s argument, and make an argument of your own.

Again, **you will have a paper due at the beginning of *each* lecture, in person, in class.** Response papers will *not* be accepted over email or after the beginning of class, absent a verifiable medical emergency. Although each paper will be collected, you will only receive grades and comments on a selection of papers.

- 3) **Field Projects:** You will be required to complete four field assignments developed by the professor. The first three will involve observations of sites in Albuquerque to investigate how ideas from class play out (or do not) in a real city. Additionally, this class will culminate in an additional field assignment of the student’s design. Students will be asked to pick a site, and describe and analyze the ways that social difference arises in and impacts that site.

400 LEVEL GRADING:

Your papers, projects, attendance and participation will be given the following weights in the calculation of final grades:

Attendance & Participation:	10% of final grade
Reflection Papers:	20% of final grade
Field Project 1:	15% of final grade
Field Project 2:	15% of final grade
Field Project 3:	15% of final grade
Final Student Designed Field Project	25% of final grade
<hr/>	
TOTAL:	100%

500 LEVEL EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

The requirements for 500 level credit in this class are the same as those for 400 level credit, with the following exceptions:

- 1) **Attendance & Participation:** I will draw heavily on the experience and abilities of the 500 level students in this class. In addition to looking to them to make a particularly robust contribution in class discussion, 500 level students will also be called upon to engage in the following activities:
 - a. 500 level students will periodically be called upon to lead small group discussions in class
 - b. Each 500 level student will be called upon to research and do a brief presentation on at least one site in Santa Fe for the March 30 Field Trip
 - c. Each 500 level student will be called upon to take the lead in teaching a given topic during one class period, based on consultation with the professor. The readings, structure, and activities for that day will be the responsibility for the 500 level student, with the input and approval of the instructor.
- 2) **Response Papers:** the page maximum for response papers is **two pages**.
- 3) **Supplemental Reading and Fourth Field Projects:** Each class period will have at least one supplemental reading. While you are not required to have read this work before class, I will expect you to use a substantial number of these readings (at least 5) as part of the Final Student Designed Field Project, and to integrate your knowledge of these readings into your contributions to class discussions.

500 LEVEL GRADING:

Your papers, projects, attendance and participation will be given the following weights in the calculation of final grades:

Attendance & Participation:	15% of final grade
Reflection Papers:	15% of final grade
Field Project 1:	15% of final grade
Field Project 2:	15% of final grade
Field Project 3:	15% of final grade
Final Student Designed Field Project	25% of final grade
<hr/>	
TOTAL:	100%

Class Periods

WEEK ONE

Tuesday, January 21: Intro – The Promise and Perils of Difference in The City
- Video: *Gathering up again: Fiesta in Santa Fe* by Jeanette DeBouzek, Diane Reyna.
Available at:

http://www.folkstreams.net/video/gathering_up_again/gathering_up_again_en.mov

Thursday, January 23: Social Order and Difference

- Lofland, Lyn, “The Normative or ‘Legal System’” ch. 2, in “The public realm: exploring the city's quintessential social territory”
- Shearing & Stenning; “Say cheese!: The Disney order that is not so Mickey Mouse”

Alternate Readings:

- Stéphane Tonnelat “The sociology of urban public spaces” In Wang Hongyang, Savy Michel and Zhai Guofang (eds.), “Territorial Evolution and Planning Solutions: Experiences from China and France,” Paris, Atlantis Press, 2010
- Nancy Fraser “Rethinking the Public Sphere: A Contribution to the Critique of Actually Existing Democracy” Social Text, No. 25/26 (1990), pp. 56-80
- Michael Sorkin (ed.) “Variations on a Theme Park: The New American City and the End of Public Space” Hill and Wang, 1992

WEEK TWO

Tuesday, January 28: The Meaning of Difference to Place I - Class

- Dreier, Mollenkopf and Swanstrom, “Place Matters: Metropolitcs For The Twenty-First Century” 2nd Ed. ch. 2*

Alternate Readings:

- David Harvey “Social Justice and the City: Revised Edition” (2009)
- Nezar Alsayyad and Ananya Roy “Medieval Modernity: On Citizenship and Urbanism in a Global Era” Space and Polity, Vol. 10, No. 1, 1–20, April 2006
- Robert Fishman “Bourgeois Utopias: The Rise and Fall of Suburbia” Basic Books, 1989
- Kenneth T. Jackson “Crabgrass Frontier: The Suburbanization of the United States” Oxford University Press 1987

Thursday, January 30: The Meaning of Difference to Place II - Race

Gregory D. Squires and Charis E. Kubrin – “Privileged Places: Race, Uneven Development and the Geography of Opportunity in Urban America” Urban Studies, Vol. 42, No. 1, 47–68, January 2005

Alternate Readings:

- Gregory Weiher “The Fractured Metropolis: Political Fragmentation and Metropolitan Segregation”
- “Karyn R. Lacy” Black spaces, black places: Strategic assimilation and identity construction in middle-class suburbia,” Ethnic and Racial Studies, Volume 27, Issue 6, 2004

- John B. Strait “Poverty Concentration In The Prismatic Metropolis: The Impact Of Compositional And Redistributive Forces Within Los Angeles, California, 1990–2000,” (2006), Journal of Urban Affairs, Volume 28, Number 1, pages 71–94.

WEEK THREE

Tuesday, February 4: The Meaning of Difference to Place III – National Origin & Legality

-Pablo Vila (1999). Constructing social identities in transnational contexts: the case of the Mexico-US border. International Social Science Journal 51 (159), 75–87.

Alternate Readings

- Nicholas De Genova, “The Legal Production Of Mexican/Migrant ‘Illegality’” Latino Studies 2004, 2, (160–185) 2004
- David G. Gutiérrez – “Walls and Mirrors: Mexican Americans, Mexican Immigrants, and the Politics of Ethnicity” - University of California Press, 1995
- Garcia-Acevedo, Maria Rosa “Politics across borders: Mexico's policies toward Mexicans in the United States,” Journal of the Southwest. 2003.
- Zaragosa Vargas “Crucible of Struggle: A History of Mexican Americans from the Colonial Period to the Present Era” Oxford University Press 2010

Thursday, February 6: First Field Project: *Order and difference I*

WEEK FOUR

Tuesday, February 11: Urban Form and Planning

- Carr, J. (2012). Public Input/Elite Privilege: The use of participatory planning to reinforce urban geographies of power in Seattle. *Urban Geography*, 33(3). 420-441.

Alternate Readings

- Bent Flyvbjerg, Rationality and Power: Democracy in Practice, 1998, Chicago, USA: The University of Chicago Press.
- Arnstein, S. R., 1969, A ladder of citizen participation. *Journal of the American Planning Association*, Vol. 35, 216–224.
- Brooks, M. P., 2002, *Planning Theory for Practitioners*. Chicago, IL: Planners Press.
- Elwood, S., 2005, Perspectives on participation, urban research, and the transformation of “local” urban geographies. *Urban Geography*, Vol. 26, 261–65.
- Maginn, P. J., 2007, Deliberative democracy or discursively biased?: Perth’s dialogue with the City Initiative. *Space & Polity*, Vol. 11, 331–352.

Thursday, February 13: First Field Project: *Order and difference II*

WEEK FIVE

Tuesday, February 18: The Creation of Place in the Face of Difference I – Traditional Forms and Appropriation

- The Myth of Santa Fe: Creating a Modern Regional Tradition" by Chris Wilson. Pp 2-45

Alternate Readings

- Sylvia Rodríguez Art, Tourism, and Race Relations in Taos: Toward a Sociology of the Art Colony *Journal of Anthropological Research* Vol. 45, No. 1, University of New Mexico Centennial 1889-1989 (Spring, 1989), pp. 77-99
- Hal Rothman The Culture of Tourism, The Tourism of Culture: Selling the Past to the Present in the American Southwest University of New Mexico Press 2003
- Hal Rothman “Devil's Bargains: Tourism in the Twentieth-Century American West” University Press of Kansas 2000
- Marguerite Shaffer “ See America First: Tourism and National Identity, 1880-1940” Smithsonian Books 2001

Thursday, February 20: The Creation of Place in the Face of Difference II – Traditional Forms and Appropriation(continued)

- The Myth of Santa Fe: Creating a Modern Regional Tradition" by Chris Wilson. Pp 80-104, 311-329

Alternate Readings

- Costas Spirou. “Urban Tourism and Urban Change: Cities in a Global Economy” Routledge, 2011
- Stephen J. Page “Urban Tourism” Routledge 1995
- Martin Selby – “Understanding Urban Tourism: Image, Culture and Experience” - I. B. Tauris 2004

WEEK SIX

Tuesday, February 25: First Field Project Due – In Class Discussion of Field Project

Thursday, February 27: Second Field Project: *The creation of place I*

WEEK SEVEN

Tuesday, March 4: The Creation of Place in the Face of Difference – The role of order and Economics

- Mitchell, D., & Staeheli, L. (2005). Turning social relations into space: Property, law and the plaza of Santa Fe, New Mexico. *Landscape Research*, 30(3), 361-378.

Alternate Readings:

- Tim Cresswell "In Place, Out of Place" Univ Of Minnesota Press, 1996 (especially chapters 1, 2, 3 and 5)
- Beckett, K & Herbert, S "Banished: The New Social Control In Urban America" Oxford University Press, 2011
- Jeanne Flavin "Race, Gender, and Punishment: From Colonialism to the War on Terror" - Rutgers University Press (November 16, 2006)

Thursday, March 6: Second Field Project: *The creation of Place II*

WEEK EIGHT

Tuesday, March 11: The City and Indigenous Experience – I - Overview

- Troy R. Johnson. "The Relocation Program, Urban Indians, and Alcatraz": Chapter 1 in *The Occupation of Alcatraz Island*, University of Illinois Press, 1996

Alternate Readings:

- Roots of the Native American Urban Experience: Relocation Policy in the 1950s Larry W. Burt *American Indian Quarterly* Vol. 10, No. 2 (Spring, 1986), pp. 85-99
- Susan Applegate "What Came out of the Takeovers: Women's Activism and the Indian Community School of Milwaukee" *American Indian Quarterly*, Vol. 27, No. 3/4,

Thursday, March 13: Second Field Project Due – In Class Discussion of Field Project

WEEK NINE

Tuesday, March 18 – NO CLASS, SPRING BREAK

Thursday, March 20 – NO CLASS, SPRING BREAK

WEEK TEN

Tuesday, March 25: The City and Indigenous Experience – II - Impacts

- Jackson, Deborah Davis. "This hole in our heart": Urban Indian identity and the power of silence. *American Indian Culture and Research Journal*. Los Angeles: 1998. Vol. 22, Iss. 4; p. 227-258
- Susan Lobo "Urban Clan Mothers: Key Households in Cities" *American Indian Quarterly*, Vol. 27, No. 3/4,

Alternate Readings:

- Natalie J. K. Baloy, "We Can't Feel Our Language": Making Places in the City for Aboriginal Language Revitalization" *The American Indian Quarterly* Volume 35, Number 4, Fall 2011
- James Bell; Nicole Lim, "Young Once, Indian Forever: Youth Gangs in Indian

- Country” *American Indian Quarterly*; Summer 2005; 29, 3/4; pg. 626
- Hokulani K. Aikau “Resisting Exile in the Homeland: He Mo'oleno No LÄ•'ie” The American Indian Quarterly, Volume 32, Number 1, Winter 2008, pp. 70-95 (Article)

Thursday, March 27: Third Field Project: *Constructing race and culture I*

WEEK ELEVEN

Tuesday, April 1: Suburbanization and Erasing Difference In the City I – Sprawl and Boosterism

- Michael Logan (1995) Fighting Sprawl and city Hall pp 95-130 (Introduction to Part 2 and Ch. 6 & 7)

Alternate Readings:

- Rosalyn Baxandall and Elizabeth Ewen “Picture Windows: How the Suburbs Happened” Basic Books 2000
- Stephen B. Goddard “Getting There: The Epic Struggle between Road and Rail in the American Century” University Of Chicago Press 1996
- Don Luymes “The fortification of suburbia: investigating the rise of enclave communities - Landscape and Urban Planning, Volume 39, Issues 2–3, 30 November 1997, Pages 187–203

Thursday, April 3: Third Field Project: *Constructing race and culture II*

WEEK TWELVE

Tuesday, April 8: NO CLASS – Association of American Geographers Conference

Thursday, April 10: NO CLASS – Association of American Geographers Conference

WEEK THIRTEEN

Tuesday, April 15: Third Field Project Due – In Class Discussion of Field Project

Thursday, April 17: Suburbanization and Erasing Difference In the City II – Resistance and Racial Tension

- Michael Logan (1995) Fighting Sprawl and city Hall. Ch. 8 & 9 pp 131-158

Alternate Readings:

- Gonzalez, George “Urban Sprawl, Global Warming, and the Empire of Capital” State University of New York Press, 2009
- Renaud Le Goix – “Gated communities: Sprawl and social segregation in southern California.” Housing Studies, Volume 20, Number 2, March, 2005 , pp. 323-343(21)

Richardson Dilworth, *The Urban Origins of Suburban Autonomy* Harvard University Press, 2005.

Saturday, April 19: FIELD TRIP DAY

WEEK FOURTEEN

Tuesday, April 22: Public/Private Space and Community Gardening

- L. Knigge, "Intersections between public and private: community gardens, community service and geographies of care in the US City of Buffalo, NY" *Geographica Helvetica* Jg. 64 2009
- V. Lawson "Geographies of Care and Responsibility" *Annals of the Association of American Geographers*, 97(1), 2007, pp. 1–11

Alternate Readings:

- Saskia Sassen, *The Global City: New York, London, Tokyo* Princeton 2001
- David Harvey *Rebel Cities: From the Right to the City to the Urban Revolution* Verso, 2012
- Mike Davis (Ed.) *Evil Paradises: Dreamworlds of Neoliberalism* The New Press, 2008

Thursday, April 24: Environmental Futures and The City

- H. Ernstson "Urban Transitions: On Urban Resilience and Human-Dominated Ecosystems" *Ambio* (2010) 39: 531-545

Alternate Readings:

- George Gonzalez (2009) "Urban Sprawl, Global Warming, and the Empire of Capital" SUNY press. Chapters 1 and 6.
- Marc Reisner (1993) *Cadillac Desert: The American West and Its Disappearing Water* Penguin
- Brian Stone Jr. (2012) *The City and the Coming Climate: Climate Change in the Places We Live* Cambridge University Press
- Peter Calthorpe (2010) *Urbanism in the Age of Climate Change* Island Press
- M. Nils Peterson, Tarla Peterson, Jianguo Liu (2013) *The Housing Bomb: Why Our Addiction to Houses Is Destroying the Environment and Threatening Our Society* Johns Hopkins Press

WEEK FIFTEEN

NO CLASS

WEEK SIXTEEN

Thursday, May 8: Wrap up & discussion of final student-directed fieldwork project
- FINAL FIELD PROJECT DUE TODAY

POLICIES:

Ethics and Academic Dishonesty:

The course emphasizes ethical practices and perspectives. Above all, students and instructors should strive to communicate and act, both in class interactions and in assigned coursework, in a manner directed by personal integrity, honesty, and respect for self and others. Included in this focus is the need for academic honesty by students as stated by the UNM Pathfinder. Students need to do original work and properly cite sources. For example, be aware of plagiarism—directly copying more than 3 or 4 words from another author without quoting (not just citing) the author is plagiarism.

Accordingly, I consider Academic Dishonesty, including plagiarism to be unacceptable. The University's official definition of Academic Dishonesty may be found at:

<http://pathfinder.unm.edu/>

This is an upper-level course for students who have developed a strong set of intellectual and work skills, and who are familiar with university policy on academic dishonesty. One of the non-negotiable requirements for passing this course is turning in your own, original, non-plagiarized work for all assignments submitted and properly citing sources. If you plagiarize, you will fail this class. Additionally, plagiarism and/or other forms of academic misconduct may lead to the system of institutional penalties outlined at the above website

Late Work: Assignments may not be submitted by e-mail. Field-project papers will be marked down 1.0 (out of a 4.0 grade) for every day they are handed in late. In addition, you will not have a chance to rewrite your work after it has been turned in. However, you are encouraged to meet with the professor in advance to discuss and ask questions about your assignments in progress.

Missed Exams: Make-ups for a missed exam will be allowed only in situations where the student has contacted the professor considerably in advance of the exam with a documented university-approved excused absence, which are limited to 1) illness documented by a physician, 2) death in the family with requisite documentation, 3) religious observance, and 4) University-sanctioned activity.

Email responsibility: Check your UNM email account regularly, as we will use this account to keep in touch with you about course requirements or updates. If you use

another email address, please set up your UNM account to forward your UNM account email to that address.

Technology: Be respectful of each other's learning by turning off cell phones and not using the internet while in class.

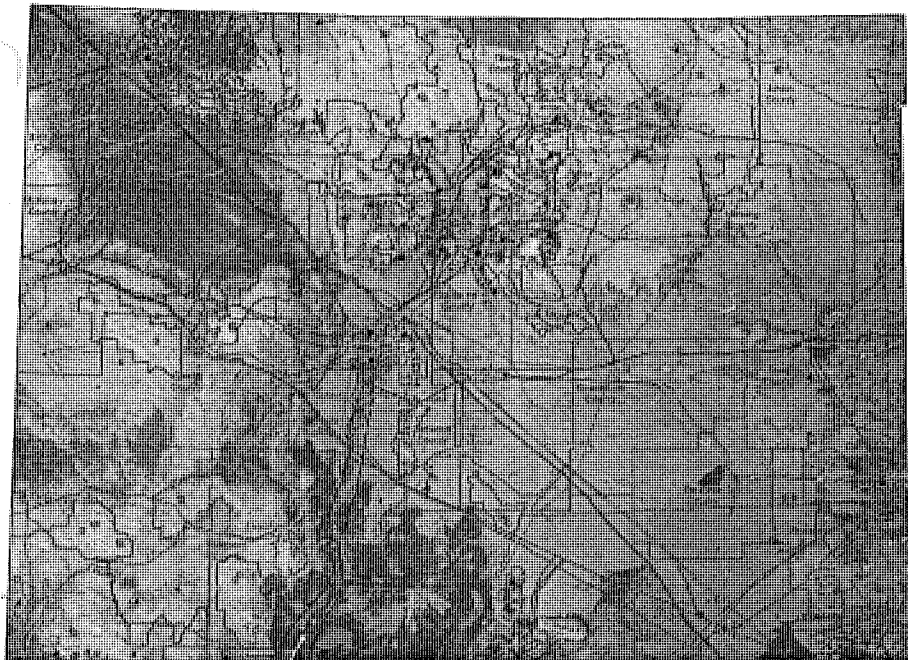
Diversity: This course encourages different perspectives related to such factors as gender, race, nationality, ethnicity, sexual orientation, religion, and other relevant cultural identities. This course seeks to foster understanding and inclusiveness related to such diverse perspectives and ways of communicating.

ADA Accessibility: Qualified students with disabilities needing appropriate academic adjustments should contact me as soon as possible to ensure your needs are met in a timely manner. Handouts are available in alternative accessible formats upon request.

Grade Appeals Policy: If you feel that I have made an error in grading your test or paper, you may bring it to my attention in the following way:

1. Carefully read the my comments;
2. Wait at least 24 hours and re-read the comments;
3. Write a clear and specific statement (typed), highlighting specific illustrations of why you believe you were graded unfairly. This should be a compelling argument that both fairly assesses your paper/exam, and objectively compares that work to the expected response;
4. Schedule a meeting with me to discuss your paper at either my office hours or a mutually agreed upon time and place, to further discuss your work and your statement;
5. If warranted, I may decide to will re-read the exam/paper and return it to you during the next section;
6. The statute of limitations on grade complaints is one week after the return of the work.

Office Hours: Office hour times and locations are subject to change. If you intend to visit me during an office hour I STRONGLY recommend that you inform me in advance to confirm time and place.



GIS Fundamentals

GEOG 581L
Spring 2015
MW 4-5:15
SMLC B59

Course Description & Objectives

This course introduces the concepts underlying Geographic Information Systems and its utilization for the input, storage, manipulation, query, display, and analysis of geographical data.

Prerequisites

No prior GIS knowledge is assumed for this course but there is an assumption that students are computer literate and have a good working knowledge of the Windows PC environment. A basic working knowledge of Microsoft Word, Excel and PowerPoint is also assumed.

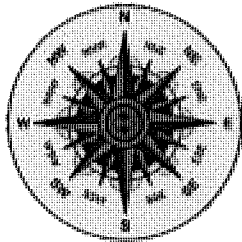
Course Objectives

- To provide an understanding of the methods by which geographic features are referenced on the earth and of the methods by which we can digitally represent such features for mapping and analysis purposes.
- To familiarize students with the major sources of digital spatial data available in the United States and to acquaint them with different data structures and data formats.
- To provide experience of a major GIS software applications (ArcGIS).

- To provide a thorough understanding of the relationship between methods of digital spatial data storage and the relationship of such methods to analytical functionality within GIS.
- To familiarize students with the range of applications of GIS and some of the innovative research areas associated with the technology.
- To provide students with skills and techniques to independently solve geospatial problems and find solutions to software questions.

Course Schedule

A detailed course schedule will be handed out and made available on the UNM Learn website. The schedule will contain the course topics and readings for each lecture and deadlines for assignments. The course schedule is subject to change – changes will be announced in class, but students are responsible for accessing the most recent version of the schedule. If UNM is closed due to a weather issue this class will also be canceled, please check the UNM Homepage for closure information. Or sign up for the UNM text alert system.



GIS

"The application of GIS is limited only by the imagination of those who use it".

Jack Dangermond,
ESRI

"GIS is a form of digital mapping technology. Kind of like Google Earth, but better."

Arnold Schwarzenegger at the Government Technology Conference's 2008

INSTRUCTOR: DR. SHAWN L. PENMAN

Office: Bandelier Hall West Room 123
Office Telephone: (505) 277-3622 x227
Email: spenman@edac.unm.edu

Email is the easiest way to reach me

Office Hours: Thursday 12:00-1:00 pm
and by appointment. Just send me an email

Course Requirements

GRADING

50%

Five Assignments

25%

One Final Project

20%

Two exams

5%

Class Attendance & Participation

Assignments and Exams

Standard enrollment and successful completion of GEOG 581L yields three (3) credits. Grades will be based on 5 exercise assignments (50%), two exams (20%) and one final project (25%) and class attendance and participation (5%). Evaluation of performance is dependent on students submitting products of good quality and meeting all submission deadlines.

Grading Policy

The plus/minus grading system will be used to assign student grades. Grading scale is as follows:

- A+ (98-100), A (94-97), A- (90-93),
- B+ (88-89), B (84-87), B- (80-83),
- C+ (78-79), C (74-77), C- (70-73),
- D+ (68-69), D (64-67), D- (60-63)
- F (59 and below).

Exercise Assignments

In total, 5 exercise assignments have to be completed. Each of these 5 exercise assignments will count towards 10% of the final grade. Specific deadlines for each assignment are provided in the course schedule. Late submission of exercise reports will result in a reduction of the grade for that assignment of 10 points (out of 100 total) per day. Details on the expected format and content of exercise reports will be provided in class.

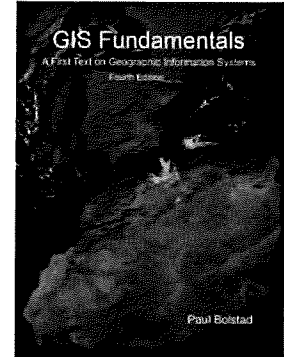
Exams

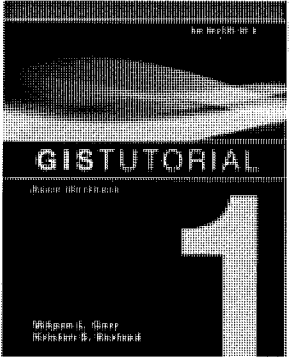
Exams will be held during regular class times on the dates indicated in the course schedule. Example exams will be distributed and discussed in class ahead of time.

Class Participation

Thoughtful class participation will not only improve the class, but will reinforce the subject being discussed. Please come with all assigned reading completed. Please inform me ahead of time through email or phone if you will be absent.

TEXTBOOKS





Required Readings

The two required textbooks for the course are:

- P. Bolstad. 20012. GIS Fundamentals, 4th Edition. Eider Press. This book is available in the UNM bookstore. Also available as pdf for \$25 from BryteWave.
- W.L. Gorr and K.S. Kurland. 2013. GIS Tutorial for ArcGIS 10.1. ESRI Press. Redlands, CA. This book is available in the UNM bookstore.

Additional readings will be posted on the UNM Learn website.

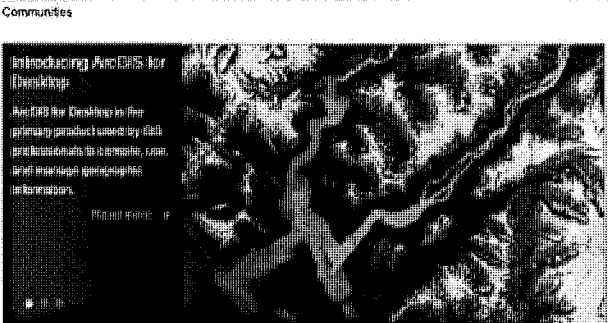
GIS LAB ACCESS & SOFTWARE

The Geography GIS lab and most UNM open use computing Pods have the necessary software (ArcGIS 10.1) to complete the lab assignments. Students will also be given a free copy of the student version of ArcGIS 10.1 that can be installed on a personal computer. Students will have access to the Geography GIS lab (Bandelier East 106) during posted open use times which are posted on the Geography webpage. Many of the UNM Computer Pods have ArcGIS installed; be careful some have an older version installed, make sure you know which version you are using. This page <http://it.unm.edu/pods/> has a map and listing of the UNM computer pods and software available in each pod. In our classroom it is ArcGIS 10.1. It is the student's responsibility to become familiarized with the operation and rules of the GIS lab and UNM Pods. Students will need to access this lab or another computing facility outside of scheduled lab sessions to complete the exercise assignments.

Helpful Equipment

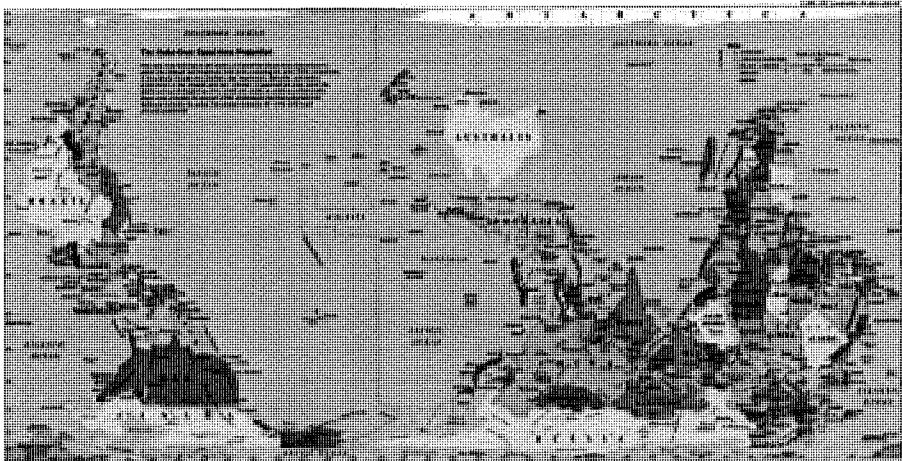
An external hard drive or a flash drive with at least 16GB of space is useful for this class. GIS data can be large and take up lots of space and you don't want to run out of disk space in the middle of an exercise. You might also want to consider a cloud backup like Dropbox for data and project backup. There's nothing worse than losing or forgetting your flash drive in the lab computer and having to start again at the beginning.

ArcGIS for Desktop



UNM Learn

Most course materials will be made available to the students through the course page on UNM Learn. It is the student's responsibility to access UNM Learn frequently to obtain course materials and check any announcements. The URL is <https://learn.unm.edu/>, please become familiar with its functionality. The instructor will typically not send out e-mails to everyone in the course with any announcements but instead post them on UNM Learn. Most questions regarding the course content and exercise assignments can also be posted in UNM Learn, with replies posted by other students and the instructor. Students should e-mail the instructor with any personal matters (such as absences) but should post general questions to UNM Learn.



Course Fine Print

Class Environment

It is important to recognize that the classroom is an environment that requires respect for all participants. Therefore, students are expected to conduct themselves in a considerate manner. All participants in the class must respect the classroom environment by being on time, turning off cell phones, pagers, and headphones, avoiding extraneous talking and chat, refraining from reading non-class material, and by not eating during classroom time.

Accommodations

Individuals who have any disability, either permanent or temporary, which might affect their ability to perform in this course, are encouraged to inform the instructor at the start of the semester. Please consult with me immediately at the beginning of the course so we can design adaptations of methods, materials, or testing as required for equitable participation.

Make-Up Exams

Make-up exams are only allowed under special circumstances and at the discretion of the instructor. These circumstances include: (1) death or illness in the student’s family or of a friend; (2) illness of the student; (3) three or more final examinations on the same day; (4) participation in a university sponsored activity at the time of a regularly scheduled examination. Make-up examinations will be granted only if circumstances are documented, and advance arrangements are made.

Incomplete Grades

Incomplete grades (I) will not be given in the course except under exceptional circumstances, based on written documentation, and at the discretion of the instructor.

Religious Preference Absence

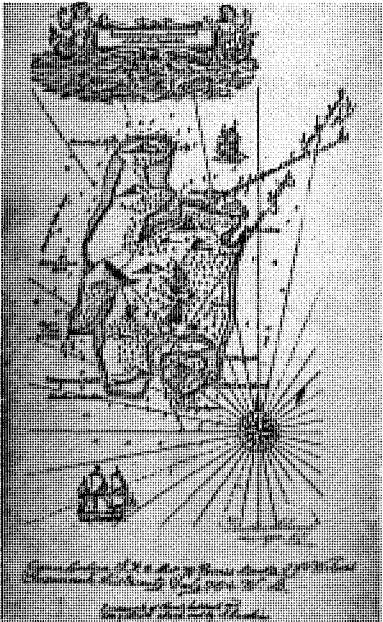
Students who anticipate being absent from class due to the observation of a major religious activity must provide written notice of the dates to the instructor by the second week of the semester.

Tapes and Notes

It is not permitted to sell notes or tapes from this class without the expressed written consent of the instructor.

Academic Dishonesty

Cheating is defined as follows: (a) the unauthorized granting or receiving of aid during the prescribed period of a course-graded exercise: students may not consult written materials such as notes or books, may not look at the paper of another student nor consult orally with any other student taking the same test; (b) asking another person to take an examination in his/her place; (c) taking an examination for or in place of another student; (d) stealing visual concepts, such as drawings, sketches, diagrams, musical programs and scores, graphs, maps, etc., and presenting them as one’s own; (e) stealing, borrowing, buying, downloading from the Internet, or disseminating tests, answer keys, or other examination material except as officially authorized, research papers, creative papers, speeches, etc.; (f) stealing or copying of computer programs and presenting them as one’s own. Such stealing includes the use of another student’s program as obtained from the magnetic media or interactive terminals or form cards, print-out paper, etc.



“I am told there are people who do not care for maps, and I find it hard to believe.”

Robert Louis Stevenson,
The Art of Writing on Treasure Island

Course Schedule

Lecture Topics / Deadlines		Exercise Assignments	Readings
Week 1			
Jan 12	Course Introduction & Intro to GIS	Exercise 1 – Spatial Data	Bolstad Ch. 1
Jan 14	GIS Data Models		Bolstad Ch. 2
Week 2			
Jan 19	No Class	Martin Luther King Jr. Holiday	
Jan 21	GIS Data Formats		
Week 3			
Jan 26	Coordinate Systems	Exercise 1 – Spatial Data	Bolstad Ch. 3
Jan 28	GIS Data Sources		
Jan 30		Exercise Report 1 due at 5:00 pm	
Week 4			
Feb 2	Data Visualization	Exercise 2 – Data Visualization	Bolstad Ch. 7
Feb 4	Data Visualization		
Week 5			
Feb 9	Presenting Data	Exercise 2 – Data Visualization	Bolstad Ch. 9 p332-339
Feb 11	Presenting Data		
Feb 13		Exercise Report 2 due at 5:00 pm	
Week 6			
Feb 16	Creating & Editing Data	Exercise 3 – Creating & Editing Data	Bolstad Ch. 4
Feb 18	Geocoding		
Week 7			
Feb 23	GPS / Remote Sensing	Exercise 3 – Creating & Editing Data	Bolstad Ch. 5 & 6
Feb 25	GPS Data Processing		
	Mid-Term Exam Preview		
Feb 27		Exercise Report 3 due at 5:00 pm	
Week 8			
Mar 4	Project Proposal Preview		

Mar 6	Mid-Term Exam		
Mar 9	No Class	UNM Spring Break	
Mar 11	No Class		
Week 10			
Mar 16	Querying Data	Exercise 4 – Vector Analysis	Bolstad Ch. 8
Mar 18	Working with Tables		
Week 11			
Mar 23	Vector Analysis	Exercise 4 – Vector Analysis	Bolstad Ch. 9
Mar 25	Vector Analysis		
Mar 27		Project Proposal due 5:00 pm	
Week 12			
Mar 30	Raster Analysis	Exercise 5 – Raster Analysis	Bolstad Ch. 10
Apr 1	Model Builder		
Apr 5		Exercise Report 4 due at 5:00 pm	
Week 13			
Apr 6	GIS Ethics, Standards, Metadata		Bolstad Ch. 14
Apr 8	TBD (Guest Lecture)		
Week 14			
Apr 13	Raster Analysis	Exercise 5 – Raster Analysis	Bolstad Ch. 11
Apr 15	Raster Analysis		
Apr 17		Exercise Report 5 due at 5:00 pm	
Week 15			
Apr 26	Final Exam Preview & Project Questions	Project work	
Apr 28	Project Presentations		
Week 16			
Apr 27	Project Presentations		
Apr 29	Project Presentations		
May 1		Project Report due at 5:00pm	
Final Exam Week			
	Final Exam		

Geography 483L/583L
Remote Sensing Fundamentals
Fall 2014
Dr. Christopher Lippitt (Chris)

Office: Bande-215
E-mail: clippitt@unm.edu
Class Meets: T & TH 1530-1645 in Bande 106
Office Hrs. T 1-2 & F 1-2 or by appt.

Course Syllabus

Objective: To introduce theoretical, technical and applied aspects of remote sensing as a tool for monitoring and managing earth resources.

Scope: Emphasis on: electromagnetic radiation transfer; data collection with aerial photographic and satellite sensor systems; and visual interpretation of air photos and satellite imagery.

Texts: Required: Jensen, J.R., 2007. Remote Sensing of the Environment: An Earth Resource Perspective, 2nd Edition, Prentice Hall (New Jersey).
Optional: Jensen, J.R. 2004. Introduction to Digital Image Processing: A Remote Sensing Perspective, 3rd Edition, Prentice Hall (New Jersey).

Exams and Graded Assignments:	% of grade
Midterm	25%
Labs and exercises	45%
Final exam	30%

Lecture Topics and Readings: The following is a provisional outline and estimated schedule for the topics to be covered each week of the semester. To make the lectures and lab sessions of maximum benefit it is useful to complete the assigned reading prior to class.

CLASS SCHEDULE

Week	Tuesday	Thursday	Reading	Homework
1	Intro. to RS	History of RS	Ch. 1 & 3	Annotated Bibliography of a news article highlighting Remote Sensing
2	Elements of Image Interpretation	Lab 1: Image Interpretation	Ch. 5	Lab
3	Principles of EMR	EMR: Atmospheric Interactions	Ch. 2 & Ch. 12	Math, Units, and Quantities Worksheet
4	EMR: Target Interactions	Lab 2: EMR Principles	Ch. 15	Lab
5	Lab 3: Spectral Signature Concepts	Air photo Geometry	Ch. 2, 12, & 15	Lab
6	Air photo Geometry	Mensuration and Photogrammetry	Ch. 4 & 6	
7	Mensuration and Photogrammetry	Platforms	Ch. 3	Object Heights Worksheet
8	Sensors	Data Acquisition and Mission Planning	Ch. 7	
9	Midterm Review (Oct. 7 th)	Fall Break: No Class		
10	Midterm Exam (Oct. 14 th)	Lab 4: Data Acquisition and	Ch. 4	Lab

		Mission Planning		
11	Intro. to Digital Image Processing	SWAAG: No Class	Mather Ch. 3 (photocopy)	Lab
12	Lab 5: Intro. to Digital Image Processing	Land Satellite Remote Sensing Systems	Ch. 3 & 7	Lab
13	Land Satellite Remote Sensing Systems	Active RS	Ch. 8, 9 & 10	
14	No Class	Thermal RS	Ch. 11	
15	Remote Sensing of Vegetation	Land Use and Land Cover	Ch. 13	
16	DIP Primer	Thanksgiving		
17	Final Review (Dec. 2nd)	Final Exam (Dec. 4 th)		

POLICY AND PROCEDURES

(1) Class Attendance and Participation

Roll will not be taken after the first week or so of class; attendance is expected and highly recommended.

(2) Textbook and Other Class Materials

Textbook: Jensen, J.R., 2007. Remote Sensing of the Environment: An Earth Resource Perspective, 2nd edition, Prentice Hall (New Jersey), is required for the course. Readings from the text are used to supplement the lecture, in terms of more detailed explanations and in providing examples and illustrations.

(3) Exams and Grades

The mid-term exam and the final exam will be based only on the lecture, lab, and reading material. A greater emphasis will be placed on materials covered in the lectures and labs. The exam format will be variable, consisting of multiple choice, true/false, matching, image interpretation, and problem solving. The final exam will be cumulative and will contain short answer essay questions.

Missing exams will not be made up, (and therefore, will count as zero points), unless the instructor is notified prior to the exam and the student receives prior approval to make up the exam. If a sudden illness or emergency occurs, make every attempt to contact the instructor before the exam. Illness or emergency excuses must be verified by a note from a responsible person (i.e., a doctor).

Make-up exams are discouraged and no student should count on the option of a make-up exam. Consecutive exams or vacation travel during final exams week is not a sufficient reason for arranging make-up exams. If a make-up exam is required and agreed to by the instructor, the student must take the exam after it is administered to the rest of the class. The make-up exams will be different from and generally be more extensive than the regular exam.

Cheating on an exam constitutes a violation of university rules and students caught cheating will automatically receive a zero grade for the exam and will be reported to the University for possible disciplinary action. Two incidences of cheating will result in expulsion from and a failing grade in the class.

Final grade decisions will be based on a flexible curve. The instructor reserves the option to raise a grade by one half to a whole grade based on consistent improvement in class performance.

(4) Labs and Homework

Remote sensing problem solving and image interpretation labs are an integral part of the course. Lab exercises will consist of some take-home exercises. All Labs are due at the beginning of the class period one week from when they are issued. Late labs will be penalized by 10% of the original point total for each day they are late (i.e., after 10 days handing in the lab will not get you any points) and are not considered submitted until in the instructors hands. Labs will be handed out and described at the beginning of each lab period.

(5) Classroom Conduct

As with all classes, respectful and honest discourse during all classroom and course related interactions and respect for the rights of fellows students to learn unhampered by distraction is expected. Non-course related communication (i.e., side conversations, cell phone calls, texting, emailing, etc.) should be reserved for outside of class time.

(6) Communication

Communication is essential to the success of this course, both for you as a student and for me as an instructor. The best way to communicate with me outside of class is by email. You are also encouraged to come to office hours or to make an appointment to see me if you are not available during that time.

(7) Helpful Tips

- Come to class (and come on time!).
- Visit me during office hours! I'm happy to answer any and all questions and love the opportunity to get to know students a little better.
- Utilize your classmates. Take a moment to exchange names and contact info with a few students at the beginning of the semester. Take the initiative to schedule group study sessions prior to exams.

Acronyms (a very partial listing)

On-line glossary: <http://www.ldeo.columbia.edu/res/fac/rsvlab/glossary.html>

Satellites and Sensors

Landsat:	Land satellite (Formerly ERTS: Earth resources technology satellite)
RBV	Return beam video camera
MSS	Multi-spectral scanner
TM	Thematic Mapper
ETM+	Enhanced Thematic Mapper Plus
OLI	Operational Land Imager
TIRS	Thermal Infrared Sensor
SPOT:	Système Pour l'Observation de la Terre
XS	Multi-spectral mode
Pan	Panchromatic mode
AVHRR	Advanced very high resolution radiometer
TIROS	Television infrared observational satellite
GOES	Geosynchronous observational environmental satellite
DMSP	Defense meteorological satellite program
ERS-1	European remote sensing satellite #1
JERS-1	Japanese earth remote sensing satellite #1
RADAR	Radio detection and ranging
RADARSAT	Canadian radar satellite
SIR	Shuttle imaging radar
ERBS	Earth radiation budget satellite
TOMS	Total ozone mapping spectrometer
SeaWiFS	Sea-viewing wide field of view sensor
EOS:	Earth Observing system (a small sample of EOS sensors)
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
MODIS	Moderate resolution imaging spectroradiometer
EOSP	Earth observing scanning polarimeter
ETM	Enhanced thematic mapper
LIS	Lightning imaging sensor
MISR	Multi-angle imaging spectrometer
MOPITT	Measurements of pollution in the troposphere
SeaWinds	Scatterometer
ADAR	Airborne data acquisition and registration system
AVIRIS	Airborne visible and infrared imaging spectrometer
SAR	Synthetic aperture radar
IFSAR	Interferometric synthetic aperture radar

Agencies and projects

BLM	Bureau of Land Management
CIESIN	Consortium for International Earth Science Information Network
EOS	NASA's Earth Observing System
EPA	Environmental Protection Agency
EROS	Earth Resources Observations Systems
ESA	European Space Agency
GSFC	NASA Goddard Space Flight Center
JPL	NASA Jet Propulsion Laboratory

NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
Pathfinder	NASA program to provide high quality global change data sets
TOPEX	Ocean topography experiment
USDA	United States Department of Agriculture
USGS	United States Geological Survey

Geography 484/584 – Applications of Remote Sensing
Spring 2014
Lecture: Tu/Th 3:30 – 4:45, BandE-106
Office hours: Tu & Th 2:30-3:30 or by appt.

Christopher Lippitt (Chris)
Email: clippitt@unm.edu
Office: Bandelier West – 215

COURSE SYLLABUS

Objectives: To build upon the theory and principles covered in GEOG 483 by exploring:
(1) computer-assisted image processing and (2) remote sensing systems that produce image data by capturing non-visible electromagnetic radiation.

Scope: The techniques and processing sequences of digital image processing will be introduced through lectures, laboratory exercises, and a class project.

Grade Basis:	Lab Exercises	40%
	Class Project	20%
	Midterm Exam	20%
	Final Exam	20%

Required Text: Jensen, 2005, Introductory Digital Image Processing: A Remote Sensing Perspective (3rd edition)
Optional Text: Jensen, 2007, Remote Sensing of the Environment: An Earth Resource Perspective (2nd edition)

Exams and Grades:
The mid-term and ½ of the final exam will be based only on the lecture and reading material. A greater emphasis will be placed on materials covered in the lectures. The exam format will be variable, consisting of multiple choice, true/false, matching, and problem solving.

Missing exams will not be made up and count as zero points, unless the instructor is notified prior to the exam and the student receives prior approval to make up the exam. If a sudden illness or emergency occurs, students must make every attempt to call the instructor before the exam and verify the excuse by a note from a responsible person. Make-up exams are discouraged. Consecutive exams or vacation travel during final exams week is not a sufficient reason for arranging make-up exams. If a make-up exam is required, the student must take the exam after it is administered to the rest of the class. The make-up exam will generally be more extensive than the regular exam. Cheating on an exam constitutes a violation of university rules and students caught cheating will automatically receive a zero grade for the exam. Two incidences of cheating will result in expulsion from the class and possible university disciplinary action.

The final class grade will be based on the cumulative point total for the class project, all exams, and all lab exercises. Final grade decisions will be based on a flexible curve. The instructor reserves the option to raise a grade by one half to a whole grade based on consistent improvement in exam performance.

Lab Content: Hands-on image processing experience will be gained with the aid of ERDAS Imagine and IDRISI Selva image processing software packages. Lab exercises will be conducted in teams and a class project will be completed by each student.

Class Project: The project for this class will consist of a complete remote sensing project, including data acquisition, preprocessing, processing, and accuracy assessment. The deliverable for projects will be a 10-

minute presentation to the class complete with slides. Attendance of class presentations is mandatory and will determine 10% of your final project grade.

Grading: All assignments are due one week after they are assigned at the beginning of class, unless stated otherwise by the instructor. Completed labs should be uploaded to UNM Learn, with questions and any required map products attached together in a single PDF. Include your name and your partners name at the top of the lab. To receive maximum points on labs, make sure to answer all questions in complete sentences, provide plenty of examples to clarify your answers, and turn in your best effort for map and image products. Late assignments will be marked off 10% per day so make sure to use the lab class time effectively when you can work with classmates and ask your instructor questions.

Lecture/Lab Schedule:

Note: This schedule is tentative, approximate, and subject to change.

Week	Tuesday	Thursday	Reading	Notes
1	Course Intro & Intro to Imaging Radiometers	Intro to Imaging Radiometers & Lab1: Intro to IP Software	Ch. 1 & Ch. 2 pg. 44-104	
2	Intro to Digital Image Processing	Image Enhancements	DIP Ch. 3 & Ch. 5 pg. 151-163	
3	Image Enhancements	Lab 2: Image Enhancements	Ch. 8 pg. 255-275	
4	Radiometric Image restoration	Geometric Image Restoration	Ch. 6 & 7	
5	Geometric Image Restoration Continued....	Lab 3: Geometric Correction	Ch. 8 pg. 276-287 & 322-329	
6		Lab 4: Spatial Filtering		
7	Classification and Thematic Mapping	Spatial Filtering and Texture	Ch. 9	Class Project Summary Due (March 6)
8	Midterm Review	Midterm Exam (March 13 th)		
9	Spring Break – No Class	Spring Break – No Class		
10	Classification and Thematic Mapping	Lab 5: Supervised Classification	Ch. 9	
11	Classification and Thematic Mapping	Classification and Thematic Mapping	Ch. 13 & Ch. 8 pg. 301-321	
12	Accuracy Assessment	Lab 6: Unsupervised Classification	Ch. 12	
13	Final Project Work Period	Final Project Work Period		
14	Multi-temporal	Lab 7: Data Pre-		

	Analysis	processing		
15	Final Project Presentations	Final Project Presentations		Final Projects Due (May 1st)
16	Final Review (May 6 th)	Final Exam (May 8 th)		

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Geography 485L/585L - Internet Mapping Syllabus

Course Instructor

Karl Benedict

Director, Earth Data Analysis Center

Research Assistant Professor, Department of Geography, University Libraries

kbene@unm.edu

(505) 277-3622 x234

Office hours prior to the class session on Wednesday afternoons (4:00-5:00 pm), and by appointment

Course Description and Objectives

Internet mapping technologies are an important component of geospatial data capture, sharing, visualization, and delivery. This course provides a survey of current and emerging internet and geospatial interoperability standards, technologies, and capabilities. The emphasis of the work in this class will be hands-on experience in four critical aspects of Internet-enabled mapping:

- The basic concepts behind web mapping technologies that enable the delivery of maps and mapped data through web browsers
- The Open Standards that facilitate the exchange of map images and geospatial data over the internet
- The use of published standards-based services in desktop mapping applications that implement those standards
- The deployment of standards-based geospatial map and data services that other systems and users may make use of

The specific class objectives that relate to these activities and departmental curriculum objectives for undergraduate and graduate students in the Geography Department include the following:

- Students will understand the concepts geospatial data and service interoperability
- Students will be able to define the specific requirements of a particular analysis or project and identify the interoperability standards that are capable of meeting those requirements
- Students will be knowledgeable in the core technologies that they may use to produce their own internet-enabled mapping capabilities
- Students will understand the strengths and limitations of current internet mapping technologies for generating cartographically effective map products.

Course Format

The general weekly structure of the class will consist of the following schedule:

Monday (by 8:00 am) Release of the week’s class module, including the recorded lecture, any required reading, portfolio milestone information, and any associated peer-review assignments.

Wednesday (5:00 - 6:15 pm) *Collaboratory* with Dr. Benedict - in-class session for demonstrations and problem-solving.

Friday (by 5:00 pm) *Due date* for *peer-review* submissions

The class will consist of the following components:

Lecture (weekly) A recorded presentation that provides an overview of high-level concepts and reference information

Portfolio Milestones (weekly) Hands-on experiences with the technologies and capabilities described in the lectures and readings. The milestones will be exploratory, in that in many instances the work will be problem based with an emphasis on creative use of concepts and reference materials in answering questions and solving practical problems.

Deep Dives (4 over the course of the semester) Activities based upon small projects that reinforce the hands-on activities undertaken in the milestones.

Peer Review of Developing Portfolio Provision of substantive feedback and discussion around products generated by peers in the class.

Mid-term & Final Examinations Take-home examinations that comprehensively cover materials introduced in class.

Readings Background and reference materials that should be reviewed in conjunction with each week’s materials.

Course Readings

Readings for the class are derived from a combination of designated course texts and online resources. While the specific readings for each week will be provided as part of the information about each class module, they will fall into two broad categories:

Required Readings that cover core knowledge required for success in the course’s activities.

Reference Readings that should be reviewed so that they may be effectively used as reference materials when working on lab and homework assignments and exams.

There are three texts that are being used in the course as core resources and are therefore listed as *required* texts.

HTML Manual of Style: A Clear, Concise Reference for Hypertext Markup Language (including HTML5), Fourth Edition (4th Edition). Larry Aronson. Addison-Wesley Professional. 2010. AKA *HTML Manual of Style* in class reading assignments. Available at the UNM Bookstore and on *1-day reserve* at Centennial Science and Engineering Library.

Beginning Google Maps API 3. Gabriel Svennerberg. Apress. 2010. AKA *Google Maps API* in reading assignments. Available through the *Books 24x7 Library Database* and on *1-day reserve* at Centennial Science and Engineering Library.

OpenLayers 2.10 Beginner's Guide.. Erik Hazzard. Packt Publishing. 2011. AKA *OpenLayers Beginner's Guide* in reading assignments. Available as an ebook through the University Libraries, and on *1-day reserve* at Centennial Science and Engineering Library.

In addition, there is an additional text that has been ordered for the class as a *recommended* text as it provides useful background and descriptive information about web site development and strategies for building more effective online resources.

Designing with Web Standards (3rd Edition). Jeffrey Zeldman & Ethan Marcotte. New Riders Press. 2009. AKA *Designing with Web Standards* in reading assignments. Available at the UNM Bookstore and on *1-day reserve* at Centennial Science and Engineering Library.

Evaluation and Grading

Class grades will be based upon the number of points acquired throughout the semester. The grade breakdown will be as follows:

- A 360 - 400 points
- B 320 - 359.9 points
- C 280 - 319.9 points
- D 240 - 279.9 points
- F < 240 points

Points for the class will be earned through a combination of portfolio milestones, deep dives, peer-review, and exams.

As an ongoing exercise in working with the web-based technologies upon which the course is based, all milestone and deep dive activities (*after the first week's exercise*) will be completed as individual web pages within your web portfolio developed in the class.

You will use the GitHub <https://github.com> as the collaborative platform for developing and hosting your portfolio as you develop it over the term. We will review the process for setting up your GitHub accounts during the first class session.

Portfolio Milestones There will be 13 weekly milestones. While there are no formal weekly due dates for the milestones, you must keep up if you expect to successfully complete the course. *If you fall behind it will be very difficult to catch up.* I will evaluate your portfolio milestones at mid-term (40 points) and at the end of the term (40 points) for completeness, functionality, creativity and accuracy (i.e. correct answers for milestone questions when asked).

Deep Dives There will be 4 deep dive assignments during the semester. These will be small project-focussed activities that will be added to your portfolio and will reinforce the hands-on activities undertaken as part of the portfolio milestones. Each homework assignment will be worth an additional 25 points (100 points total). Evaluation of the deep dive assignments will also take place a mid-term and at the end of the class as part of the portfolio review.

Peer Review There will be 4 points during the semester that you will be asked to perform a peer review of specific components within the portfolios of your peers. Each peer review will contribute up to 5-points to your overall score for the course. The peer-review points you earn will be based upon the *substantive* feedback that you provide to other students as part of the assignment. I will review the peer-review procedures in more detail when we have our first peer-review activity.

Exams There will be two exams: a midterm and final. The midterm will be a take-home exam that will be released on Monday March 10 and due on Wednesday March 12 by the end of the class session. The final exam will be a take-home exam which will released on Monday May 12 and due on Wednesday May 14 by 5:00 pm. Each exam will be worth 100 points (200 points total).

While students are encouraged to collaborate in their work on their portfolio milestone and deep dive assignments, submitted work must be original and written and submitted by each individual student. Both exams will be individual - each student must complete their exam individually. All assignments and exams are open book and online resources may also be used in completion of the assignments and exams. BUT, again, all submitted work must be original and created by each student.

Please refer to the Pathfinder for detailed student conduct policies, and in particular the following Policy on Academic Dishonesty.

POLICY ON ACADEMIC DISHONESTY ALSO SEE FACULTY HANDBOOK D100 Adopted by the President June 15, 1992

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Technical Requirements

As an hybrid in-person/online course that is focused on the integration of online resources with desktop tools there are some specific hardware and software requirements for successful completion of the class.

Hardware Requirements

- At least 2 GB RAM
- At least 20 GB of available disk space
- Internet Connection (broadband [>728 Kb/sec] recommended)

Software Requirements

Operating System (one of the following) Microsoft Windows Vista or above

Mac OS 10.6 or above

Linux (*speak to Dr. Benedict*)

Geographic Information System (GIS) Quantum GIS (platform specific download)

ArcGIS 10 (*optional* - request free student version installation code from Dr. Benedict - *Windows Only*)

Geographic Data Processing/Analysis (one of the following) FWTools (*Windows & Linux* - free download)

GDAL and related frameworks (*Mac* - the current “GDAL Complete” convenience package available here)

You will need the following classes of software, check with Dr. Benedict if you would like to use an alternative to the ones suggested below.

Text Editor Notepad (*Windows* - included with operating system)

Notepad++ (*Windows* - free download)

TextEdit (*Mac* - included with operating system)

TextWrangler (*Mac* - free download)

Secure File Transfer Protocol Client WinSCP (*Windows* - free download)

Fugu (*Mac* - free download)

Secure Shell (SSH) Client PuTTY (*Windows* - free download)

Terminal (*Mac* - included with operating system)

Web Browser (at least one of the following) Firefox (*All Operating Systems* - free download)

Chrome (*All Operating Systems* - free download)

A desktop GitHub client for your operating system of choice The “Official” GitHub client <https://github.com>

SourceTree <http://www.sourcetreeapp.com>

Course Outline

Module 1 - *Introduction and Outline* Week 1 - January 21-24.

Module 2a - *Web-based Mapping Clients* Week 2 - January 27-31. Introduction to HTML, CSS, and Javascript

Weeks 3, 4 - February 3-14. Google Maps API

Module 3 - *GIS and Services Oriented Architectures (SOA)* Week 5 - February 17-21.

Module 4a - *Interoperability Standards* Week 6 - February 24-28. WMS, KML, and XML

Week 7 - March 3-7. WFS & WCS

Mid-term Exam and Portfolio Review Week 8 - March 10-12 (*Exam Due by end of class on March 12*)

Spring Break - No Class Week 9 - March 17-21.

Module 2b - *Web-based Mapping Clients* Weeks 10, 11 - March 24 - April 4. OpenLayers Javascript Framework

Module 4b - *Interoperability Standards* Week 12 - April 7-11. Desktop GIS Integration

Module 5 - *Developing and Hosting OGC Services* Week 13 - April 14-18. Platforms and GeoServer Introduction

Week 14, 15 - April 21 - May 2. OGC services and styling in GeoServer

Module 6 - *Integrating OGC Services into Web Mapping Clients* Week 16 - May 5-9.

Final Exam and Portfolio Review Week 17 - May 12-14 (Exam due by 5:00 pm May 14)

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Geography 586 GIS Applications
Spring 2014
Lecture&Lab: W2:00-4:30, Bandelier East 106
Office hours: T TR 2:00-3:30 or By Appointment

Danqing (Dana) Xiao
Email: dxiao@unm.edu
Office: Bandelier West 213

COURSE SYLLABUS

Objectives: Review and application of core principles of Geographic Information Science and the intermediate level operation of Geographic Information Systems.

Scope: The techniques of ArcGIS will be introduced through lectures, laboratory exercises, and a class project.

Grade Basis:

Lab Exercises	50%
Class Project	30%
Project Presentation	10%
Attendance	10%

Required Text: Allen, David W. (2010) *GIS Tutorial 2: For Arcgis 10*, Esri Press, Redlands, CA. Eleventh Edition.

Project presentation: Missing project presentations will not be made up and count as zero points, unless the instructor is notified prior to the presentation and the student receives prior approval to make up the exam/presentation. If a sudden illness or emergency occurs, students must make every attempt to call the instructor before the presentation and verify the excuse by a note from a responsible person. Vacation travel during the academic term is not a sufficient reason for arranging make-up presentations.

Lab Content: Hands-on experience will be gained with the aid of ArcGIS 10 software packages. Lab exercises will be conducted individually and a class project will be completed by each student. Attendance will be recorded and is strongly recommended if you wish to be successful in this class.

Grading: Most assignments are due one week after they are assigned at the beginning of class, unless stated otherwise by the instructor. Labs need to be in soft copy format, with questions and any required map products in the same file (*.doc or *.PDF). Include your name at the top of the lab. To receive maximum points on labs, make sure to answer all questions in complete sentences, provide plenty of examples to clarify your answers, and turn in your best effort for map products. Late assignments will be marked off 10% per day so make sure to use the lab time effectively when you can work with classmates and ask your instructor questions. The final class grade will be curved.

Lecture/Lab Schedule:

Note: This schedule is tentative, approximate and subject to change.

Week	Wednesday	Reading	Lab
1	Introduction; Mapping where things are	Chap. 1	Exercise 1-3
2	Mapping Quantities	Chap. 2	Exercise 2-3, 2-4
3	Mapping Density	Chap. 3	Exercise 3-3
4	Finding what's inside	Chap. 4	Exercise 4-2
5	Selecting what's nearby	Chap. 5-1~5-3	Exercise 5-3
6	Buffering	Chap. 5-4~5-6	Exercise 5-6
7	Distance Calculation	Chap. 5-7~5-9	Exercise 5-9
8	Mapping change	Chap. 6	Exercise 6-3
9	Spring break; No class on Wed		
10	Calculating Centers	Chap. 7-1~7-3	Exercise 7-3
11	Calculating spatial distribution	Chap. 7-4~7-5	Project Proposal
12	Analysing Patterns	Chap. 8	Exercise 8-3, 8-4
13	Identifying clusters	Chap. 9	
14	Project Presentations		Project Help Period
15	Project Presentations		Project Help Period
16	Project Presentations <i>Project Due on Friday</i>		Project Help Period

GEOG 487/587: Spatial Analysis and Modeling

Instructor: Dana Xiao
Email: dxiao@unm.edu

Office: Bandelier West, Room 213
Office Hours: TR 1:45-3:00

Course Description:

This course is designed for people who have basic statistical knowledge and wish to explore further into the more advanced spatial analysis. This course focuses the formal definitions of statistical analyzes, and illustrate them with SPSS labs. Lectures cover statistical basics in geography, hypothesis testing, correlation analysis, factor analysis, and spatial pattern analysis.

Textbook

Statistical Techniques in Geographical Analysis, Third Edition, Dennis Wheeler, Gareth Shaw, Stewart Barr. Routledge Press.

Course Goals and Objectives:

- Introduce students to the basic statistical principles in geography;
- Learn spatial analysis algorithms and how to apply them to study geographical events;
- Learn SPSS basics and ArcGIS Model Builder;

Grading:

Assignments: 50%
Midterm: 15%
Final Project: 25%
Class participation: 10%

Late assignments: A late submission of the written summary after the due date will be docked 10 percent per day and will not be accepted for credit after a week.

ACADEMIC INTEGRITY: All labs should be done independently. Academic dishonesty includes cheating, plagiarism and all forms of misrepresentation in academic work, and is unacceptable at the University of New Mexico. Plagiarism (the submission of another's work without appropriate attribution) and cheating are violations of the Student Conduct Code.

The Department of Geography & Environmental Studies assesses a curriculum fee of \$50 on every undergraduate class (excluding independent study and internship credits). Because you have enrolled in this course and have paid a curriculum fee, you are entitled to access a variety of departmental resources and facilities, as detailed on our website:
<http://geography.unm.edu/resources/for-students/how-are-course-fees-spent.html>

	Lecture	Assignment	Readings
Week 1	Intro to Statistics and Computer Applications		Chap 2
Week 2	Data Collection and Descriptive Statistics	Lab 1	Chap 3&4
Week 3	Probability Distribution Samples and Population	Lab 2	Chap 5&6
Week 4	Hypothesis Testing I	Lab 3	Chap 7.1 ~7.8
Week 5	Hypothesis Testing II: ANOVA	Take-home Midterm	Chap 7.9 ~7.17
Week 6	Correlation Analysis	Lab 4	Chap 8
Week 7	Linear Regression	Lab 5	Chap 9
Week 8	Multiple Regression	Lab 6	Chap 10
Week 9	Spring Break		
Week 10	Factor Analysis	Lab 7	Chap 11
Week 11	Cluster Analysis	Lab 8	Chap 12
Week 12	Pattern Analysis	Lab 9	Chap 13
Week 13	ArcGIS Model Builder	Lab 10	
Week 14	ArcGIS Model Builder+Python	Lab 11	
Week 15	Presentations		
Week 16	Presentations	Final Project due on Friday 10:00pm	

GEOG488/588: GIS Concepts and Techniques

Instructor: Xiao, Danqing (Dana)

Office: Bandelier West, Room 213

Office Hours: TR 3:15-4:15

Course Description: Theoretical and cognitive foundation for representation of knowledge in GIS; Fundamental concepts necessary to design and implement geographical information systems. Logic programming as a tool for fast design and prototyping of data models. Formal languages and formal models, conceptual modeling techniques, methods for data abstraction, object-oriented modeling and database schema design. Relational data model and database query languages, including SQL.

Course Goals and Objectives:

- Introduce students to the theoretical foundation for representing knowledge in GIS
- Use logic-based programming as a tool for fast prototyping and design of data structures
- Introduce major database models including relational and object-oriented models

Expected Outcomes:

- Understand formal languages and formal theories
- Understand the conceptual modeling for databases
- Understand the logic of formulating possibly complex queries
- Learn SQL in this course; learn other programming languages in the future with the help of formal theories.

Grading:

Assignments: 60%

Final Exam: 30%

Class participation: 10%

Late assignments: A late submission of the written summary after the due date will be docked 10 percent per day and will not be accepted for credit after a week.

ACADEMIC INTEGRITY: All labs should be done independently. Academic dishonesty includes cheating, plagiarism and all forms of misrepresentation in academic work, and is unacceptable at the University of New Mexico. Plagiarism (the submission of another's work without appropriate attribution) and cheating are violations of the Student Conduct Code.

	Lecfure	Assignment	Readings
Week 1	Introduction to Spatial Data Models		
Week 2	Basic Set Theory and Logics	Assignment 1 Math Exercises	Set theory, Wikipedia
Week 3	Topology		Smith, 2001
Week 4	Topological Relations	Assign 2: Defining a Spatial Relation	Egenhofer and Franzosa, 1991
Week 5	Qualitative Spatial Relations		Freska, 1991
Week 6	Information System	Assign 3: Relation Matrices	Tutorial Spatial Database, Chap 1
Week 7	Database Design: Classes		Tutorial Spatial Database, Chap 2
Week 8	Database Design II: Abstractions Fall break: No class on Thu		Mark and Frank, 1992
Week 9	Relational Data Model	Assign 4: Family Tree	Relational database, wikipedia
Week 10	Relational Operators		Base Tutorial 123: Chap 1-3
Week 11	SQL		Base Tutorial 123: Chap 4-6
Week 12	SQL 2	Assign 5: SQL Queries	Base Tutorial 123: Chap 7-9
Week 13	Spatial Database		Tutorial Spatial Database, Chap 3-4
Week 14	Spatial Database		Tutorial Spatial Database, Chap 5-6
Week 15	Oracle Spatial Thanksgiving: No class on Thu		Oracle Spatial Database Document
Week 16	Final Exam due on Friday 10:00pm of the Exam Week	Final Exam (Take-home)	

Seminar: Race and Environmental Justice
Geography 518

INSTRUCTOR: _____

Email: _____

Office: _____

Office Hours: _____

CLASS MEETINGS: _____

COURSE DESCRIPTION: This course is intended to introduce graduate level students with both theoretical backgrounds to, and contemporary examples of research interrogating the imbricated nature of race, natural hazards, and environmental justice.

STUDENT LEARNING OUTCOMES

1. Students will be able to demonstrate a clear understanding of foundational and contemporary approaches to understanding race
2. Students will be able to demonstrate a clear understanding of foundational and contemporary approaches to human-environment interrelations
3. Students will be able to demonstrate a clear understanding justice as a normative principal
4. Students will be able to identify the ways that race animates and contemplates contemporary issues of environmental, natural hazard, and/or health inequality.

TEXTS:

The books to purchase are as follows:

EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

1) **Class Participation:** Because much of the learning in this course comes from thoughtful discussion, listening, and interacting around the topics of the course, you are expected to attend and to participate during each class meeting. If you are not here to be a participant along with your classmates, everyone loses. Both your attendance and the quality of your participation will be considered in determining final grades.

- a. **Timely completion of the following weekly analysis assignments.** If you have not submitted a timely analysis, I will ask you to leave the class in which the covered readings are discussed. As mentioned below, you may opt out of this requirement once during the semester.

- b. **Respectful dialog.** This is a non-negotiable requirement of this class. Practices to ensure this include: listening closely and respectfully; refraining from ridicule or interruption; retaining modesty and humility. I particularly stress the “golden rule”; if you introduce an author or a concept not otherwise covered in class, this is an opportunity for you to introduce helpful supplementary substance. In other words, contribute expansively in the learning experience, avoiding name- or concept-dropping. There is much to explore in the course and many arguments to be heard, so let’s work to create an environment where explorations are encouraged and enjoyable.
- 2) **Weekly Analyses:** Every week each student will compose and transmit a reaction to each week’s reading and post it to the entire class via WebCT by _____. This reaction can take many forms: a critical reaction to one or more of the readings; a set of questions to be explored in class; the isolation of a line of tension between different readings; a proposed set of connections to other readings. Other possibilities exist, and deserve to be explored, but the principal goals of the reaction are two: to develop a critical response to the readings, and to contribute to building a constructive class discussion. You may opt out of one of these papers over the course of the semester and still be allowed to attend the relevant discussion.
- 3) **Final Paper:** You must write a final paper 20-25 pages long (typed, double-spaced, normal margins, twelve-point font), not including title page and/or bibliography. I expect this paper to engage with a substantial portion of the course readings and concepts from our in-class discussions. The “big idea” is to use the resources available from this class – including the literature, in class discussions, and my knowledge and feedback – to help frame, or otherwise address a problem or project. And this is why I REQUIRE you to engage with a substantial portion of the literature from this class (even if it is not the only, or even the majority of the literature you address), so that you have the opportunity to draw on those tools to the fullest. Thus, the page limits act primarily as a guideline. Ultimately what is most important is substantially engaging with broader explanatory concepts from class. That said, I hope your work in this class will help you in your existing course of study and research. Thus the final paper is open to a wide array of topics and projects. To ensure that you are able to use this opportunity to the fullest, you are required to meet with me during my office hours to discuss your final paper topic at some point prior to the last week of classes. The final paper is due on _____.

GRADING:

Your paper, exams, attendance and participation will be given the following weights in the calculation of final grades:

Participation & Weekly Analyses:	50% of final grade
Final Paper:	50% of final grade
<hr/>	
TOTAL:	100%

Class Schedule

UNIT 1: HISTORICAL AND THEORETICAL FOUNDATIONS

Week 1 - Introduction
READING: No reading assignment

Week 2 Theoretical Backgrounds: Conceptualizing the Environment
READING:

Week 3 Theoretical Backgrounds: Conceptualizing Justice
READING:

Week 4 Critical Race Theory I – an Introduction
READING:

Week 5 Critical Race Theory II – Race, Spatiality, and Justice
READING:

Week 6 Marxist Geography
READING:

Week 7 Feminist Geography
READING:

Week 8 Critical Legal Theory
READING:

Week 9 Indigenous Meaning Systems
READING:

Week 10 Deep Ecology and Post-Human approaches
READING:

UNIT 2: CONTEMPORARY APPLICATIONS

Week 11 Race and Environmental Pollution I
READING:

Week 12 Race and Environmental Pollution II
READING:

Week 13 Race and Natural Hazards I
READING:

Week 14 Race and Natural Hazards II
READING:

Week 15 Race and Crime
READING:

Week 16 Race and Health
READING:

POLICIES:

Ethics and Academic Dishonesty:

The course emphasizes ethical practices and perspectives. Above all, students and instructors should strive to communicate and act, both in class interactions and in assigned coursework, in a manner directed by personal integrity, honesty, and respect for self and others. Included in this focus is the need for academic honesty by students as stated by the UNM Pathfinder. Students need to do original work and properly cite sources.

Accordingly, I consider Academic Dishonesty, including plagiarism to be unacceptable. The University's official definition of Academic Dishonesty may be found at:

<http://pathfinder.unm.edu/>

This is a graduate course for students who have developed a strong set of intellectual and work skills, and who are familiar with university policy on academic dishonesty. One of the non-negotiable requirements for passing this course is turning in your own, original, non-plagiarized work for all assignments submitted and properly citing sources. If you plagiarize, you will fail this class. Additionally, plagiarism and/or other forms of academic misconduct may lead to the system of institutional penalties outlined at the above website

Late Work: Late work will not be accepted. Turn in your work in a timely manner by deadline. In addition, you will not have a chance to rewrite your work after it has been turned in. However, you are encouraged to meet with the professor in advance to discuss and ask questions about your assignments in progress.

Email responsibility: Check your UNM email account regularly, as we will use this account to keep in touch with you about course requirements or updates. If you use another email address, please set up your UNM account to forward your UNM account email to that address.

Technology: Regularly check your UNM email account as we will use this account regularly for the course. If you use another email address, please forward your UNM email to that address. Of course, turn off cell phones and do not internet surf in class.

ADA Accessibility: Qualified students with disabilities needing appropriate academic adjustments should contact me as soon as possible to ensure your needs are met in a timely manner. Handouts are available in alternative accessible formats upon request.

Diversity: This course encourages different perspectives related to such factors as gender, race, nationality, ethnicity, sexual orientation, religion, and other relevant cultural identities. This course seeks to foster understanding and inclusiveness related to such diverse perspectives and ways of communicating.

Office Hours: Office hour times and locations are subject to change. If you intend to visit me during an office hour I STRONGLY recommend that you inform me in advance to confirm time and place.

Grades: All grades assigned are final and non-negotiable. No incompletes for the semester will be given unless you can demonstrate valid and compelling reasons for your inability to complete the work. No extra-credit or make-up assignments will be offered.

OILS 515 - Introduction to Spatial Data Management - Syllabus

Many data products are inherently spatial. Obviously spatial data include data collection locations, but many other data may also be considered spatial: locations in space that documents pertain to and locations of historic or literary events illustrating just a few. While maps are a familiar product derived from spatial data, there is significant understanding of the underlying data – the processes to which it has been subjected, the actual values within the data, the originator of the data, any limitations in the appropriate use of the data, and the nature of the dataset itself (format, scale, coordinate system, units) – that is required before it can be productively used for research or applications. This course is designed to provide graduate-level students with the necessary skills and knowledge to meet this challenge through hands-on work in *discovering, creating, managing, using, documenting* and *sharing* spatial data. After completing this course students will be better prepared to develop a plan for the management of their spatial data, locate and evaluate data sources that they need for their research, create and structure data that they collect for maximum value both during and after their research project, and document their data throughout their research projects, maximizing the impact of their research and the value of the data they generate and share with other researchers.

Course Instructor

Karl Benedict

- Associate Professor, College of University Libraries and Learning Sciences
- Affiliated Faculty, Department of Geography
- Adjunct Professor, Department of Anthropology

Email: kbene@unm.edu

Phone: (505) 277-5256

Office Hours: Wednesdays from 4-5 pm in CSEL L173 and by appointment.

Office Location:

Centennial Science and Engineering Library - CSEL L173

Course Description and Objectives

An understanding of core spatial data concepts and principles is increasingly important in the current world of collaborative, spatially enabled research and applications. We are no longer working in a vacuum as individual researchers

that only need to understand and use the data that we create and use in our separate research projects. Successful research depends upon being able to integrate data generated by others with our own and by extension being able to share our data with others, both during our research projects and also for posterity (and to meet the requirements of funding agencies). This class will focus on the following aspects of spatial data management that relate to this need for effective integration, use, collaboration and sharing:

- The *Research* and *Data Lifecycles*
- Types of spatial data
- Spatial database design and management
- Working with and managing gridded data
- Spatial data documentation standards and practices
- Data management planning
- Ethical, legal and privacy issues as they relate to spatial data
- Emerging topics

Upon completion of the course students will have improved their knowledge and skills in the following areas:

- Locating and evaluating spatial data based upon knowledge of formats, content models and documentation standards
- Structuring data (both in terms of format selection and content) from a variety of sources to enable integrated research
- Evaluate data products to determine which elements of a dataset might raise ethical, legal or privacy issues if released or shared with others
- Documenting data as an ongoing process throughout the research cycle
- Producing machine- and human-readable documentation for data to support discovery, understanding, and use of data that they produce

Course Format

The course is structured as a combination of short lectures/demonstrations (presented as part of our concurrent collaborative sessions) that set the stage for the technical topics covered in the readings, hands-on work with data and data documentation, and data management planning exercises. While offered as an online course, several online web conferences (collaboratory sessions) are required as part of the class participation. These sessions are plananed for Wednesday evenings from 5:00-6:30 pm and listed under the “Collaboratory” column in the class calendar.

Readings

Nikos Mamoulis (2012), Spatial Data Management. Synthesis Lectures on Data Management #21. Morgan & Claypool Publishers. DOI10.2200/S00394ED1V01Y201111DTM021. [http://unm.worldcat.org/title/spatial-data-management/oclc/767844616&referer=brief_results\[SDM\]](http://unm.worldcat.org/title/spatial-data-management/oclc/767844616&referer=brief_results[SDM])

Michael J. Hernandez (2003). Database Design for Mere Mortals: a Hands-on Guide to Relational Database Design. 3rd ed. Addison-Wesley. [http://unm.worldcat.org/title/database-design-for-mere-mortals-a-hands-on-guide-to-relational-database-design/oclc/872560697?ht=edition&referer=di\[DBD\]](http://unm.worldcat.org/title/database-design-for-mere-mortals-a-hands-on-guide-to-relational-database-design/oclc/872560697?ht=edition&referer=di[DBD])

Additional online readings will also be assigned over the course of the semester.

Evaluation and Grading

Course grades will be based on a combination of participation in live and online discussions and peer-review, the smaller assignments (listed under the “Assignment” column in the class calendar), and the semester-long class project. The grade for the class will be weighted according to the following breakdown:

- Class Participation: 20%
- Small Assignments: 40%
- Class Project: 40%

While students are encouraged to collaborate in their work on the project and homework assignments, submitted work must be original and written and submitted by each individual student.

Please refer to the Pathfinder for detailed student conduct policies, and in particular the following Policy on Academic Dishonesty.

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Technical Requirements

Software

- Recent Windows, Mac or Linux Operating System
- GIS - Quantum GIS <http://www.qgis.org/>
- Spatial Database - SpatiaLite
 - <http://www.kyngchaos.com/software/frameworks>[Mac OS X]
 - <http://www.gaia-gis.it/gaia-sins/>[Windows & Source (Linux)]
- Python (possible, based upon interest)

Hardware

Relatively recent laptop or desktop computer with at least 4GB ram and 50 GB free hard disk space

Headset with integrated microphone and headphones (strongly recommended) or microphone and speakers (not recommended but can work in some circumstances) for participation in remote collaboration sessions

Network Connectivity

Broadband internet connectivity. Some wireless networks may not be sufficient and should be tested prior to participation in web conferences.

Weekly Schedule

Week		Assignment			
	Date	Topic	Collaboratory	Project	
1	tbd	Course Overview - Introduction to the Data Lifecycle	Class Introduction -	-	
2	tbd	Types of Spatial Data - Vector	-	Domain specific literature review	Define data management focus for term
3	tbd	Types of Spatial Data - Raster	-	-	-

Week	Date	Topic	Collaboratory	Assignment	Project
4	tbd	Database design I	Discuss literature review results	Post literature review to discussion	-
5	tbd	Database design II	-	Locate and describe data and review for documentation, usability and understanding	-
6	tbd	Geodatabase design	-	-	-
7	tbd	Managing raster data	-	-	-
8	tbd	Fall Break	-	-	-
9	tbd	Data formats for Analysis and Archiving	<i>Presentations</i> of data - review		Enumerate specific data (\geq three datasets) to be used in the project
10	tbd	Documenting data - the interview	-	-	Create initial data
11	tbd	XML Document creation, editing and validation	-	-	-
12	tbd	Metadata Standards - FGDC	-	-	Document Data
13	tbd	Metadata Standards - ISO and Dublin Core	Data management planning process Q&A	Create a data management plan	-

Week	Date	Topic	Collaboratory	Assignment	Project
14	tbd	Data management planning	-	-	-
15	tbd	Data management planning (continued)	-	Data management plan peer review	Project data and documentation peer review
16	tbd	Emerging concepts/ Ethical, legal and privacy issues	<i>Project Presentations</i>	-	Present project results and peer review outcome
17	tbd	Finals Week	-	-	-

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Geography 524

Adv. Topics in Remote Sensing
Fall 2016
Dr. Christopher Lippitt (Chris)

Office: Bande-203
E-mail: clippitt@unm.edu
Class Meets: F 0930-1200 in Bande 106
Office Hrs. T 1-2 & F 1-2 or by appt.

Course Syllabus

Objective: To explore theoretical, technical and applied advancements in remote sensing as a tool for monitoring and managing earth resources.

Scope: Student selected topics

Texts: Optional: Jensen, J.R., 2007. Remote Sensing of the Environment: An Earth Resource Perspective, 2nd Edition, Prentice Hall (New Jersey).
Optional: Jensen, J.R. 2004. Introduction to Digital Image Processing: A Remote Sensing Perspective, 3rd Edition, Prentice Hall (New Jersey).

Graded Assignments:	% of grade
Subject Presentations	30%
Participation	20%
Final Project Presentation	20%
Final Project Paper	30%

Learning Outcomes:

1. Students will be able to discuss the frontiers of Remote Sensing innovation and research
2. Students will be able to apply an advanced remote sensing technique/method to their own field of expertise
3. Student will have a working knowledge of how remote sensing has been successfully applied to their own field of expertise
4. Students will be able to orally present complex technical remote sensing topics in a clear and concise manor
5. Students will be able to report complex technical remote sensing topics, clearly and concisely, in writing

Subject Presentations: Each class meeting will start with 2 student lead subject presentation and discussions. Each student will be responsible for researching the topic, providing the class with relevant readings developed in consultation with the instructor. Topics and dates will be selected at the first class meeting. Presenters are expected to provide the class with reading materials at least 1 week prior to their scheduled time to present and lead discussion. The student will present core concepts and considerations of their topic for approximately 20 minutes and then lead a ~30-40 minute discussion of the topic with the class. Participation by all students is expected.

Project: Each student will complete a remote sensing project of scientific merit, meaning that it contributes novel scientific knowledge. The project’s innovation may be methodological or application focused, but each must employ remote sensing to answer a novel, defined research question. Project results will be presented in professional paper presentation format, with 20 minutes for presentation and 10 minutes for questions. Presentations and papers are expected to be of professional quality sufficient for presentation and publication at national meetings and their proceedings.

COURSE SCHEDULE:

Week 1: Introduction – selection of topics and dates

Weeks 2-10: Student subject presentations – Readings to be assigned by student facilitators

Week 11: No Class – SWAAG conference

Week 12: Peer evaluation of First Full Draft of final Paper

Week 13: Final project workgroups

Week 14: No Class – Thanksgiving

Weeks 15-16: Student Presentations of Final Projects

POLICY AND PROCEDURES

(1) Class Attendance and Participation

Attendance is expected. This is a seminar course where participation is required to obtain many of the core benefits of the course. Participation represents a significant portion of the grade for this course because it is critical to the success of the course for all participants.

(2) Textbook and Other Class Materials

There are no required textbooks for this course. Readings will be provided by peers in hard or soft copy format.

(3) Classroom Conduct

As with all classes, respectful and honest discourse during all classroom and course related interactions and respect for the rights of fellows students to learn unhampered by distraction is expected. Non-course related communication (i.e., side conversations, cell phone calls, texting, emailing, etc.) should be reserved for outside of class time. Enthusiastic debate of course topics is encouraged.

(4) Communication

Communication is essential to the success of this course, both for you as a student and for me as an instructor. The best way to communicate with me outside of class is by email. You are also encouraged to come to office hours or to make an appointment to see me if you are not available during that time.

(5) Helpful Tips

- Come to class (and come on time!).
- Visit me during office hours! I'm happy to answer any and all questions and love the opportunity to get to know students a little better.
- Utilize your classmates. Take a moment to exchange names and contact info with a few students at the beginning of the semester. Take the initiative to schedule group study sessions prior to exams.

GEOG 4/527: Introductory Programming for GIS

Course Description:

This course is designed for people who are familiar with ArcGIS 10 (and later versions) but who are new to programming. As a high level programming language with a variety of built in spatial tools, Python has become the de facto programming language of the GIS user community. ArcGIS therefore supports both control and custom tool development through Python scripting. This course introduces programming with python, primarily through interaction with ArcGIS, and explores the core of spatial analysis functions in ArcGIS using Python modules.

Textbook (Required):

GIS Tutorial for Python Scripting, David W. Allen, ESRI Press 2014

Building Skills in Python, Steven F. Lott, opensource textbook:

<http://www.itmaybeahack.com/homepage/books/>

Prerequisite:

GEOG 381: Intro to GIS

or

GEOG 581: Fundamentals of GIS

Course Goals and Objectives:

- Introduce students to basic programming principles;
- Learn the basics of programming in Python;
- Introduce ArcGIS ArcPy and how it works with Python;

Learning Outcomes:

- Students will have an understanding of the basic concepts of programming, including data structure and functions ;
- Students will be able to write and execute simple, standalone programs in Python;
- Students will be able to CUSTOMIZE advanced functions using Python and ArcGIS ArcPy for a specific research purpose.

Grading:

Assignments: 60%

Final Project: 30%

Class participation: 10%

Final Project: Students will work on final projects in groups of 2-3. Each group needs to develop a tool for ArcGIS written in Python. The tool shall provide a function that is currently not offered by ArcGIS (e.g., a new hexagonal binning map tool). The tool needs to have a GUI interface to enable interaction in ArcGIS. When grading, the complexity of the tool will be considered as well as robustness.

Late assignments: Late submission of assignments will be penalized 10 percent of the total available points per day and will not be accepted for credit after a week.

ACADEMIC INTEGRITY: All labs should be done independently. Academic dishonesty includes cheating, plagiarism and all forms of misrepresentation in academic work, and is unacceptable at the University of New Mexico. Plagiarism (the submission of another’s work without appropriate attribution) and cheating are violations of the Student Conduct Code.

	Lecture	Assignment	Readings
Week 1	Programming Language Basics: Why Programming? Why Python? Why ArcGIS?		
Week 2	Programming Language Basics: Expressions and Variables		
Week 3	Programming Language Basics: Logic Operators and Looping		
Week 4	Data Types: Strings, Tuples, and Lists		
Week 5	Data Types: Sets and Exceptions		
Week 6	Data Types: Classes & Files		
Week 7	Functions: Functions and Modules		
Week 8	Fall break		
Week 9	Functions: Recursion		
Week 10	ArcGIS and Python: Using Python in Field Calculation		
Week 11	ArcGIS and Python: Table Operations and Hashing		
Week 12	ArcGIS and Python: Arcpy toolboxes I		
Week 13	ArcGIS and Python: Arcpy toolboxes II		
Week 14	Project Presentation		
Week 15	Project Presentation Thanksgiving	All labs due	
Week 16	Final Project due on Friday 10:00pm of the Exam Week		

GEOG 4/528: Advanced Programming for GIS

Course Description:

More and more GIS programmers are turning to Python and this course focuses on the creation of standalone, distributable programs in Python. A number of advanced data structures and applications are explored. Real-world applications of the various coding topics are also presented. An emphasis is placed on developing robust, documented code that is ready for distribution to other users. Building on GEOG 4/5XX, this course gives programmers a foundation in the fundamentals of abstraction and data structures in the Python language.

Textbook (Required):

Data Structures and Algorithms Using Python, Rance D. Necaise, 1st Edition, Wiley 2010

Prerequisite:

GEOG 4/527 Introductory Programming for GIS

Course Goals and Objectives:

- Learn advanced Python topics;
- Become proficient in Pyscripter programming environment;
- Learn to collaborate on advanced Python + GIS projects.

Expected Outcomes:

- Students will be able to understand advanced concepts of programming, including data structures and algorithms;
- Students will be able to code advanced programs in Python, and COLLABORATE;
- Students will be able to build readable, documented python code for distribution and reuse.

Grading:

Assignments: 50%

Final Project: 40%

Class participation: 10%

Final Project: Students will work on final projects independently. The student can either develop an extension for an existing software package (e.g., an extension to use R modules in ArcGIS), or update an existing spatial algorithm to improve the efficiency (e.g., an efficient Kriging). Either path will require supporting documentation and legible, properly annotated code. When grading, the complexity, efficiency, and robustness of the resulting code will be considered, in addition to the supporting documentation and annotation. .

Late assignments: Late submission of assignments will be penalized 10 percent of the total available points per day and will not be accepted for credit after a week.

ACADEMIC INTEGRITY: All labs should be done independently. Academic dishonesty includes

cheating, plagiarism and all forms of misrepresentation in academic work, and is unacceptable at the University of New Mexico. Plagiarism (the submission of another’s work without appropriate attribution) and cheating are violations of the Student Conduct Code.

	Lecture	Assignment	Readings
Week 1	Abstract Data Types		
Week 2	Arrays		
Week 3	Sets and Maps		
Week 4	Algorithm Analysis		
Week 5	Searching and Sorting		
Week 6	Linked Structures		
Week 7	Stacks & Queues		
Week 8	Fall Break		
Week 9	Recursion		
Week 10	Hash Tables		
Week 11	Advanced Sorting		
Week 12	Binary Trees		
Week 13	Search Trees		
Week 14	Voronoi Diagram		
Week 15	Point in Polygon Algorithm	All labs due	
Week 16	Final Project due on Friday 10:00pm of the Exam Week		

GEOG550: Plant Geography

Draft syllabus — Chris Duvall, 4 November 2015

1. Learning outcomes:

- Students will be able to explain advanced theories of geographic change and difference in plant communities.
- Students will be able to summarize major patterns of current plant geography.
- Students will be able to describe major processes of ecological change in plant communities.
- Students will be able to formulate and execute field-based research projects on plant communities.
- Students will build proficiency in communicating research findings and advanced theoretical concepts in oral and written formats.

2. Grading/expectations:

- Participation (attendance and contribution to in-class discussions) is worth 50% of a student's score for the course.
- Assignments are worth 50% of a student's score. There are three assignments: 1) Exam on basic principles (see week 4, below); 2) Independent research on historical biogeography (see weeks 7 and 8, below); and 3) Group, field-based research on vegetation (see weeks 9, 12, 13, and 16, below).

3. Course outline:

- Week 1: The course begins with an overview and basic review of genetics, evolution, and taxonomy, biological fields that are central to biogeography.
- Week 2: This week focuses on broad-scale patterns of plant geography by examining the difference between vegetation, flora, and ecosystems, and identifying correlations between vegetation, climate, and land surface features, and between flora, fauna, and dispersal barriers.
- Week 3: This is the first of two weeks that examine key theories in biogeography. This week focuses on island biogeography, by examining key texts and case studies.
- Week 4: This week focuses on biogeographic theories of system behavior. Course materials provide overviews and critiques of ideas such as ecological succession, non-equilibrium theory, stability/instability, and general systems theory. This week includes an exam on the material covered thus far.
- Week 5: This is the first of four weeks focused on historical biogeography. This week focuses on evolutionary processes, focusing on the geographic processes that can lead to speciation, and the patterns of genetic variation these processes can produce.
- Week 6: In this second week on historical geography, the course focuses on phylogeography, or the distribution of genetic lineages. Course materials provide an overview of analytical methods, and major findings in the field.

- Week 7: In this third week on historical biogeography, the course explores actual biogeographic patterns that are associated with past events, such as Pleistocene climate change, transatlantic human migrations, and uplift of the Rocky Mountains. Students select actual course content by leading discussion of the topic of their first research assignment in class.
- Week 8: In this final week on historical biogeography, student-led discussions of research findings continue and conclude.
- Week 9: During this week, the course takes a field trip to a local site. Students will observe vegetation and flora, and work in groups to develop testable hypotheses related to plant geography. These hypotheses are the basis of the assignment that will be completed during weeks 12, 13, and 16. Course materials will review basic methods of field data collection, some of which will be practiced during the field trip.
- Week 10: This week is the first of two on ecological processes of change. This week focuses on plant geomorphology, or the relationship between surface processes and vegetation. Course materials will cover basic principles and select case studies.
- Week 11: This week focuses on the processes through which climate change can affect vegetation and floras. Course materials focus on the most recent findings related to current global climate change.
- Week 12: This week, the course reviews basic methods of statistical analysis used in association with field data collection. In conjunction with this topical content, students have time to work in class on their group research project.
- Week 13: During this week, the course takes a field trip, returning to the site visited during week 9. Student groups will collect data to test their research hypotheses.
- Week 14: This week is the first of two on human–plant relationships. This week focuses on vegetation management practices. Course materials will provide an overview of principles related to invasive plants, wildfires, and forestry.
- Week 15: This week focuses on social–cultural meanings plants have to humans. Course materials consider economic botany, agriculture, ethnobotany, and plants as expressive symbols.
- Week 16: During this week, student groups present and discuss the results of their research projects, including reflections on the research process.

GEOG551: Drylands

Draft syllabus — Chris Duvall, 4 November 2015

1. Learning outcomes:

- Students will be able to explain the formation and persistence of drylands.
- Students will be able to identify major biological adaptations to dry environments.
- Students will be able to explain advanced theories of geomorphology in dryland environments.
- Students will be able to describe human activities and impacts in major global dryland areas.
- Students will build proficiency in communicating research findings and advanced theoretical concepts in oral and written formats.

2. Grading/expectations:

- Participation (attendance and contribution to in-class discussions) is worth 50% of a student's score for the course.
- Assignments are worth 50% of a student's score. There are four assignments: 1) Exam on basic principles (see week 8, below); 2) Exam on global dryland regions (see week 16, below); 3) Independent research: first draft of research paper (see weeks 4 and 9, below); and 4) Independent research: first draft of research paper (see weeks 12 and 16, below).

3. Course outline:

- Week 1: The course begins by specifying the geographic region covered in the course, by defining "dryland" and related terms, and by identifying the relevant global biomes and climate regions. Broadly, "dryland" refers to areas with very low absolute levels of average annual precipitation, and areas with over 50% of average annual precipitation concentrated in less than four months.
- Week 2: This week, the course examines the climate patterns and processes associated with drylands, in order to recognize and understand climatic variability between different dryland areas, and the persistence of drylands through geological time.
- Week 3: The course focuses on organism and ecosystem adaptations to dryness this week. Course materials will provide an overview plant and animal physiologic adaptations, and periodic ecosystem structural changes related to seasonal aridity.
- Week 4: This week is the first of four related to dryland geomorphology. The course focuses on soil formation processes this week, and compares these processes to those observed in other environments. Course materials include key theoretical works, and select case studies. Additionally, students will work in peer groups in class to develop their individual research projects.

- Week 5: Course materials focus on temporary fluvial processes this week. Students will learn about landforms produced by ephemeral to seasonal drainage events, such as alluvial fans, bajadas, and playas.
- Week 6: This week the course focuses on geomorphic processes associated with exotic rivers, or those that flow through drylands. Course materials will focus on basic theories, and also review case studies associated with major exotic rivers including the Nile, Niger, and Colorado.
- Week 7: This final week of dryland geomorphology will focus on aeolian processes. Students will learn about erosion and deposition caused by wind, and how these processes are related to aridity.
- Week 8: This week the course includes a review of material covered thus far, and an exam on this material.
- Week 9: During this week, students work in peer groups in class to finalize and evaluate the first drafts of their research papers.
- Week 10: This is the first of six weeks that examine conditions in dryland areas in each continent. Topical materials will include: identification and description of major dryland areas; formative physical geographic processes for these areas; and past and present human impacts on these areas. The focus this week is on North American drylands, particularly the Mojave, Sonora, and Chihuahuan deserts, the Colorado Plateau, Great Basin, and Great Plains.
- Week 11: During this week, the course continues its focus on North American drylands, including a field trip to a local site.
- Week 12: The six-week course component that examines drylands in each continent continues by focusing on South America, particularly the Atacama Desert, Patagonia, and the Andean highlands. Also during this week, students will work in peer groups in class to continue developing and revising their individual research projects.
- Week 13: The continental focus of this week is Eurasian drylands, which extend primarily in a broad band from western China to the eastern Mediterranean.
- Week 14: This week focuses on African drylands, including the Sahara, Kalahari, and Somali deserts, as well as the continent's extensive savanna woodlands.
- Week 15: This week considers Australian drylands, particularly the Great Victoria Desert, as well as the Polar drylands, particularly Antarctica.
- Week 16: During this week, students will complete their individual research projects by presenting their findings in class. Also, during finals week there will be an exam on material covered during weeks 10 through 15.

GEOG 590
Qualitative Methods

TBA

Instructor: Melinda Harm Benson
Assistant Professor, Department of Geography
Office Hours: MW from 2:00-3:00 p.m. and by appointment
Bandelier Hall West Room 211
Email: mhbenson@unm.edu

Readings: Readings will be provided on UNM Learn. In addition, there are the following required texts available at the bookstore and online vendors:

- Maggi Savin-Baden and Claire Howell Major (2013), *Qualitative Research: the Essential Guide to Theory and Practice*
- Melanie Limb and Claire Dwyer, eds. (2001), *Qualitative Methodologies for Geographers: Issue and Debates*
- Shawn Wilson (2008), *Research as Ceremony: Indigenous Research Methods*

All other readings will be provided on UNM Learn.

Description: This course is designed to expose students to the underlying theories, purpose, scope, and procedures of qualitative research, especially as applied to human geography. It is not a template or “how to” course, because qualitative work is very context dependent. Instead the course will give you a framework for proceeding with your own qualitative research, as well as for evaluating qualitative research. Readings will draw on a variety of work in the social sciences, especially anthropology, geography, sociology, and women’s studies. We will examine a range of qualitative methods, including interviews, participant and non-participant observation, ethnography, action research, and discourse analysis. Through case study readings, we will examine how scholars employ these methods in different research contexts, with particular attention to the ethical and practical considerations of doing so. The course will engage theoretical debates relevant to qualitative research by addressing questions such as:

- How does qualitative research challenge the practice of social "science" and the search for "universal truths"?
- How do we represent the world, or multiple understandings and perspectives of it?
- What are the implications of using qualitative data for the researcher, the research product, and the "researched"?
- How do we interpret qualitative data and present it to scholarly audiences?

This course is open to all graduate students, ideally those who have already had some exposure to the major theoretical and epistemological debates in their own disciplines.

Objectives: This course contributes to the Geography Department’s mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. Our goals for the M.S. degree program are as follows:

- A. Students will learn to conduct legitimate and original research on geographical topics.
- B. Students will develop an ability to communicate clearly and effectively.
- C. Students will prepare themselves for professional careers in Geography.

Student Learning Outcomes (SLOs) for this Degree Program related to those goals are:

- A.1. Students will be able to state an original research question appropriate for geographic analysis.
- A.2. Students will be able to state how a research project contributes to an existing body of geographic literature.
- A.3. Students will be able to design legitimate geographic methodology.
- A.4. Students will be able to implement legitimate geographic methodology.
- A.5. Students will be able to explain and assess the results of original geographic research.
- B.1. Students will be able to communicate clearly and effectively in a written format.
- B.2. Students will be able to communicate clearly and effectively in an oral format.
- C.1. Students will be able to enter professional positions or Ph.D. programs related to geography or environmental management.

Core concepts and themes in the program are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

Place and regions. A spatially literate student knows and understands: a. the physical and human characteristics of place; b. that people create regions to interpret earth's complexity; and c. how culture and experience influence people's perceptions of places and regions. Examples of concepts useful in understanding place and region include: regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems, and etc.

Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

Human Systems. A spatially literate student knows and understands: a. the characteristics, distribution, and migration of human populations on the earth's surface; b. the characteristics, distribution, and complexity of earth's cultural mosaics; c. the patterns networks and economic interdependence on the earth's surface; d. the processes patterns and functions of human settlement; and e. how the forces of cooperation and conflict among people influence the division and control of earth's surface. Examples of concepts useful in understanding human systems include: location, scale, spatial change and spread, spatial association, perception, and etc.

Spatial Representation. A spatially literate student knows and understands: a. how to use maps and other geographic representations, tools and technologies to acquire, process and report information from a spatial perspective; and b. how to use mental maps to organize

information about people, places, and environments in a spatial context. Tools used include: GIS, remote sensing, GPS, and etc.

Geographic Analysis. A spatially literate student knows and understands: a. how to analyze the spatial organization of people, places, and environments on the earth’s surface; and b. how to apply geography to interpret the past and present, and to plan for the future. Methods used for spatial representation are a cornerstone of geographic analysis. In addition, broad concepts useful in analysis include: Location (distribution, density, pattern, clustering, and dispersion); Scale (distance, hierarchies, and changes in scale and interpretation); Spatial change and spread (diffusion and dispersion, spatial flows, and regional evolution); Perception; Place (regions, regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems); Spatial association/interaction (proximity and adjacency, distance decay, and geographic features as points, networks or regions, site, situation); and Spatial alignment, orientation, and direction.

By the end of the course, students should be able to distinguish different epistemological underpinnings within qualitative research; articulate the strengths and weaknesses of different qualitative methodologies for particular research questions; and should feel confident using qualitative methods in their own research projects. In order to work on feeling confident with different methods, we will practice them in different ways –in assignments (see below), and in seminar activities.

Prerequisites: None

Grading:	Attendance and participation	25%
	Reading reflections	25%
	Learning Activities	25%
	Final Research Design	25%

Grading will be on a straight scale:
A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%.

Course Organization and Assignments

Attendance and Participation

This course is a discussion-based seminar that requires active participation from all class members. You will be expected to share your thoughts and ideas with the class. Good participation is a matter of both quality and quantity. More information on what constitutes “quality” participation will be provided in class. Attendance is required, and a student with more than two absences may be dropped from the course at the instructor’s discretion. Being late to class is the equivalent of ½ of an absence.

Reading Reflections

You will come to each class with your reactions to the week’s reading assignments. This is your opportunity to demonstrate that you have read and thought about the assigned text for the day. Unless you are given specific guidance for the week’s reflection paper, please organize your reaction with three sections (clearly label

them with headings). (1) Summary: provide a two-three sentence summary for each of the readings—distilling the author’s thesis to its essence. (2) General reaction and application. Briefly share your general reaction to the readings. You might address such things as whether you liked the reading and why or why not. What ideas stood out to you? What did it make you think about? Apply the reading material to the course’s main theme and/or other readings and discussions related to the course. You may opt out of one of these papers over the course of the semester and still be allowed to attend the relevant discussion. (3) Discussion Leads. Finally, put *at least* three questions down that can facilitate our class discussion—critical points you want the class to engage and so forth. This way, everyone should have several items to help initiate discussion in class.

These weekly assignments will be **due at the beginning of each class, and you will need to bring a copy to class** in order to facilitate discussion and hand in for assessment.

Learning Activity Assignments

One focus of this class is to examine how, on a practical level, qualitative research is conducted. It is therefore essential that students learn how to apply what they are learning to problem-based scenarios. Class assignments will include both in class and outside activities. Learning activities (LAs) are designed to prepare students for discussion and to actively engage the material and assist in the development of their research methods and design.

Research Design

Each student will work independently to develop a research design using qualitative methods. More information on this will be provided in a separate handout. Depending on the class, this may involve an in-class presentation.

A note about late assignments

To do well in this course, you must turn in your assignments on time. Late assignments will be penalized by reducing the maximum points achievable by twenty percent (20%) for each day the assignment is late.

Student Support

If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation to, the Information Accessibility Resource Center: <http://as2.unm.edu>; (505) 277-3506.

Student Code of Conduct

Students should exhibit respectful classroom values and behavior by:

- engaging in appropriate communication, interaction and preparedness;
- demonstrating trust, respect and civility;
- approaching course content as important and necessary;
- meeting all deadlines for assignments and team member obligations;
- turning off cell phones in class;
- avoiding unnecessary talking; and
- not reading outside material or doing other work during class.

Students should contribute to a positive learning environment by:

- arriving, attending and departing class in a respectful manner;
- taking responsibility for team and individual assignments; and
- developing cooperative relationships with other students and faculty.

Students should support a professional learning environment by:

- avoiding inappropriate language;
- refraining from unrealistic expectations in dealing with administration, faculty and staff; and
- communicating with the instructor if changes could be made to improve the learning environment.

Students must uphold the academic integrity standards of the University of New Mexico.

Academic integrity is conceptualized as doing and taking responsibility for one's own work. This includes individual assignments and, for group assignments, the assumption of responsibility for work that is turned in as the "work product" of a team. Each team member is equally responsible for the work presented as the output of that team's effort. For more information on UNM's standards for academic integrity, see the policy on academic dishonesty at <http://www.unm.edu/~sac/policies.html#academicdishonesty>.

Tentative Course Schedule, Subject to change at instructor's discretion. ALWAYS check the lecture from the previous class regarding class assignments.

Date:	Topic:	Readings:	Topics, deadlines, etc.
January 16	Introduction	N.A.	Course business and expectations; Situating Qualitative Research; overview of methodologies and orientations
January 23	Ethical Reflections	Limb & Dwyer, ch. 55, Savin-Baden & Major ch 21	Issues of ethics in qualitative research; discussion regarding research design project
January 30	Epistemological Stances	Savin-Baden & Major ch 12 ch 4, Foucault (1970), TBD	Western paradigms-positivism, structuralism, post structuralism; new materialism
February 6	Epistemological Stances	Willson (2008); Schwandt T. (2000)	Indigenous research methods
February 13	Theoretical Orientations	Limb & Dwyer, ch. 3	Feminism and new materialist
February 20	Theoretical Orientations	Savin-Baden & Major ch 12	Grounded theory
February 27	Methods	Limb & Dwyer, ch. 12, Savin-Baden & Major ch 13	Ethnography
March 6	Methods	Limb & Dwyer, ch. 10, Savin-Baden & Major ch 25	Participatory Action and observation; draft research designs due
March 13	N.A.	NA.	N.A.
March 20	Methods	Savin-Baden & Major ch 23	Interviews
March 27	Methods	Limb & Dwyer, chs. 8, 9	Focus groups
April 3	Data analysis and coding	Limb & Dwyer, ch. 13	Field notes and coding
April 10	Data analysis and coding	Savin-Baden & Major chs 27, 28	Data and discourse analysis

April 17	N.A.	N.A.	In class presentations of research design; final research designs due
April 24	N.A.	N.A.	In class presentations of research design.
May 2	N.A.	N.A.	Course wrap, evaluations, etc.; final papers due.

GEOG 445: Geography of New Mexico and the Southwest

CR# 43683, Fall 2012
T/TH 9:30-10:45am, Castetter Hall 57
Dr. Maria Lane, mdlane@unm.edu
Department of Geography & Environmental Studies
Office: 224 Bandelier West, 277-4075
Office hours: Tues 1-2:30pm & Thurs 11am-1pm

The American Southwest is many things to many people. Originally home to some of the oldest urban settlements in North America, this arid region has undergone successive phases of conquest, colonialism, and economic development to become one of today's most complex (and most misunderstood) American cultural landscapes.

This course examines the changing historical, economic, and cultural geography of the American Southwest through the lens of human-environment interaction, focusing particularly on New Mexico. Over the course of the semester, students will learn how to apply several basic techniques of geographic analysis. They will use these techniques to conduct original field research here in Albuquerque, analyzing how various parts of the city have responded in unique ways to the broad trends affecting the Southwest as a whole.

What will you get out of this course?

By the end of the class, you will have a firm grasp of human-environment relationships within the Southwest. You will also be capable of conducting fieldwork and geographical analysis within this region. The course structure is designed to provide a learning environment in which each student can achieve the following:

1. Identify on a map the basic environmental and cultural features of the American Southwest.
2. Explain prominent environmental and cultural patterns in the Southwest using core geographic concepts.
3. Analyze the relationships influencing human-environment interaction in different times and places in the Southwest.
4. Implement basic field research techniques for a Southwestern field site.
5. Analyze field data and assess its value and limitations.

What are your responsibilities in this course?

This upper-level course requires students to do substantial independent work and to take responsibility for their own progress. Students are expected to read assigned texts carefully, to attend and participate in all class activities, to complete all writing assignments on time, and to become active contributors to their field research groups.

FORMAT AND ATTENDANCE

You will achieve the five learning outcomes listed on page 1 by participating in a variety of learning activities, including reading articles and book chapters, working with maps, completing in-class assignments, writing several original analytical papers, and working in groups to plan and implement original research. Lecture presentations will be only one part of how you learn the content and techniques of this class. On most days, significant class time will be spent on activities designed to help you master material with the support of the instructor and your classmates. For this reason, it is extremely important that you attend all class sessions. **If you will not be able to attend class regularly, you should not enroll in this course.**

REQUIRED TEXTS

Required reading assignments for each week will be posted in WebCT and are drawn from the following sources:

- *Southwest: Three Peoples in Geographical Change 1600-1970*, by D.W. Meinig.
- *Dreaming of Sheep in Navajo Country*, by Marsha L. Weisiger
- Additional readings posted in WebCT.

Reserve copies of *Southwest* are and *Dreaming of Sheep in Navajo Country* are on reserve in Zimmerman Library. The reading assignments for each unit are listed in the weekly modules on WebCT, along with a reading guide for each day.

CLASS COMMUNICATIONS

Class materials are posted on WebCT and will NOT be available in paper copies. To log in, go to <http://vista.unm.edu>, enter your UNM NetID/password, then click GEOG 445.

WebCT contains PDFs of required articles, reading guides, assignment details, grading rubrics, and student grades. You will submit your written papers through WebCT, using electronic forms that allow me to provide feedback visible only to you. I will also use WebCT to make periodic class announcements via email. Please make sure that you check your WebCT mail regularly, or change the settings to forward messages to the email address that you check most often.

INSTRUCTOR CONTACT

In upper-division courses with significant levels of independent work, it is important for students to consult with the instructor regularly. See the first page of the syllabus for my office hours. If your schedule does not permit you to visit during office hours, please email me to set an appointment. Note: Whenever you email me, you MUST include “GEOG445” in the subject line of your email, and you must sign your email with your full name. This will prevent the problem of your email getting caught in my junkmail filter.

REQUIRED ASSIGNMENTS AND ACTIVITIES

You will demonstrate course content mastery through the following required assignments and activities.

Assignments and Quizzes (daily)

This class involves a number of in-class assignments, group activities, and occasional unannounced reading quizzes. These are designed to provide opportunities for you to learn geographical concepts and techniques in an environment where you can take advantage of instructor support and peer assistance. Because these activities are fundamental to how you will learn in this course, in-class assignments constitute a substantial part of your overall grade. In order to earn the maximum “in-class” points, you must attend, participate in and contribute to all in-class activities.

Short Essay Assignments (due throughout October and November)

Before you begin working on your major analytical paper for the class, you will complete a series of short weekly essays on various topics. These weekly essays will help you develop your writing skills and hone your analytical techniques, using feedback from the instructor to improve your performance. These short essays will count toward your overall assignments/quizzes score.

Midterm Exam (October 2)

The first third of the class focuses on basic geographic details about the physical and historical geography of the Southwest. You will demonstrate your mastery of this content through a midterm examination that includes multiple-choice questions, map identifications, and essays. A review sheet will be provided on WebCT, and the exam will be discussed extensively in class ahead of time. Makeup exams will be offered only for emergency situations and at the instructor’s discretion.

Analytical Paper (draft due December 4; final version due December 6)

The final section of the course focuses on the geographic analysis of environmental and urban issues in various Southwestern locations. You will demonstrate mastery of geographic analysis through an original essay paper (1,500-2,000 words). An essay prompt and grading rubric will be provided on WebCT, and the assignment will be discussed extensively in class.

Fieldwork Report & Presentation (presentations November 8 & 13; papers due November 13)

The final element of the course is a field research project that you will conduct in a group with other students. Each group will be assigned a field site in Albuquerque, with individual group members responsible for specific types of data-gathering at each site. You will conduct your fieldwork together, as a group, during the weekend of October 27/28 (with followup fieldwork expected for the following weekend of November 3/4) and will then work collaboratively to develop an analytical report and presentation over the following two weeks. Detailed instructions and grading rubrics will be provided on WebCT for both the independent and group-based elements of this assignment. This will also be discussed extensively in class. Note that the course schedule provides for group meetings during regular class time.

OPTIONAL FINAL EXAM

The final exam in this class is optional. If you choose to take the final exam and earn a better score than the midterm, I will replace your original score. The final exam will cover the exact same material as the midterm and will use the same format, but the questions will be different. Makeups will NOT be offered for this optional exam, for any reason.

GRADING

Your mastery of course content and concepts will be evaluated scored using the following breakdown:

	% of Grade	Description	Dates
Assignments, Quizzes & Short Essays	30%	Individual and group activities, in-class and at home	Daily
Midterm Exam*	25%	Covers physical and historical geography	Tuesday, Oct 2
Analytical Paper	20%	Original paper on urban / environmental issues	Thursday, Dec 6
Field Report	15%	Individual report on fieldwork	Tuesday, Nov 13
Field Presentation	10%	Group presentation on fieldwork	Thursday, Nov 8 or Tuesday, Nov 13

* This score can be improved by taking the optional final exam, see above.

COURSE SCHEDULE

Individual reading assignments and detailed assignment guides will be posted in WebCT. For each week, you will open the online module to access all relevant materials.

UNIT 1: Introduction

- Week 1 8/21 Course Welcome and Intro
 8/23 Defining the Region

UNIT 2: Physical Geography

- Week 2 8/28 Topography
 8/30 Climate
Week 3 9/4 Water
 9/6 Vegetation

UNIT 3: Historical Geography

- Week 4 9/11 Precolonial Geography
 9/13 Colonial Spanish Transitions I
Week 5 9/18 Colonial Spanish Transitions II
 9/20 Colonial Mexican Transitions
Week 6 9/25 Anglo Territorial Transitions
 9/27 An American Century

TUESDAY, OCTOBER 2: MIDTERM EXAM

UNIT 4: Economic and Urban Issues

- Week 7 10/4 Albuquerque and surroundings
 10/9 El Paso and surroundings
 10/11 NO CLASS: FALL BREAK
Week 8 10/16 Tucson and surroundings
 10/18 Phoenix and surroundings

UNIT 5: Field Research

- Week 9 10/23 In-class preparation for Albuquerque neighborhood research
 10/25 In-class preparation for Albuquerque neighborhood research
 ((10/27&10/28: FIELDWORK IN GROUPS, exact times TBD))
Week 10 10/30 In-class groupwork: field data analysis
 11/1 In-class groupwork: field data analysis
 ((11/3&11/4: FOLLOWUP FIELDWORK IN GROUPS, exact times TBD))
Week 11 11/6 In-class groupwork: field data analysis
 11/8 Final group presentations
 11/13 Final group presentations // **Final reports due at beginning of class**

UNIT 6: Human-Environment Interactions

- Week 12 11/15 Pastoralism and its origins
 11/20 Navajo-Anglo conflicts in the grasslands
 11/22 NO CLASS: THANKSGIVING HOLIDAY
Week 13 11/27 Interpreting environmental conflict
 11/29 Interpreting cultural conflict
Week 14 12/4 Peer review workshop // **Full draft of paper due at beginning of class**
 12/6 Semester wrap-up // **Final papers due at beginning of class**

TUESDAY, DECEMBER 11, 7:30-9:30AM: OPTIONAL FINAL EXAM

ACADEMIC ASSISTANCE

Because 20% of your grade in this class comes from an essay assignment, I encourage you to take advantage of the options offered by the Center for Academic Program Support (CAPS). CAPS provides academic assistance free-of-charge to UNM students enrolled in undergraduate courses on the Albuquerque campus. The CAPS Writing Center offers one-on-one peer tutoring for students at any stage of the writing process, from generation and organizing ideas to revising essays and improving grammatical skills. Individual appointments for writing tutoring may be made in person at CAPS (Third Floor of Zimmerman Library) or by phoning 277-7205.

ACADEMIC INTEGRITY

Intellectual integrity is expected in all work. Although this course features numerous peer instruction activities and encourages collaboration and group learning, written essays are expected to be the independent work of each individual student.

Using someone else's language, ideas, or other original material without acknowledgement constitutes plagiarism. This includes, but is not limited to, purchasing a paper and submitting it as one's own; "recycling" someone else's paper; cutting and pasting from the Web; paraphrasing someone else's ideas without acknowledgement; or copying phrases, sentences or passages without quotation marks and/or without acknowledgement. Anyone who is caught plagiarizing will receive an F in the course and will be referred to the Dean of Students Office.

Map Design and Geovisualization
Geography *481L
Scott M. Freunds Schuh

Objectives

Mapping is crucial to understanding spatial distributions, and in this course, you will learn how to create maps. There are two components to creating an effective thematic map: appropriate treatment of the data to be mapped, and appropriate graphic emphasis within the map. You will learn about mapping techniques and about map and graphic design. You will gain hands-on experience producing maps. Principles you learn in class will be applied in the labs to deepen your understanding of the course material and build technical expertise. You will also be coached in the gentle art of constructive criticism—you will be critiquing your classmates’ maps as part of your grade.

Your maps will be drawn using *Adobe Illustrator* illustration software. In addition, for the choropleth, proportional symbol and cartogram map exercises, you will be using *Microsoft Excel* for data handling and analysis. Finally, you will be using *Komposer* to create a personal web page where you will publish your maps.

Text

Dent, B. D., J. Torguson and T. Hodler, 2008. *Cartography: Thematic Map Design* (6th ed.), McGraw Hill.
(Though not required, and good tutorial text on Abode Illustrator would be helpful.)

Timetable

GEOG 481L lecture meets Mondays and Wednesdays from 9am to 10am, and lab meets immediately after lecture from 10am till noon.

Office

I have two offices in Bandelier West — 103 (Dept Chair Office) and 222 (my research office). My email address is sfreunds@unm.edu. In case of an **emergency**, you can call my office at 277-0058 (e.g., emergency = you will miss an exam). For all other communication, you are welcome and strongly encouraged to stop by my office, or see me before or after class.

Grading Notes 1&2

Grades are (typically) assigned as follows: A (85% and above), B (75 to 85%), C (65 to 75%), D (55 to 65%), F (below 55%). This grading scale may be adjusted depending on overall class grades. Course grades will be based on exams (35%), map critiques (5%) and labs (60%) as follows:

Exam 1	20%
Exam 2	15%
Map Critiques	5%
Labs	
ex1	5%
ex 2	10%
ex 3	5%
ex 4	10%
ex 5	10%
ex 6	10%
ex 7	10%

NOTE¹: I do not give make-up exams, nor accept late assignments. (all lab assignments are due at the start of lab period unless otherwise specified)

NOTE²: Attendance in class and lab is absolutely mandatory. You are responsible for all information given in lecture AND lab (lecture content, announcements, changes in lab assignments, etc.). If you miss a lecture or lab, it is your responsibility to find out from your classmates (**not me!**) what you missed.

Preliminary Course Outline

Lecture	Topic	Lab (all assignments are due at the start of lab)
Week 1 19-23	introduction to course (Chs. 1, 2, 3, 4) review generalization (Ch. 1) map design/map organization (Ch. 12)	Illustrator Tutorial, begin ex 1: balance, layout, design
Week 2 26-30	map organization/visual hierarchy ex. typography (Ch. 13)	begin ex 2: typography <u>ex 1 due Wednesday</u>
Week 3 3-6	typography (cont.) <u>(no class Monday)</u> <u>critique ex 1 due, in-class critiques</u>	work on ex 2
Week 4 9-13	symbolization & color (Ch. 4 & Ch. 14)	<u>compilation worksheets ex 2 due for OK</u> work on ex 2
Week 5 16-20	TBD <u>critique ex 2 due, in-class critiques</u>	<u>ex 2 due</u> Watch Komposer Tutorials on YouTube
Week 6 23-27	web pages (Ch. 16)	begin ex 3: making a web page
Week 7 30-4	<u>exam 1 (no class Monday)</u> proportional symbols (Ch. 8)	begin ex 4: proportional symbol
Week 8 7-11	review exam 1 <u>critique ex 3 due, in-class critiques</u> choropleth maps (Ch. 6)	<u>ex 3 due</u> (basic webpage layout)
Week 9 14-18	in-class exercise, data classing (Ch. 6)	begin ex 5, choropleth maps
Week 10 21-25	isarithm maps (Ch. 9) <u>critique ex 4 due, in-class critiques</u>	<u>ex 4 due</u> ; work on ex 5
Week 11 28 - 1	No class - At CaGIS/ASPRS conf.	work on ex 5
Week 12 4-8	dynamic maps/animation (Ch. 11) dot maps (Ch. 7) talk about ex 7	<u>ex 5 due</u> ; begin ex 6: isarithms work on ex 6
Week 13 11-15	<u>critique ex 5 due</u> cartograms (Ch. 10)	work on ex 6 <u>ideas for ex 7 due</u>
Week 14 18-22	<u>critique ex 6 due</u> digital data maps vs. GISs	<u>ex 6 due</u> , work on ex 7
Week 15 25-29	odds and ends	
Week 16 2-6	course summary Exam 2 on Wednesday	<u>ex 7 due</u>

Other Potential Readings: (just in case the Dent/Torguson/Hodler book does not fulfill your hunger for knowledge)

Bugayevskiy, L.M. and Snyder, J.P. (1995) *Map Projections*. Bristol, PA: Taylor and Francis.

Campbell, J. (2001) *Map Use and Analysis (4th ed.)*, McGraw Hill.

Clarke, K. C. (1995) *Analytical and Computer Cartography (2nd ed.)*, Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Cromley, R. G. (1992) *Digital Cartography*, Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Keates, J. S. (1980) *Cartographic Design and Production*, New York, NY: Longman Group Limited.

MacEachren, A. (1995) *How Maps Work*. New York, NY: Guilford Press.

MacEachren, A. (1994) *Some Truth With Maps: A Primer on Symbolization and Design*, Washington, D.C.: Association of American Geographers.

Kimerling, J.A., Muehrcke, P. C. and Muehrcke, J. O. (1992) *Map Use: Reading, Analysis and Interpretation (5th ed.)*, Madison, Wisconsin: JP Publications.

Monmonier, M., 1993, *Mapping it Out: Expository Cartography for the Humanities and Social Sciences*, Chicago: The University of Chicago Press.

Monmonier, M. and Schnell, G.A. (1988), *Map Appreciation*, Englewood Cliffs, NJ: Prentice Hall.

Peterson, M., 1995, *Interactive and Animated Cartography*. Englewood Cliffs, NJ: Prentice Hall.

Robinson, A. H., R. D. Sale, J. L. Morrison, P. C. Muehrcke, A. J. Kimerling, and S. C. Guphill, 1995, *Elements of Cartography (6th ed.)*, New York, NY: John Wiley & Sons.

Slocum, T.A., McMaster, R.B., Kessler, F.C. and Howard, H.H. (2005) *Thematic Cartography and Geographic Visualization*. Englewood Cliffs, NJ: Prentice Hall

GEOG 514.011/ LAW-593-018
Fall 2014
Natural Resources Management Seminar
Wednesdays from 3:00-5:30 pm; TBD

Instructor: Melinda Harm Benson
Associate Professor, Department of Geography and Environmental Studies
Office Hours: T/H 1:30-2:30 p.m., W 1:00-3:00 and by appointment
Bandelier Hall West Room 223
Email: mhbenson@unm.edu

Readings: Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World. Stuart F. Chapin, Gary Kofinas, Carl Folke (Eds.) (Springer: 2009)

Knowledge and Environmental Policy Re-Imagining the Boundaries of Science and Politics. William Ascher, Toddi Steelman and Robert Healy (MIT Press: 2010)

Resilience Practice: Building Capacity to Absorb Disturbance and Maintain Function. Brian Walker and David Salt (Island Press 2012).

All other readings will be provided via an online platform.

Description: This course is a discussion-based seminar exploring the interdisciplinary nature of contemporary natural resource challenges. Topics covered will vary each semester but will focus on the intersection of law with other disciplines in the arena of natural resource management.

The year's course will focus on natural resource issues related to resilience theory and adaptive management. Adaptive management is quickly emerging as a growing trend in environmental governance because it recognizes that our understanding of natural systems is constantly evolving and reflects a willingness to test our assumptions about social-ecological systems in order to adapt and learn. This shifts the environmental governance paradigm by creating a new relationship between environmental science and social institutions—one that embraces uncertainty and possesses the necessary flexibility to incorporate that uncertainty into management actions involving both social and ecological systems.

Students will provide presentations based on their own research related to relevant case studies and will have the option of either (1) preparing a manuscript-length paper related to this research or (2) taking a “take-home” final exam as part of the course assessment. Field trips may be included to investigate local issues relevant to the class.

Objectives: This course contributes to the Geography Department's mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. Our goals for the M.S. degree program are as follows:

- A. Students will learn to conduct legitimate and original research on geographical topics.

- B. Students will develop an ability to communicate clearly and effectively.
- C. Students will prepare themselves for professional careers in Geography.

Student Learning Outcomes (SLOs) for this Degree Program related to those goals are:

- A.1. Students will be able to state an original research question appropriate for geographic analysis.
- A.2. Students will be able to state how a research project contributes to an existing body of geographic literature.
- A.3. Students will be able to design legitimate geographic methodology.
- A.4. Students will be able to implement legitimate geographic methodology.
- A.5. Students will be able to explain and assess the results of original geographic research.
- B.1. Students will be able to communicate clearly and effectively in a written format.
- B.2. Students will be able to communicate clearly and effectively in an oral format.
- C.1. Students will be able to enter professional positions or Ph.D. programs related to geography or environmental management.

Core concepts and themes in the program are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

Place and regions. A spatially literate student knows and understands: a. the physical and human characteristics of place; b. that people create regions to interpret earth's complexity; and c. how culture and experience influence people's perceptions of places and regions. Examples of concepts useful in understanding place and region include: regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems, and etc.

Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

Human Systems. A spatially literate student knows and understands: a. the characteristics, distribution, and migration of human populations on the earth's surface; b. the characteristics, distribution, and complexity of earth's cultural mosaics; c. the patterns networks and economic interdependence on the earth's surface; d. the processes patterns and functions of human settlement; and e. how the forces of cooperation and conflict among people influence the division and control of earth's surface. Examples of concepts useful in understanding human systems include: location, scale, spatial change and spread, spatial association, perception, and etc.

Spatial Representation. A spatially literate student knows and understands: a. how to use maps and other geographic representations, tools and technologies to acquire, process and report information from a spatial perspective; and b. how to use mental maps to organize information about people, places, and environments in a spatial context. Tools used include: GIS, remote sensing, GPS, and etc.

Geographic Analysis. A spatially literate student knows and understands: a. how to analyze the spatial organization of people, places, and environments on the earth’s surface; and b. how to apply geography to interpret the past and present, and to plan for the future. Methods used for spatial representation are a cornerstone of geographic analysis. In addition, broad concepts useful in analysis include: Location (distribution, density, pattern, clustering, and dispersion); Scale (distance, hierarchies, and changes in scale and interpretation); Spatial change and spread (diffusion and dispersion, spatial flows, and regional evolution); Perception; Place (regions, regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems); Spatial association/interaction (proximity and adjacency, distance decay, and geographic features as points, networks or regions, site, situation); and Spatial alignment, orientation, and direction.

Prerequisites: None; however, some familiarity in environmental/natural resource management needed.

Grading:	Attendance and Participation	25%
	Reading Reaction Papers	25%
	Project Presentation/Class Facilitation	25%
	Final Exam OR Case study Manuscript	25%

Grading will be on a straight scale:
A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%.

Course Organization and Assignments

Attendance and Participation

This course requires active participation from all class members. You will be expected to share your thoughts and ideas with the class. Good participation is a matter of both quality and quantity. More information on what constitutes “quality” participation will be provided in class. Attendance is required, and a student with more than two absences may be dropped from the course at the instructor’s discretion. Being late to class is the equivalent of ½ of an absence.

Reading Reflections

Please come to each class with your reactions to the week’s reading assignments. This is your opportunity to demonstrate that you have read and thought about the assigned text for the day. Unless you are given specific guidance for the week’s reaction paper, please organize your reaction with three sections (clearly label them with headings). 1) Summary: provide a two-three sentence summary for each of the readings—distilling the author’s thesis to its essence; (2) General reaction and application. Briefly share your general reaction to the readings. You might address such things as whether you liked the reading, and why or why not. What ideas stood out to you? What did it make you think about? Apply the reading material to the course’s main theme and/or other readings and discussions related to the course. This is your opportunity to demonstrate your ability to tie the concepts discussed in the reading to contemporary natural resource issues;

3) Discussion Leads. Finally, provide ***at least three questions*** that can facilitate our class discussion—critical points you want the class to engage and so forth. This way, everyone should have several items to help initiate discussion in class.

These weekly assignment will be approximately **one page, single spaced**. **You will need to bring a copy to class** in order to facilitate discussion.

Project Presentation/Class Facilitation

Students will be independently investigating an issue/case study relevant to the course and presenting those findings in class. More information on this assignment will be provided later in a separate handout.

Final Exam OR Case study Manuscript

Students will have the option of either taking a cumulative take-home exam at the end of the course OR writing up some aspect of their case study research. More information regarding these options will be provided in a separate handout.

A note about late assignments

To do well in this course, you must turn in your assignments on time. Late assignments will be penalized by reducing the maximum points achievable by twenty percent (20%) for each day the assignment is late. **Late Reading Reflection assignments will not be accepted.**

A note about field trips.

One or more field trips may take place during the semester. These are required, but alternative assignments will be provided for you if you are unable to attend.

Student Support

If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation to, the Information Accessibility Resource Center: <http://as2.unm.edu>; (505) 277-3506.

Student Code of Conduct

Students should exhibit respectful classroom values and behavior by:

- engaging in appropriate communication, interaction and preparedness;
- demonstrating trust, respect and civility;
- approaching course content as important and necessary;
- meeting all deadlines for assignments and team member obligations;
- turning off cell phones in class;
- avoiding unnecessary talking; and
- not reading outside material or doing other work during class.

Students should contribute to a positive learning environment by:

- arriving, attending and departing class in a respectful manner;
- taking responsibility for team and individual assignments; and
- developing cooperative relationships with other students and faculty.

Students should support a professional learning environment by:

- avoiding inappropriate language;
- refraining from unrealistic expectations in dealing with administration, faculty and staff;
and
- communicating with the instructor if changes could be made to improve the learning environment.

Students must uphold the academic integrity standards of the University of New Mexico.

Academic integrity is conceptualized as doing and taking responsibility for one's own work. This includes individual assignments and, for group assignments, the assumption of responsibility for work that is turned in as the "work product" of a team. Each team member is equally responsible for the work presented as the output of that team's effort. For more information on UNM's standards for academic integrity, see the policy on academic dishonesty at <http://www.unm.edu/~sac/policies.html#academicdishonesty>.

Tentative Course Schedule as of September 12, 2013

Subject to change at instructor's discretion. ALWAYS check the lecture from the previous class regarding class assignments.

Date:	Topic:	Readings:	Descriptions, deadlines, etc.
August 20	Introduction to resilience thinking; complexity theory and challenges facing social-ecological systems	Walker and Salt (2012) pp 1-25; Supp. Benson and Craig (2014)	Welcome and introductions; discuss case study requirement; introduction to conceptual framework for resilience; facing the challenge: the end of sustainability
August 27	Introduction to resilience thinking, part 2	Finish Walker and Salt (2012)	Resilience theory 101
September 3	Integrating resilience into governance	Folke (2005); Chapin, et al., pp. 77-102; Supp. Benson and Garmestani (2011)	Adaptive governance and institutional challenges and resilience theory; case study topic discussion
September 10	Introduction to adaptive management	Williams, et al. (2009); Williams and Brown (2014)	Overview of adaptive management as vehicle for resilience theory, the U.S. Department of Interior's approach; case study selections
September 17	Adaptive management and its implementation	Nie and Courtney (2011); Stern et al. (2011); Macdonald and Styles (2014)	How does adaptive management interface with current management approaches?
September 24	Policy and Epistemology	Ascher, et al. (2010)	The role of knowledge in environmental governance
October 1	Resilience Practice	Resilience Alliance Workbook; + selected basin assessments from Adaptive Water Governance Workgroup	Assessing resilience—conducting case studies in resilience thinking and adaptive management; case study updates
October 8	Resilience case study: New Mexico's Middle Rio Grande	Benson et al. (in press); Runge (2011); skim AM plan for ESA Collaborative Program	Introduction to Middle Rio Grande; guest speakers-- Dagmar Llewellyn, U.S. Bureau of Reclamation, Mark Stone and Ryan Morrison, UNM College of Engineering
October 15	Resilience and its	Davidson (2010);	Resilience and its critics; can this ecological concept

	critics	MacKinnon and Derickson (2012); Brown (2013); Nadasdy (2007)	be applied to social systems?
October 22	Case study: Forest Systems	Chapin, et al pp. 149-170; TBD	TBD
October 29	Case study: Drylands	Chapin, et al pp. 171-196; TBD	TBD
November 5	Case study: Freshwater systems	Chapin, et al pp. 197-220; TBD	TBD
November 12	Case Study: Oceans and Estuaries	Chapin, et al pp. 221-258; TBD	TBD
November 19	Case study: Food Production and Resilience	Chapin, et al., pp. 259-280; TBD	TBD
November 26	Case study: Resilient Cities	Chapin, et al., pp. 281-294; TBD	TBD
December 3	N.A.	N.A.	Course wrap; evaluations, etc.; Take home exam OR case study manuscript due.

Geog 515: Cultural and Political Ecology

Instructor: Chris Duvall

Office: 220 Bandelier West

Mail box: 111 Bandelier West

Classroom: 104 Bandelier West

Office hours: M & T 1:00-2:30 p.m., or by appointment

Class meetings: W, 5:30–8:30 p.m.

E-mail: duvall@unm.edu

Spring 2014

Course description:

This course examines the theoretical approaches of cultural and political ecology, focusing spatially on the Atlantic World. The theoretical focus on cultural and political ecology gives training in an important field in geography, and provides a means of linking the diverse disciplinary perspectives adopted in the course. The Atlantic World is an instructive zone for learning how social and cultural processes can influence human–environment interactions, because environmental transformations in this broad region have been produced through processes such as cultural diffusion, economic development, labor control, and racism.

You will be able to conduct research on topics of your choice to complete the assignments for this course, as long as the theoretical approach in your research is rooted in cultural and political ecology.

This is a graduate-level course, and the course activities and assignments are designed to improve your skills in academic research, writing, and presentation. You are expected to complete significant independent research and writing for this course.

Learning objectives for Geog 515:

- If you successfully complete this course, you will able to:
- 1) Explain the approaches of cultural ecology and political ecology in the analysis of human-environment interactions.
 - 2) Summarize the geographic processes that have affected African-descent (and other minority) populations in the Americas, including the environments these peoples have experienced.
 - 3) Develop cultural-ecological and political-ecological arguments to explain human-environment interactions.
 - 4) Conduct independent research on human-environment interaction, and communicate research findings in written and graphic formats.
 - 5) Communicate academic arguments and research findings in oral formats.

Required books:

You are expected to bring required readings to class every time we meet. We will use the following books in approximately the order listed below. In addition to these books, we will use a few additional readings that I will provide as PDFs.

- Robbins (2012) *Political Ecology*. 2nd edition. Blackwell.
- Carney & Rosomoff (2009) *In the Shadow of Slavery: Africa’s Botanical Legacy in the Atlantic World*. University of California Press.
- Telles (2004) *Race in Another America: The Significance of Skin Color in Brazil*. Princeton University Press.
- Vale (1982) *Plants and People*. Association of American Geographers.

Assignments and grading:

All students are REQUIRED to complete the following assignments:

Scored item	Percent of total	Points
Attendance (percent of actual meetings attended)	10%	100
Participation (bringing reading materials to class, and discussing them)	10%	100
Weekly assignments (reading/writing work to prepare before or during class)	22.5%	225
Topical and theoretical bibliography (first step of research paper)	10%	100
Argumentative essay (first complete draft of research paper)	22.5%	225
Research slides (to present research paper briefly in class)	5%	50
Argumentative essay (final, revised draft of research paper)	20%	200
SEMESTER TOTAL	100%	1000

Final grades will be assigned based on the following scale:

A+	≥97% of total possible points		
A	≥93% of total possible points	C	70-77% of total possible points
B+	88-93% of total possible points	D+	65-70% of total possible points
B	81-88% of total possible points	D	60-65% of total possible points
C+	77-81% of total possible points	F	<60% of total possible points

I may adjust these score ranges downward if necessary.

Due dates and deadlines:

Exams, assignments, and other activities are due as indicated in the course calendar (below). Extensions to assignment due dates or alternate dates for exams or other activities will be granted only if a student can provide proof that an unforeseen, unpreventable situation has prevented him/her from completing and/or turning in an assignment, exam, or other activity on the scheduled due date. Any request for an extension to an assignment due date or an alternate date for an exam or other activity must be made more than 24 hours before the beginning of class on the due date for which an extension is sought, unless there is a verifiable emergency that occurs during this 24-hour period.

The major assignment for this course is a research paper. I split this assignment into three separate parts: a research bibliography, a first complete draft of the research paper, and the final draft of the research paper. Students who fail to turn in any of these three parts will receive no credit for any part submitted. I may accept late assignments depending upon individual circumstances. However, in the case of the first complete draft of the research paper, I will not score any assignments received more than one week past the due date indicated on the course calendar. The purpose of requiring a first draft and a final draft is to require revision, which is a strong way to improve writing skills. If a student submits a first draft more than one week late, I will provide feedback on the draft in order to enable revision, and award 70% of the points possible for the assignment.

Any complaints about a score or requests for reevaluation of any assignment, exam, or other activity must be made less than one week after the score in question has been made available. Any such complaint or request must be made in writing, and provide an explanation why the score in question is incorrect or inaccurate. Scores will be made available only to each student him/herself, during regularly scheduled class meetings or another pre-planned meeting time. If a student who eventually wishes to raise a complaint about or request a reevaluation of an assignment, exam, or other activity misses class when the score in question is made available, no extension of time to complain about the score or request a reevaluation will be granted, unless the student: a) misses class due to a verifiable emergency that occurs less than 24 hours before the beginning of class, or b) can show that the score in question is truly erroneous. If one of these conditions is met, the student will have one week from receipt of a score to complain about the score or request a reevaluation. No scores will be made available by telephone or e-mail; scores will be provided only in person and only to a student him/herself.

Communication policies and practices:

Communication is a key to success in this, and other, courses. For this course, there are several guidelines for communication all of us must follow.

First, no comments will be tolerated that are offensive, derogatory, or disparaging to any identifiable group of people. If you have any questions about appropriate ways to express yourself when discussing course material (or other topics), please ask me for guidance.

Second, *let me know as soon as possible* when you have a question about course requirements, or if there is something that is hindering your performance in class. I want you to succeed in this course (and in your others too), and it is easiest for me to help if we have some time to find a solution. *Last-minute questions/requests/comments often arrive too late for me to offer help, so please plan ahead.*

Third, I prefer to communicate in person—we can cover a lot more in a two-minute conversation than in a series of e-mails. Ask questions during, before, or after class, or come see me during my office hours. If these times don’t work for you, contact me by e-mail to schedule a different time to meet.

When communicating by e-mail, there are two things you must remember. First, I will respond only to messages sent from ‘unm.edu’ e-mail addresses, except in the case of emergencies. Many messages sent to me via gmail.com, yahoo.com, hotmail.com, and other web-based e-mail services are sent to the trash by my spam filter.

To eliminate the possibility that any of your messages are filtered out, you must use your unnm.edu e-mail account. Second, I expect that all messages to me use a professional writing style, which means:

- Every message has a subject line (e.g. “Geog 515”, “Question on class”, “Absent next week”)
- Every message has a greeting (e.g. “Hey Chris:”, “Dear Professor:”, “Hi Dr. Duvall:”)
- Every message is signed (e.g. “See you in class, Tammy”, “Cheers, Billy”, “Sincerely, Pat”)
- Every message uses proper spelling and punctuation (e.g. “you”, NOT “u”; “for”, NOT “4”; etc.)
- Every message has a professional, respectful tone

These expectations are not firm rules but I expect you to put some effort into practicing to communicate in the way you will be required in most jobs you will have after graduation.

- Finally, please follow these suggestions when communicating with me:
- If you have a **question during class**, please raise your hand and ask me during class, or approach me immediately afterwards. If you have a question, other students probably share it, so your asking will help others in the class too.
 - If you have a **question/comment about course content**, assignments, exams, readings, or other course material, please either talk to me in person, or send me an e-mail message. I will respond to you directly and might also give my response to the entire class—without identifying you in any way—because other students probably have similar questions/comments.
 - If you have a **schedule conflict** that means you will miss an assignment due date, exam, or other activity, please *PLAN AHEAD and tell me as soon as possible*. I will work with you to resolve the conflict.
 - If you have an **emergency** that affects your performance in this course, please let me know as soon as possible. I will work with you to resolve the situation. *Emergencies are rare and I trust that people tell me they have an emergency only when this is true.*

Academic integrity:

UNM has strict and explicit regulations governing academic integrity, which are posted on the Internet in the *University Catalog* (<http://www.unm.edu/%7Eunmreg/catalog.htm>). **Cheating by presenting someone else’s work as your own is not tolerable in this course or anywhere at UNM.** For more information on the importance of academic integrity at UNM, see the *UNM Faculty Handbook* (<http://www.unm.edu/~handbook/D100.html>), the UNM Dean of Students web site (<http://www.unm.edu/~dosojacademichonesty.html>), and the *UNM Pathfinder* section on student conduct (<http://pathfinder.unm.edu/policies.htm#studentcode>). If you are uncertain what is meant by “academic integrity”, including “plagiarism”, please consult the UNM Department of English information sheet (http://www.unm.edu/~english/Resources/pdf/Academic_Integrity_students.pdf), or the list of Internet resources provided by the UNM-Valencia Teaching & Learning Center (http://www.unm.edu/~tlc/contents/web_resources/integrity.html).

Please take the time to read and understand UNM’s policies governing academic integrity. *I strictly enforce these policies when grading student work.* **In this course, a student will receive zero points for any exam, assignment, or activity in which any portion violates UNM’s regulations governing academic integrity, regardless of when I discover the violation.** Additionally, a student who violates these regulations may receive a failing grade for the course, and be reported to his/her academic dean, which may lead to expulsion.

COURSE CALENDAR

Date	Meeting topics:	Do these readings <i>before</i> class, and bring copies of the readings <i>to</i> class:
Jan. 22	<ul style="list-style-type: none">• Course introduction• Topical vs. theoretical	
Jan. 29	<ul style="list-style-type: none">• Cultural ecology	<ul style="list-style-type: none">• Grossman, L. (1977) Man-environment relationships in anthropology and geography. <i>Annals of the Association of American Geographers</i> 67: 126-144.• Denevan, W. M. (1983) Adaptation, variation, and cultural geography. <i>Professional Geographer</i> 35: 399-407.

Date	Meeting topics:	Do these readings <i>before</i> class, and bring copies of the readings <i>to</i> class:
Feb. 5	<ul style="list-style-type: none"> Cultural ecology? 	<ul style="list-style-type: none"> Vale, <i>Plants and people</i>
Feb. 12	<ul style="list-style-type: none"> Cultural ecology? 	<ul style="list-style-type: none"> Grossman, L. (1981) The cultural ecology of economic development. <i>Annals of the Association of American Geographers</i> 71: 220-236. Denevan, W. M. (1992) The pristine myth: the landscape of the Americas in 1492. <i>Annals of the Association of American Geographers</i> 82: 369-385. Brookfield, H. C. & C. Padoch (1994) Appreciating agrodiversity: a look at the dynamism and diversity of indigenous farming practices. <i>Environment</i>, 36: 7-11, 37-45.
Feb. 19	<ul style="list-style-type: none"> Political ecology 	<ul style="list-style-type: none"> Robbins, <i>Political Ecology</i>
Feb. 26	<ul style="list-style-type: none"> Political ecology 	<ul style="list-style-type: none"> Robbins, <i>Political Ecology</i>
Mar. 5	<ul style="list-style-type: none"> History, science, and knowledge Bibliography due 	<ul style="list-style-type: none"> Davis, M. (2004) The political ecology of famine: The origins of the Third World. In <i>Liberation ecologies: Environment, development, social movements</i> (2nd ed.), eds. R. Peet & M. Watts: 48-63. London: Routledge. Fairhead, J. & M. Leach. (1996) Rethinking the forest-savanna mosaic: colonial science and its relics in West Africa. In <i>The lie of the land: challenging received wisdom on the African environment</i>, eds. M. Leach & R. Mearns: 105-121. Oxford, UK: James Currey. Schiebinger, L. (2005) Agnotology and exotic abortifacients: The cultural production of ignorance in the eighteenth-century Atlantic World. <i>Proceedings of the American Philosophical Society</i> 149: 316-343.
Mar. 12	<ul style="list-style-type: none"> Subsistence and subalterity 	<ul style="list-style-type: none"> Carney & Rosomoff, <i>In the Shadow of Slavery</i>
Mar. 19		NO CLASS — — Spring Break!
Mar. 26	<ul style="list-style-type: none"> Race 	<ul style="list-style-type: none"> Telles, <i>Race in another America</i>
Apr. 2	<ul style="list-style-type: none"> Identity/ Identification First draft of essay due via e-mail 	<ul style="list-style-type: none"> Hames, R. (2007) The ecologically noble savage debate. <i>Annual Review of Anthropology</i> 36: 177–90. Farfán-Santos, E. (2009) <i>Quilombolismo</i>: Fighting and dying for rights. <i>TransScript</i> 1: 131-153.
Apr. 9	<ul style="list-style-type: none"> Labor 	<ul style="list-style-type: none"> Fenoaltea, S. (1984) Slavery and supervision in comparative perspective: A model. <i>Journal of Economic History</i> 44: 635-668. Scott, J.C. (1989) Everyday forms of resistance. In <i>Everyday forms of peasant resistance</i>, ed. F.D. Colburn: 3-33. Armonk, NY: M.E. Sharpe. González, M.J. (1995) Resistance among Asian plantation workers in Peru 1870-1920. In <i>From chattel slaves to wage slaves: The dynamics of labour bargaining in the Americas</i>, ed. M. Turner: 201-223. London: James Currey.
Apr. 16	<ul style="list-style-type: none"> Plants 	<ul style="list-style-type: none"> Robbins, P. and J. Sharp (2003) Producing and consuming chemicals: The moral economy of the American lawn. <i>Economic Geography</i> 79(4): 425-451. Maranz, S. (2009) Tree mortality in the African Sahel indicates an anthropogenic ecosystem displaced by climate change. <i>Journal of Biogeography</i>, 36, 1181-1193. Head, L. and J. Atchison (2009) Cultural ecology: emerging human-plant geographies. <i>Progress in Human Geography</i> 33(2): 236-245.

Date	Meeting topics:	Do these readings <i>before</i> class, and bring copies of the readings <i>to</i> class:
Apr. 23	<ul style="list-style-type: none">• Drugs	<ul style="list-style-type: none">• Kepe, T. (2003) Cannabis sativa and rural livelihoods in South Africa: Politics of cultivation, trade and value in Pondoland. <i>Development Southern Africa</i> 20: 605-615.• Steinberg, M.J. and K. Mathewson (2008) Landscapes of drugs and war: Intersections of drugs and conflict. In <i>The geography of war and peace</i>, ed. C. Flint: 242-258. Oxford, UK: Oxford University Press.• Campos, I. (2010) Degeneration and the origins of Mexico's War on Drugs. <i>Mexican Studies/Estudios Mexicanos</i> 26(2): 379-408.
Apr. 30	<ul style="list-style-type: none">• Food	<ul style="list-style-type: none">• Guthman, J. (2011) Excess production or over-production?: US farm policy, global warming, and the bizarre attribution of obesity. In <i>Global political ecology</i>, ed. R. Peet, P. Robbins, and M.J. Watts: 51-67. Oxford, UK: Oxford University Press.• Guthman, J. (2012) Opening up the black box of the body in geographical obesity research: Toward a critical political ecology of fat. <i>Annals of the Association of American Geographers</i>, 102: 951-957.• Boyd, M. (2001) Making meat: Science, technology, and American poultry production. <i>Technology and Culture</i> 42: 631-664.• Sano, Y., et al. (2011) Understanding food insecurity among Latino immigrant families in rural America. <i>Journal of Family and Economic Issues</i>, 32, 111-123.
May 7	<ul style="list-style-type: none">• Research presentations• Presentation slides due in class today	COURSE EVALUATIONS IN CLASS

Ideally, you will turn in the complete, final draft of your argumentative essay in class on May 5.

If not, the final draft is due by e-mail or in my mailbox/office **no later than 9:45 p.m. on Wednesday, May 14.**

Seminar: Globalization

Geography 516

Fall 2012

INSTRUCTOR:

John Carr – carrj@unm.edu

Office: Bandalier West Room 201

Office Hours:

Tuesdays 12:15-1:15

Thursdays 10:00-11:00

CLASS MEETINGS:

Tuesday 3:15-5:45

Bandalier West 104

COURSE DESCRIPTION:

While state, cultural, and economic projects have always been largely intertwined, mutually constitutive, and fundamentally inseparable, the current age has heralded an intensification of economic, social, and political flows across the globe, all often lumped under the rubric of “globalization.” While this term encompasses a broad, complex, and often contradictory set of dynamics, two major schools of critique have attempted to address the ways these contemporary dynamics impose hardship, injustice, and violence upon people around the world. The first of these seeks to expose the abuses and contradictions posed by the adoption of neoliberal political and economic policies by “core” countries (i.e. the U.S., France, U.K., Germany) and many transnational organizations. The second of these critiques is concerned with the ways that past colonial relationships between these same “core” nations and the global South are currently impacting former colonies.

This class seeks to explore the ways that the dynamics of neoliberalism and post-colonialism have developed, and their relations to discourses and practices of globalization. This will require several steps. While there is much that is new in the dynamics that have been lumped together under the globalization label, there is also much that is old, much of it traceable to the enlightenment, and subsequent articulations of liberalism. Thus, we will start by exploring classical economic and political liberalism, discussing how it impacted the colonial project, early forms of “globalized” post-enlightenment economics, and the cultural discourses underlying these projects. We will then move to contemporary works that both reproduce and seek to analyze the discourse of “globalization,” before turning to authors who focus more specifically on the roles of neoliberalism and post-colonialism in a globalized world.

STUDENT LEARNING OUTCOMES

- A.1. Students will be able to explain and assess the results of original research from a variety of social science fields, especially geography.
- A.2. Students will develop an understanding for contemporary theories and critiques of globalization, neoliberalism, and post-colonialism

- B.1. Students will be able to communicate clearly and effectively in a written format.
- C. 1. Students will be able to enter professional positions or Ph.D. programs related to geography and/or the study of economic, political, and/or cultural dimensions of globalization.

TEXTS: There are two sets of required texts: those you must purchase (at the campus bookstore, through amazon.com or abebooks.com, etc.) and those for the third class period which will be made available to you on-line via WebCT and the UNM library electronic reserve system.

The password for e-reserves for this class is: lobo516

The books to purchase are as follows:

- Edward Said, *Orientalism*. Vintage; 1st Vintage Books Ed edition. **ISBN-13: 978-0394740676**
- Uday Singh Mehta, *Liberalism and Empire : A Study in Nineteenth-Century British Liberal Thought*. University Of Chicago Press. **ISBN-13: 978-0226518824**
- Mona Domosh, *American Commodities in an Age of Empire*. Routledge. **ISBN-13: 978-0415945721**
- Thomas Friedman, *The World is Flat 3.0: A Brief History of the Twenty-first Century* . Picador. **ISBN-13: 978-0312425074**
- David Harvey – *A Brief History of Neoliberalism.*: Oxford University Press, USA. **ISBN-13: 978-0199283279**
- Saskia Sassen, *Territory, Authority, Rights*. Princeton University Press. **ISBN-13: 978-0-691-09538-736**
- Aihwa Ong, *Neoliberalism as Exception: Mutations in Citizenship and Sovereignty*. Duke University Press. **ISBN-13: 978-0822337485**
- Stephen Flusty, *De-Coca-Colonization: Making the Globe from the Inside Out*. Routledge. **ISBN-13: 978-0415945387**
- Frantz Fanon, *The Wretched of the Earth*. Grove Press. **ISBN-13: 978-0802141323**
- Carla Freeman, *High Tech and High Heels In the Global Economy: Women, work and pink-collar identities in the Caribbean*. Duke University Press. **ISBN-13: 978-0822324393**
- James Ferguson, *Global Shadows: Africa in the Neoliberal World Order*. Duke University Press. **ISBN-13: 978-0822337171**.
- Mike Davis, *Planet of Slums*. Verso. **ISBN- 13: 978-1844670222**
- Derek Gregory, *The Colonial Present: Afghanistan, Palestine, Iraq*. Wiley-Blackwell. **ISBN-13: 978-1577180906**.
- Ananya Roy, *Poverty Capital: Microfinance and the Making of Development*. Routledge. **ISBN- 13: 978-0415876735**

EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

- 1) **Class Participation:** Because much of the learning in this course comes from thoughtful discussion, listening, and interacting around the topics of the course, you are expected to attend and to participate during each class meeting. If you are

not here to be a participant along with your classmates, everyone loses. Both your attendance and the quality of your participation will be considered in determining final grades. *PLEASE NOTE: YOUR PARTICIPATION EACH WEEK IS CONTINGENT UPON YOUR COMPLIANCE WITH THE FOLLOWING REQUIREMENTS:*

- a. **Timely completion of the following weekly analysis assignments.** If you have not submitted a timely analysis, I will ask you to leave the class in which the covered readings are discussed. As mentioned below, you may opt out of this requirement once during the semester.
 - b. **Respectful dialog.** This is a non-negotiable requirement of this class. Practices to ensure this include: listening closely and respectfully; refraining from ridicule or interruption; retaining modesty and humility. I particularly stress the “golden rule”; if you introduce an author or a concept not otherwise covered in class, this is an opportunity for you to introduce helpful supplementary substance. In other words, contribute expansively in the learning experience, avoiding name- or concept-dropping. There is much to explore in the course and many arguments to be heard, so let’s work to create an environment where explorations are encouraged and enjoyable.
- 2) **Weekly Analyses:** Every week each student will compose and transmit a reaction to each week’s reading and post it to the entire class via WebCT by **9:00 AM on Monday**. This reaction can take many forms: a critical reaction to one or more of the readings; a set of questions to be explored in class; the isolation of a line of tension between different readings; a proposed set of connections to other readings. Other possibilities exist, and deserve to be explored, but the principal goals of the reaction are two: to develop a critical response to the readings, and to contribute to building a constructive class discussion. You may opt out of one of these papers over the course of the semester and still be allowed to attend the relevant discussion.
- 3) **Final Paper:** You must write a final paper 20-25 pages long (typed, double-spaced, normal margins, twelve-point font), not including title page and/or bibliography. I expect this paper to engage with a substantial portion of the course readings and concepts from our in-class discussions. The “big idea” is to use the resources available from this class – including the literature, in class discussions, and my knowledge and feedback – to help frame, or otherwise address a problem or project. And this is why I REQUIRE you to engage with a substantial portion of the literature from this class (even if it is not the only, or even the majority of the literature you address), so that you have the opportunity to draw on those tools to the fullest. Thus, the page limits act primarily as a guideline. Ultimately what is most important is substantially engaging with broader explanatory concepts from class. That said, I hope your work in this class will help you in your existing course of study and research. Thus the final paper is open to a wide array of topics and projects. To ensure that you are able to use this opportunity to the fullest, you are required to meet with me during my office hours to discuss your final paper topic at some point prior to the last week of

classes. The final paper is due in my department mailbox by 12:00PM on Wednesday, December 19th.

GRADING:

Your paper, exams, attendance and participation will be given the following weights in the calculation of final grades:

Participation & Weekly Analyses:	50% of final grade
Final Paper:	50% of final grade
<hr/>	
TOTAL:	100%

Class Schedule

1 - August 21 Introduction
READING: No reading assignment

UNIT 1: LIBERALISM, CULTURE, AND COLONIZATION

2 – August 28 Cultural Frameworks for the Colonial Project
READING: - Edward Said, *Orientalism*

3 – September 4 Classical Liberalism
READING: - John Locke, Second Treatise of Government (Selections)
 - J.S. Mill, “On Liberty” (selections)
 - Adam Smith, *The Wealth of Nations* (selections)
 - C.B. MacPherson, “The Political Theory of Possessive Individualism” (Selections)

4 – September 11 Liberalism and Colonialism
READING: - Uday Singh Mehta, *Liberalism and Empire*

5 – September 18 American Empire and Economic Policy
READING: - Mona Domosh, *American Commodities in an Age of Empire*

UNIT 2: DISCOURSES OF GLOBALIZATION AND NEOLIBERAL THOUGHT/PRACTICE

6 – September 25 The Case for Globalization
READING: -Thomas Friedman, *The World is Flat* pp. 3-437, 533-604

7 – October 2 What Is Neo in Neoliberalism?
READING: - David Harvey – *A Brief History of Neoliberalism*

- 8 – October 9 Complicating Neoliberalism I
 READING: - Stephen Flusty, *De-Coca-Colonization*
- 9 – October 16 Complicating Neoliberalism II
 READING: - Aihwa Ong, *Neoliberalism as Exception: Mutations in Citizenship and Sovereignty*
- 10 – October 23 Reevaluating Neoliberalism and Globalization
 READING: - Saskia Sassen, *Territory-Authority-Rights*

UNIT 3: POSTCOLONIALISM

- 11 – October 30 The Roots of PostColonialism
 READING: Frantz Fanon, *The Wretched of the Earth*
- 12 – November 6 Globalization, Post-Colonialism and Gender
 READING: Carla Freeman, *High Tech in High Heels*
- 13 – November 13 Globalization, Post-Colonialism and the “Problem” of Africa
 READING: James Ferguson, *Global Shadows: Africa in the Neoliberal World Order*
- 14 – November 20 The Post-Colonial City, Mega-Slum as Neoliberal Urban Form
 READING: Mike Davis: *Planet of Slums*
- 15 – November 27 Post-Colonialism and the American Adventure in the Middle-East
 READING: - Derek Gregory, *The Colonial Present*
- 16 – December 4 Post-Colonialism, Development, and Microfinance – What Lies Beyond Neoliberalism?
 READING: - Ananya Roy, *Poverty Capital*

POLICIES:

Ethics and Academic Dishonesty:

The course emphasizes ethical practices and perspectives. Above all, students and instructors should strive to communicate and act, both in class interactions and in assigned coursework, in a manner directed by personal integrity, honesty, and respect for self and others. Included in this focus is the need for academic honesty by students as stated by the UNM Pathfinder. Students need to do original work and properly cite sources.

Accordingly, I consider Academic Dishonesty, including plagiarism to be unacceptable. The University’s official definition of Academic Dishonesty may be found at:

<http://pathfinder.unm.edu/>

This is a graduate course for students who have developed a strong set of intellectual and work skills, and who are familiar with university policy on academic dishonesty. One of the non-negotiable requirements for passing this course is turning in your own, original, non-plagiarized work for all assignments submitted and properly citing sources. If you plagiarize, you will fail this class. Additionally, plagiarism and/or other forms of academic misconduct may lead to the system of institutional penalties outlined at the above website

Late Work: Late work will not be accepted. Turn in your work in a timely manner by deadline. In addition, you will not have a chance to rewrite your work after it has been turned in. However, you are encouraged to meet with the professor in advance to discuss and ask questions about your assignments in progress.

Email responsibility: Check your UNM email account regularly, as we will use this account to keep in touch with you about course requirements or updates. If you use another email address, please set up your UNM account to forward your UNM account email to that address.

Technology: Regularly check your UNM email account as we will use this account regularly for the course. If you use another email address, please forward your UNM email to that address. Of course, turn off cell phones and do not internet surf in class.

ADA Accessibility: Qualified students with disabilities needing appropriate academic adjustments should contact me as soon as possible to ensure your needs are met in a timely manner. Handouts are available in alternative accessible formats upon request.

Diversity: This course encourages different perspectives related to such factors as gender, race, nationality, ethnicity, sexual orientation, religion, and other relevant cultural identities. This course seeks to foster understanding and inclusiveness related to such diverse perspectives and ways of communicating.

Office Hours: Office hour times and locations are subject to change. If you intend to visit me during an office hour I STRONGLY recommend that you inform me in advance to confirm time and place.

Grades: All grades assigned are final and non-negotiable. No incompletes for the semester will be given unless you can demonstrate valid and compelling reasons for your inability to complete the work. No extra-credit or make-up assignments will be offered.

Law and Geography

Geography 517

Spring 2014

INSTRUCTOR:

John Carr – carrj@unm.edu

Office: Bandalier West Room 201

Office Hours:

Monday 1:00-3:00

CLASS MEETINGS:

Thursday 6:00-8:30

Bandalier West 104

Description:

Much of the law is either implicitly or explicitly spatial – including concepts of property, jurisdiction, zoning, trespass, the regulation of public parks and sidewalks, and natural resources and environmental regulations. Law is constructed in a formal language, but it is practiced daily in ways that affect how landscapes are constructed and experienced. In some fashion, law has helped build every landscape that you and I observe and inhabit. Similarly, landscapes shape how law is understood and enacted; law works differently in different places. Notwithstanding the essential spatiality of the law and the enduring impact of law on human activity in space, an emerging body of literature is only now beginning to examine the ways that law impacts our understandings of, and experiences with space, and vice versa.

This class seeks to provide an overview of both the legal system and the mechanisms and doctrines through which law is spatially manifested, as well as the growing literature addressing the links between law and geography. This will require several steps. The class will examine the dominant philosophical approaches to understanding the project of law, including critical legal studies. The remainder of the course will then focus on a succession of topics and case study investigations into how different approaches to understanding the law can drive differing interpretations of the interconnections between law and geography.

Objectives:

This course contributes to the Geography Department's mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. Our goals for the M.S. degree program are as follows:

- A. Students will learn to conduct legitimate and original research on geographical topics.
- B. Students will develop an ability to communicate clearly and effectively.
- C. Students will prepare themselves for professional careers in Geography.

Student Learning Outcomes (SLOs) for this Degree Program related to those goals are:

- A.1. Students will be able to state an original research question appropriate for geographic analysis.
- A.2. Students will be able to state how a research project contributes to an existing body of geographic literature.
- A.3. Students will be able to design legitimate geographic methodology.
- A.4. Students will be able to implement legitimate geographic methodology.
- A.5. Students will be able to explain and assess the results of original geographic research.
- B.1. Students will be able to communicate clearly and effectively in a written format.
- B.2. Students will be able to communicate clearly and effectively in an oral format.
- C.1. Students will be able to enter professional positions or Ph.D. programs related to geography or environmental management.

Core concepts and themes

in the program are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

Place and regions. A spatially literate student knows and understands: a. the physical and human characteristics of place; b. that people create regions to interpret earth's complexity; and c. how culture and experience influence people's perceptions of places and regions. Examples of concepts useful in understanding place and region include: regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems, and etc.

Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

Human Systems. A spatially literate student knows and understands: a. the characteristics, distribution, and migration of human populations on the earth's surface; b. the characteristics, distribution, and complexity of earth's cultural mosaics; c. the patterns networks and economic interdependence on the earth's surface; d. the processes patterns and functions of human settlement; and e. how the forces of cooperation and conflict among people influence the division and control of earth's surface. Examples of concepts useful in understanding human systems include: location, scale, spatial change and spread, spatial association, perception, and etc.

Spatial Representation. A spatially literate student knows and understands: a. how to use maps and other geographic representations, tools and technologies to acquire, process and report information from a spatial perspective; and b. how to use mental maps to organize information about people, places, and environments in a spatial context. Tools used include: GIS, remote sensing, GPS, and etc.

Geographic Analysis. A spatially literate student knows and understands: a. how to analyze the spatial organization of people, places, and environments on the earth's surface; and b. how to apply geography to interpret the past and present, and to plan for the future. Methods used for spatial representation are a cornerstone of geographic analysis. In addition, broad concepts useful

in analysis include: Location (distribution, density, pattern, clustering, and dispersion); Scale (distance, hierarchies, and changes in scale and interpretation); Spatial change and spread (diffusion and dispersion, spatial flows, and regional evolution); Perception; Place (regions, regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems); Spatial association/interaction (proximity and adjacency, distance decay, and geographic features as points, networks or regions, site, situation); and Spatial alignment, orientation, and direction.

In this course, students will achieve the following outcomes.

- Students will be able to explain and assess the results of original research from a variety of social science fields, especially legal geography.
- Students will develop an understanding for contemporary theories and critiques of the legal system.
- Students will learn how to employ investigative practices in legal geography (how to read a case, gain access to government documents, and situate legal events within various contexts, etc.).
- Students will be able to communicate clearly and effectively in a written format.
- Students will be able to enter professional positions or Ph.D. programs related to geography and/or the study of law.

Prerequisites: None

TEXTS: The following texts will be available at the UNM bookstore. All articles and book chapters will be available on-line through the Learn-UNM portal.

Books:

- Foucault, Michel (1977), *Discipline and Punish: The Birth of the Prison* Vintage
- Merry, Sally Engle (2000) *Colonizing Hawai'i: The Cultural Power of Law* Princeton
- Uday Singh Mehta (1999) *Liberalism and Empire: A Study in Nineteenth-Century British Liberal Thought* University of Chicago
- Nicole Graham (2011) *Landscape: Property, Environment, Law* Routledge
- Catherine Kellogg (2010) *Law's Trace: From Hegel to Derrida* Routledge
- Edward Mussawir (2011) *Jurisdiction and Deleuze* Routledge
- Steve Herbert (1996) *Policing Space: Territoriality and the Los Angeles Police Department* Univ Of Minnesota Press
- Katherine Beckett & Steve Herbert (2011) *Banished: The New Social Control in Urban America* Oxford University Press
- Braverman et. al. eds (2014) *The Expanding Spaces of Law: A Timely Legal Geography* Stanford Law Books
- David Delaney (2011) *The Spatial, the Legal and the Pragmatics of World-Making* *Nomospheric Investigations* Routledge

EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

- 1) **Class Participation:** Because much of the learning in this course comes from thoughtful discussion, listening, and interacting around the topics of the course, you are expected to attend and to participate during each class meeting. If you are not here to be a participant along with your classmates, everyone loses. Both your attendance and the quality of your participation will be considered in determining final grades. *PLEASE NOTE: YOUR PARTICIPATION EACH WEEK IS CONTINGENT UPON YOUR COMPLIANCE WITH THE FOLLOWING REQUIREMENTS:*
 - a. **Timely completion of the following weekly analysis assignments.** If you have not submitted a timely analysis, I will ask you to leave the class in which the covered readings are discussed. As mentioned below, you may opt out of this requirement once during the semester.
 - b. **Respectful dialog.** This is a non-negotiable requirement of this class. Practices to ensure this include: listening closely and respectfully; refraining from ridicule or interruption; retaining modesty and humility. I particularly stress the “golden rule”; if you introduce an author or a concept not otherwise covered in class, this is an opportunity for you to introduce helpful supplementary substance. In other words, contribute expansively in the learning experience, avoiding name- or concept-dropping. There is much to explore in the course and many arguments to be heard, so let’s work to create an environment where explorations are encouraged and enjoyable.
- 2) **Weekly Analyses:** Every week each student will compose and transmit a reaction to each week’s readings and post it to the entire class via the “Discussion Boards” tab (Under “Course Tools) in Learn UNM by **9:00 AM on Thursday**. This reaction serves the purposes of: helping you to keep up with the weekly reading assignments, forcing you to summarize each article succinctly: giving quieter students ‘voice’ and – most importantly – prodding you to come to terms with what you have read. Feel free to discuss whatever you wish in them, but you should go beyond mere summarization. You should try to draw out larger themes of consensus and debate, and work towards seeing the relevance of what you are reading to your own interests and career. Your reflections should be around 2 pages. You may opt out of one of these papers over the course of the semester and still be allowed to attend the relevant discussion.
- 3) **Final paper:** Students will be conducting an investigation into a “legal geography” of interest to them that they will share with the class. More will be provided in a separate handout.

GRADING:

Your paper, exams, attendance and participation will be given the following weights in the calculation of final grades:

Participation:	33% of final grade
Weekly Analyses:	33% of final grade
Final paper:	34% of final grade
<hr/>	
TOTAL:	100%

Class Schedule

- 1 - August 21

Introduction – What is Law? What is the Legal System?

READING: No reading assignment
- 2 – August 28

Classical Liberalism

READING: - John Locke, Second Treatise of Government (Selections)
- J.S. Mill, “On Liberty” (selections)
- Adam Smith, *The Wealth of Nations* (selections)
- C.B. MacPherson, “The Political Theory of Possessive Individualism” (Selections)
- 3 – September 4

Law, Governance, Control

READING: - Foucault, Michel (1977), *Discipline and Punish: The Birth of the Prison*
- 4 – September 11

Law and the Colonial Experience

READING: - Merry, Sally Engle (2000) *Colonizing Hawai'i: The Cultural Power of Law*
- 5 – September 18

Liberalism and Colonialism II

READING: - Uday Singh Mehta (1999) *Liberalism and Empire: A Study in Nineteenth-Century British Liberal Thought*
- 6 – September 25

Natural Resources & Environmental Regulation

READING: - Nicole Graham (2011) *Landscape: Property, Environment, Law*

- 7 – October 2 Law's Project
 READING: Catherine Kellogg (2010) *Law's Trace: From Hegel to Derrida*
- 8 – October 9 Law's Spatiality
 READING:
 - Edward Mussawir (2011) *Jurisdiction and Deleuze*
- 9 – October 16 Property, Modernism, Space
 READING:
 - Nicholas Blomley, (1998) "Landscapes of Property" *Law and Society Review*.
 - Nicholas Blomley, (2007) 'Making private property: enclosure, common right and the work of hedges', *Rural History*. 18, 1, 1-21
 - Mitchell, T. (2002). "Principles true in Every Country," in, *Rule of Experts: Egypt, Techno-Politics, Modernity*. Berkeley: University of California Press. P. 54-79
 - Petchesky, Rosalind Pollack, "The Body as Property: A Feminist Re-Vision." In *Concieving the New World Order: The Global Politics of Reproduction*. Faye D. Ginsburg and Rayna Rapp, eds. U. California Press (1995)
- 10 – October 23 NO CLASS – SWAAG Conference
- 11 – October 30 Urban Geography and Policing
 READING:
 - Steve Herbert (1996) *Policing Space: Territoriality and the Los Angeles Police Department*
- 12 – November 6 Urban Geography and Spatial Control
 READING:
 - Katherine Beckett & Steve Herbert (2011) *Banished: The New Social Control in Urban America*
- 13 – November 13 Contemporary Issues – Expanding spaces of Law
 READING:
 - Braverman et. al. eds (2014) *The Expanding Spaces of Law: A Timely Legal Geography*
 - Chapters 1 & TBA

14 – November 20 The Meaning of Legal Geography Revisited

READING:

- David Delaney (2011) *The Spatial, the Legal and the Pragmatics of World-Making Nomospheric Investigations*

15 – November 27 NO CLASS – Thanksgiving break

16 – December 4 Wrap Up & Presentation of Final Project

READING:

- No Reading Assigned

POLICIES:

Ethics and Academic Dishonesty:

The course emphasizes ethical practices and perspectives. Above all, students and instructors should strive to communicate and act, both in class interactions and in assigned coursework, in a manner directed by personal integrity, honesty, and respect for self and others. Included in this focus is the need for academic honesty by students as stated by the UNM Pathfinder. Students need to do original work and properly cite sources.

Accordingly, I consider Academic Dishonesty, including plagiarism to be unacceptable. The University's official definition of Academic Dishonesty may be found at:

<http://pathfinder.unm.edu/>

This is a graduate course for students who have developed a strong set of intellectual and work skills, and who are familiar with university policy on academic dishonesty. One of the non-negotiable requirements for passing this course is turning in your own, original, non-plagiarized work for all assignments submitted and properly citing sources. If you plagiarize, you will fail this class. Additionally, plagiarism and/or other forms of academic misconduct may lead to the system of institutional penalties outlined at the above website

Late Work: Late work will not be accepted. Turn in your work in a timely manner by deadline. In addition, you will not have a chance to rewrite your work after it has been turned in. However, you are encouraged to meet with the professor in advance to discuss and ask questions about your assignments in progress.

Email responsibility: Check your UNM email account regularly, as we will use this account to keep in touch with you about course requirements or updates. If you use another email address, please set up your UNM account to forward your UNM account email to that address.

Technology: Regularly check your UNM email account as we will use this account regularly for the course. If you use another email address, please forward your UNM email to that address. Of course, turn off cell phones and do not internet surf in class.

ADA Accessibility: Qualified students with disabilities needing appropriate academic adjustments should contact me as soon as possible to ensure your needs are met in a timely manner. Handouts are available in alternative accessible formats upon request.

Diversity: This course encourages different perspectives related to such factors as gender, race, nationality, ethnicity, sexual orientation, religion, and other relevant cultural identities. This course seeks to foster understanding and inclusiveness related to such diverse perspectives and ways of communicating.

Office Hours: Office hour times and locations are subject to change. If you intend to visit me during an office hour I STRONGLY recommend that you inform me in advance to confirm time and place.

Grades: All grades assigned are final and non-negotiable. No incompletes for the semester will be given unless you can demonstrate valid and compelling reasons for your inability to complete the work. No extra-credit or make-up assignments will be offered.

Geography 525 – GIScience Seminar
Spring 2014
Meeting time, location: F 3-5:30, BandE-106
Office hours: Tu & Th 2:30-3:30 or by appt.

Christopher Lippitt (Chris)
Email: clippitt@unm.edu
Office: Bandelier West – 215

COURSE SYLLABUS

Objectives: To (1) develop an understanding of the state of Geographic Information Science and (2) to develop professional research and writing skills.

Grade Basis: Class participation	25%
Annotated Bibliographies	15%
Article Rankings	15%
Writing Assignments	25%
Peer Reviews	20%

Required Text: None

Grades:
The final class grade will be based on the cumulative point total for the class, weighted as outlined above . Final grade decisions will be based on a flexible curve. The instructor reserves the option to raise a grade by one half to a whole grade based on consistent improvement in performance. Late assignments will be accepted within one week of the due date for 1/2 credit.

Annotated Bibliographies: Each week, students will be expected to produce 1 1-page annotated bibliography using the following format:

- Title
- Abstract
- Citation
- Summary of its impact on the debate

Article Rankings: During the first 8 weeks of the semester, students will present their article, how it affects the debate, and lead a discussion of the implications of that article each week. Once discussion has ceased, all students will be asked to rank the relevance of that article to the debate to produce an aggregate score of relevance. The aggregate relevance score of each student will determine the ‘Article Ranking’ portion of their grade. The rubric for ranking is:

- 1: Directly Addresses the Debate, had strong influence on my opinion
- 2: Peripheral to the debate, but had a strong influence on my opinion
- 3: Peripheral to the debate and had a minimal influence on my opinion
- 4: Seemingly unrelated or irrelevant to the debate

Peer Reviews: Students will have their work reviewed by peers and each student will review their peer’s work. Peer reviews are intended to be helpful to the author, constructive in their approach and tone, and thorough. To receive full credit, reviews must meet these criteria and thoroughly address errors in logic, grammar, spelling, sentence structure, ease of reading, and citation.

Class Schedule:

Note: This schedule is tentative, approximate, and subject to change.

Week	
1-8	Each student will present an article each week. The impact of the article on the Systems/Science debate will be discussed and then ranked by each student.
9	Spring Break
10	Each student will bring 10 copies of a draft outline and problem statement of a publication on the debate to class. All students will evaluate and rank all other student’s outlines. We will collectively produce a master outline based on synthesis of student outlines and sections will be assigned to each student.
11	First section drafts due. All students will review and edit 2 of their peers sections in class and those revisions will be discussed/presented to the class.
12-13	Iterative revisions based on peer feedback
14	Draft Conclusion due. All students will review and edit 2 of their peers sections in class and those revisions will be discussed/presented to the class.
15	Final Draft of Problem Statement, assigned section, and Conclusions due
16	Debrief and journal target discussion

GEOG 461/561 –Environmental Management
Fall 2021
3 credits; T/R
3:15 pm - 5:45 pm; Mitchell Hall Room 206

Instructor: Melinda Harm Benson
Assistant Professor, Department of Geography and Environmental Studies
Bandelier Hall West Room 223
Office Hours: T/R 12:30-1:30 p.m., W: 1:00-2:00 p.m. and by appointment
Email: mhbenson@unm.edu

Readings: Jim Salzman and Barton H. Thompson Jr. (2010). Environmental Law and Policy 3rd ed.

All other readings will be provided on WebCT.

Description: This course will examine and discuss the nature of environmental management issues and challenges. Students will apply their critical thinking skills to a variety of environmental policy approaches and apply those skills to contemporary environmental and natural resource problems.

Objectives: This course contributes to the Geography Department's mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. The Geography Department has broad learning goals for students in its BA degree, which this course contributes to most directly. The goals are:

- A. Students will develop an ability to see meaning in the arrangement of things in space.
- B. Students will develop an ability to see relationships between people, places, and the environment.
- C. Students will become geographical problem solvers capable of using qualitative, quantitative and/or spatial methods of analysis.
- D. Students will become clear and effective communicators.

Effective written and oral communication is a key part of a good education (Goal D). Written communication will be evaluated through student problem-based work assignments, etc. Oral communication will be evaluated through class discussion and presentations. Writing assignments will also be used to evaluate student's abilities to analyze geographic problems (Goal C). A spatially literate student (Goal A, B and C) will know and understand the following core concepts and themes used in geography. Core concepts and themes are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

Place and regions. A spatially literate student knows and understands: a. the physical and human characteristics of place; b. that people create regions to interpret earth's complexity; and c. how culture and experience influence people's perceptions of places and regions. Examples of concepts useful in understanding place and region include: regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems, and etc.

Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

Human Systems. A spatially literate student knows and understands: a. the characteristics, distribution, and migration of human populations on the earth's surface; b. the characteristics, distribution, and complexity of earth's cultural mosaics; c. the patterns networks and economic interdependence on the earth's surface; d. the processes patterns and functions of human settlement; and e. how the forces of cooperation and conflict among people influence the division and control of earth's surface. Examples of concepts useful in understanding human systems include: location, scale, spatial change and spread, spatial association, perception, and etc.

Spatial Representation. A spatially literate student knows and understands: a. how to use maps and other geographic representations, tools and technologies to acquire, process and report information from a spatial perspective; and b. how to use mental maps to organize information about people, places, and environments in a spatial context. Tools used include: GIS, remote sensing, GPS, and etc.

Geographic Analysis. A spatially literate student knows and understands: a. how to analyze the spatial organization of people, places, and environments on the earth's surface; and b. how to apply geography to interpret the past and present, and to plan for the future. Methods used for spatial representation are a cornerstone of geographic analysis. In addition, broad concepts useful in analysis include: Location (distribution, density, pattern, clustering, and dispersion); Scale (distance, hierarchies, and changes in scale and interpretation); Spatial change and spread (diffusion and dispersion, spatial flows, and regional evolution); Perception; Place (regions, regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems); Spatial association/interaction (proximity and adjacency, distance decay, and geographic features as points, networks or regions, site, situation); and Spatial alignment, orientation, and direction.

For this course, a smaller subset of these themes and concepts is relevant. These themes will be a central part of the course. Student knowledge and understanding of these themes and concepts will be evaluated through the quality of their participation, problem-based work assignments and reading reactions, case studies, and examinations. Students will be:

- learning about current environmental management concepts and approaches;
- gaining a basic understanding of how environmental management schemes are created and enforced;
- learning about different types of contemporary environmental management challenges (e.g., resource consumption and waste, biodiversity loss, climate change, etc.);

- applying existing environmental management concepts and approaches to contemporary environmental management challenges and identifying the strength and weaknesses of various environmental management schemes; and
- increasing critical thinking while investigating and discussing environmental management challenges.

Prerequisites: None

Grading:	Attendance and Participation	25%
	Learning Activity Assignments	25%
	Case Study ¹	25%
	Exams	25%

Grading will be on a straight scale:
A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%.

Course Organization and Assignments

Attendance and Participation

This course requires active participation from all class members. You will be expected to share your thoughts and ideas with the class. Good participation is a matter of both quality and quantity. More information on what constitutes “quality” participation will be provided in class. Attendance is required, and a student with more than four absences may be dropped from the course at the instructor’s discretion. Being late to class is the equivalent of ½ of an absence.

Discussions using WebCt will also provide a basis for class participation. After class, each student will post one (1) discussion question/comment AND will respond to at least one (1) question/comment posted by another student regarding the week’s material. Discussion threads will generally be open from Thursday-Tuesday between classes.

Learning Activity Assignments

The focus of this class is to examine how, on a practical level, environmental management is achieved. It is therefore essential that students learn how to apply what they are learning to problem-based scenarios. Class assignments will include both in class and outside activities. Learning activities (LAs) are designed to prepare students for discussion and to actively engage the material.

Case Study

Students will conduct their own research on a contemporary environmental management challenge in the United States. More information on this assignment will be provided in a separate handout.

Exam

There will be a both a midterm and a comprehensive final exam. Each student will be allowed to bring a typed, summary course outline to each exam as a reference guide. More information regarding how to develop and use an outline will be provided in class.

¹ For graduate students, this will include an in-class participation.

A note about late assignments

To do well in this course, you must turn in your assignments on time. Late assignments will be penalized by reducing the maximum points achievable by twenty percent (20%) for each day the assignment is late. For this reason, the WebCT will generally lock an assignment five days after deadline. If you need an extension, please make sure to request it in advance.

A note about field trips

There may be field trips during the semester. While attendance is required, an alternative assignment will be provided for you if you are unable to attend and if the field trip takes place outside of regularly scheduled class time.

Student Support

If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation to, the Information Accessibility Resource Center: <http://as2.unm.edu>; (505) 277-3506.

Student Code of Conduct

1. Students should exhibit respectful classroom values and behavior by:
 - engaging in appropriate communication, interaction and preparedness;
 - demonstrating trust, respect and civility;
 - approaching course content as important and necessary;
 - meeting all deadlines for assignments and team member obligations;
 - turning off cell phones in class;
 - avoiding unnecessary talking; and
 - not reading outside material or doing other work during class.
2. Students should contribute to a positive learning environment by:
 - arriving, attending and departing class in a respectful manner;
 - taking responsibility for team and individual assignments; and
 - developing cooperative relationships with other students and faculty.
3. Students should support a professional learning environment by:
 - avoiding inappropriate language;
 - refraining from unrealistic expectations in dealing with administration, faculty and staff; and
 - communicating with the instructor if changes could be made to improve the learning environment.
4. Students must uphold the academic integrity standards expected by the University of New Mexico. Academic integrity is conceptualized as doing and taking responsibility for one's own work. This includes individual assignments and, for group assignments, the assumption is that all worked turned in is the "work product" of the team. Each team member is equally responsible for the work presented as the output of that team's effort. For more information on UNM's standards for academic integrity, see the policy on academic dishonesty at <http://www.unm.edu/~sac/policies.html#academicdishonesty>.

Date:	Unit:	Readings:	Topics/Activities/Deadlines:
Week 1: August 22	Introduction	Salzman & Thompson 1-13	Welcome and introduction; syllabus review; history of environmental protection; Rio+ 20—where do we go from here?
Week 2: August 29	Strategies and Approaches	Salzman & Thompson 14-87; Extinction of the American Passenger Pigeon (1936); Hill (2000). Supp./561: Hill interview (2012).	Introduction to concepts in environmental management; the management toolkit—the five “Ps of environmental management approaches; using the toolkit—the basics of implementation and enforcement
Week 3: September 5	Strategies and Approaches; begin Air Quality	Salzman & Thompson 87-112; skim Albuquerque-Bernalillo County (2006). Supp./561: Reed and Bruyneel (2010)	Wrap up strategies and approaches; Introduction to the Clean Air Act (CAA); scales of governance and the role of federalism; discussion regarding case study requirement and finding case study topic ideas
Week 4: September 12	Air Quality and begin Climate	Salzman & Thompson 113-141; surf EPA’s climate website (and, if necessary IPCC (2007)); Supp./561: Moritz (2012); MacDonald (2010)	Ozone depletion and lessons learned, climate change policy approaches and pollution trading schemes
Week 5: September 19	Climate	Copenhagen Accord (2009); UNDP (2010); Dimitrov (2010); Adger and Barnett (2009) Reese (2012); Supp./561: Van Rijswick and Salet (2012)	International agreements: the Copenhagen Accord—from government to governance? Climate change mitigation and adaptation efforts across scales of governance; in class activity regarding how to make an outline
Week 6: September 26	Resource Consumption	S&T pp. 198-220; Wackernagel, et al (1999); Jacobs (2011); Supp./561: Correia (2012); Klinsky et al (2009)	Carbon footprint/ecological footprinting as a management tool—what do we manage? The End of Sustainability; case study topics due
Week 7: October 3	Research Skills	N.A.	Research day with librarian Anne Schultz; Location: room 253 at Centennial library ; in class time to work on outlines in preparation for midterm exam
Week 8: October 10	Toxics and Waste Management	N/A	Midterm exam ; in-class midterm assessment; case study draft bibliography-to-date due

Week 9: October 17	Toxics and Waste Management	S&T pp. 198-220 Supp./561: Scruggs et al. (20xx)	Introduction to toxics, role of risk assessment, etc.; the Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (“Superfund”); discuss midterm exam
Week 10: October 24	Water Supply	Utton Center (2012); surf ABWUA’s website regarding local conservation measures	Overview of water allocation in the American West, local water conservation measures; guest speaker Katherine Yuhas, conservation director for the Albuquerque Bernalillo County Water Utility Authority (confirmed)
Week 11: October 31	Water Quality	Salzman & Thompson 146-171; Craig and Noto (review NM section (2012)); Supp./561: U.S. Air Force (2011)	Introduction to Clean Water Act Col. Jeff Lanning from Kirtland Air Force Base and Bruce Thomson, Civilian Co-Chair of the Citizens Advisory Board and Director of UNM Water Resources Program (invited)
Week 12: November 7	Wetlands and Biodiversity	Salzman & Thompson 265-301; Howell (2011); Supp./561.: Daily (1997)	Wetlands protection, introduction to the Endangered Species Act, ecosystem services and a policy orientation
Week 13: November 14	Biodiversity	Ruhl 2008; Supp./561: Benson 20xx)	Biodiversity and climate change—environmental management and the “no analog” future
Week 14: November 21	Field Trip!	N.A.	Optional case study deadline
Week 15: November 28	National Environmental Policy Act	Salzman & Thompson 321-334; Haugrud (2009); Mandelker (2009) Boling (2009); Supp./561: Benson and Garmestani (2011)	Introduction to the National Environmental Policy Act (NEPA) and the future of NEPA
Week 16: December 5	Course wrap	N.A.	What is the future of environmental management? Course evaluations; final exam review, etc.; case study due
Final Exam	N/A	N/A	Please consult the registrar for time and location

GEOG 462/562 – Water Resources Management

Fall 2014

11:00-12:15pm 3 credits; MECH 208

Instructor: Melinda Harm Benson
Associate Professor, Department of Geography & Environmental Studies
Bandelier Hall West Room 223
Office Hours: T/H 1:30-2:30 p.m., W 1:00-3:00 and by appointment
Email: mhbenson@unm.edu

Readings: Sandra Postel and Brian Richter. 2003. Rivers for Life: Managing Water for People and Nature

All other readings will be available through an online platform.

Description: This course will examine and discuss the nature of water management challenges. Students will apply their critical thinking skills to a variety of policy approaches and apply those skills to contemporary environmental and natural resource problems.

Objectives: This course contributes to the Geography Department's mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. The Geography Department has broad learning goals for students in its BA degree which this course contributes to most directly. The goals are:

- A. Students will develop an ability to see meaning in the arrangement of things in space.
- B. Students will develop an ability to see relationships between people, places, and the environment.
- C. Students will become geographical problem solvers capable of using qualitative, quantitative and/or spatial methods of analysis.
- D. Students will become clear and effective communicators.

Effective written and oral communication is a key part of a good education (Goal D). Written communication will be evaluated through student problem-based work assignments and the case study paper. Oral communication will be evaluated through class discussion and case study presentations. The case study paper will also be used to evaluate student's abilities to analyze geographic problems (Goal C). A spatially literate student (Goal A, B and C) will know and understand the following core concepts and themes used in geography. Core concepts and themes are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

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Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

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Our own watershed will serve as a laboratory in which we investigate the multiple governance challenges involved in the realm of water resources. We will focus not

only on what current policies *are* currently but also what can and *should* be policies and approaches in the future. Most of the case studies will focus on domestic issues, but international challenges and topics may be introduced where appropriate.

Key concepts discussed in this course will include: weather v. climate, climate mitigation v. adaptation, the hydro-*social* cycle, virtual water, ecosystem services and payments for ecosystem services, conservation reliant species, etc.

Prerequisites: None

Grading:	Attendance and Participation	25%
	Reading Reflections/Learning Activities	25 %
	Unit Assessments	25%
	Final exam OR policy paper	25% ¹

Grading will be on a straight scale:
A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%.

Course Organization and Assignments

Attendance and Participation

This course requires active participation from all class members. You will be expected to share your thoughts and ideas with the class. Good participation is a matter of both quality and quantity. More information on what constitutes “quality” participation will be provided in class. Attendance is required, and a student with more than four absences may be dropped from the course at the instructor’s discretion. **Being late to class is the equivalent of ½ of an absence.** Students can enhance their participation with active engagement of online opportunities, including blogs and discussion boards.

Reading Reflections and Learning Activities

Reading reflections and learning activities are designed to prepare students for in-class time and gain a deeper understanding of the course material. More information regarding these assignments will be provided in class. Examples include: bringing discussion questions to class, in-class writing assignments, etc. Often these will be due prior to class and must be uploaded on the UNM Learn on-line course platform. Because the point of these assignments is to prepare you for class, **late reading reflections and learning activities will not be accepted.** Graduate students are

¹ Note: graduate students are required to take the policy paper option and will provide an in-class presentation related to his or her research.

expected to review supplemental materials and initiate class discussion based on these materials.

Unit Assessment and Final Exam

There will be exams that will require students to demonstrate their mastery of the course material and ability to integrate and apply the course themes and approaches. More information on the exams will be provided.

A note about late assignments

To do well in this course, you must turn in your assignments on time. Late assignments will be penalized by reducing the maximum points achievable by twenty percent (20%) for each day the assignment is late. **Late reading reflections and learning activities will not be accepted.**

A note about field trips

As you can see from the course schedule, there are field trips that will take place during the semester. If you are unable to attend a field trip outside of class time, an alternative assignment will be provided for you.

Student Support

If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation to, the Information Accessibility Resource Center: <http://as2.unm.edu>; (505) 277-3506.

Student Code of Conduct

1. Students should exhibit respectful classroom values and behavior by:
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 - meeting all deadlines for assignments and team member obligations;
 - turning off cell phones in class;
 - avoiding unnecessary talking; and
 - not reading outside material or doing other work during class.

2. Students should contribute to a positive learning environment by:
 - arriving, attending and departing class in a respectful manner;
 - taking responsibility for team and individual assignments; and
 - developing cooperative relationships with other students and faculty.
3. Students should support a professional learning environment by:
 - avoiding inappropriate language;
 - refraining from unrealistic expectations in dealing with administration, faculty and staff; and
 - communicating with the instructor if changes could be made to improve the learning environment.
4. Students must uphold the academic integrity standards expected by the University of New Mexico. Academic integrity is conceptualized as doing and taking responsibility for one's own work. This includes individual assignments and, for group assignments, the assumption of responsibility for work that is turned in as the "work product" of a team. Each team member is equally responsible for the work presented as the output of that team's effort. For more information on UNM's standards for academic integrity, see the policy on academic dishonesty at <http://www.unm.edu/~sac/policies.html#academicdishonesty>.

Tentative class schedule: subject to change at the instructor's discretion; ALWAYS check previous class lecture for updated information regarding reading assignments and deadlines.			
Date:	Topic:	Readings:	Description:
In this class, we first explore how water is allocated. Once allocated, how do we use it? Once we use it (or impact it by some other activity), what are environmental implications? There are three units: (1) supply and allocation (2) uses (3) implications. For each, we will briefly examine broader issues and then focus mainly on issues related to New Mexico. There will be an in class assessment after each unit.			
Unit I: Supply and Allocation			
August 19	Introduction	N.A.	Welcome, introductions; syllabus review
August 21	Introduction	Milly et al, 2008); Gleick (2010); Swyngedouw (2009)	Drought, climate and the end of stationarity; hydro-social cycle
August 26	Water supply and allocation: allocation strategies	Utton Center chs. 1-3; Cech (2010) ch 8	Water supply and allocation in the West, i.e., the prior appropriation doctrine
August 28	Water supply and allocation: the role of history and culture	Utton Center, chs 4, 5, (select from 20-22);	Water culture; tribal water issues and acequias; film: <i>Neustras Acequias</i>
September 2	Water supply and allocation: the federal role	Graff 1999; Cech 294-337	Water projects and the federal role—the Bureau of Reclamation and U.S. Army Corps, etc.
September 4	Water supply and allocation: integrating science	TBD	Role of Science in Policy with Dr. Ryan Morrison, College of Engineering (confirmed)
September 9	Water supply and allocation: across jurisdictional boundaries	Utton Center ch. 25-26	Interstate compacts and international agreements; Arizona Water Settlements Act—water project for the Gila? Amy Haas, New Mexico Interstate Stream Commission (confirmed)

September 11	Water supply and allocation: more on compact agreements	TBD	More interstate compacts; San-Juan Chama Diversion projects
September 16	Water supply and allocation	N.A.	Review of Unit I
September 18	Water supply and allocation	N.A.	Unit I Summary and Assessment
September 23	Water uses: groundwater and domestic wells	Utton Center ch. 6, 12	Groundwater issues, domestic wells
Unit II: Water uses			
September 25	Rivers for Life: Managing Water For People And Nature	Postel and Richter (2003)	Author meets reader: guest Sandra Postel (confirmed)
September 30	Water and land use	Ainsfield (2010) ch 10; Lovell (2011); Gallegos (2004); Hoekstra and Mekonnen (2012)	Introduction to water uses, review Unit I assessment results; Agricultural uses for water; virtual water
October 2	Water and land use	Utton Center ch 15, 16	GIS tools water rights transfers from agriculture to municipal use; guest Veronica Chavez, Office of the State Engineer (confirmed)
October 7	Water use and households	Utton Center ch. 7-8 Bates et al (2011); surf ABQUA website	Water conservation; guest speaker; Katherine Yuhas, conservation officer, ABQUA (confirmed)
October 9	N.A.	N.A.	Fall Break!
October 14	Water uses: keeping water instream	Benson et. al (2013); supp. Petts (2009	Environmental flows—the San Juan Chama Optimization project—meet the project team (Steve Harris, Rio Grande Restoration (confirmed)

October 16	Water uses: industrial	Fleck (2010); Ainsfield (2010) ch 11; supp: review Proposed Intel-ISC Water Rights Agreement site	Water for industry; Intel settlement, etc.
October 21	Water uses: energy development	TBD	Oil and gas industry, fracking fluids, etc.; Unit II review
October 23	N.A.	N.A.	No class BUT SWAAG conference October 23-25 (for extra credit, attend one paper session during the conference and write a 200 word summary)
October 28	Water uses	N.A.	Unit II Assessment; in class review of assessment
Unit III: challenges and implication of water and land use practices			
October 30	Use implications and challenges: water quality	Salzman and Thompson (2010) ch 5; Utton Center ch. 14	Protecting water quality—a federalist approach
November 4	Use implications and challenges: toxics	TBD	Groundwater contamination and superfund sites
November 6	Use implications and challenges: municipal wastewater	Cech (2010) ch 11	Wastewater treatment
Friday! November 7	Use implications and challenges: municipal waste water	N.A.	Field trip! Southside Reclamation plant (3:30-5:00pm)
November 11	Use implications and challenges: flooding and stormwater	Peterson (1992); TBD	Stormwater and flood control; Albuquerque Metropolitan Arroyo Flood Control Authority; Bruce Thomson, AMAFCA board member (confirmed)
November 13	Use implications and challenges: wetlands	Hough and Robertson	Wetlands protection: Clean Water Act section 404; emerging, innovative

	protection	(2009); Daily (1997)	approaches and payments for “ecosystem services”
Saturday! November 15	Use implications and challenges: stormwater runoff and wetlands protection	N.A.	Field trip! Valle de Oro National Wildlife Refuge with Jennifer Owen-White, Refuge Manager (9-11am)
November 18	Use implications and challenges: biodiversity	Cech (2010) ch 12	ESA basics; local endangered species issues: the Rio Grande Silvery Minnow and Southwestern Willow Flycatcher
November 20	Use implications and challenges: biodiversity	USFWS (2011); Scott et al (2005); TBD	Endangered Species Act continued; candidate species and conservation reliant species
November 25	Water and privatization	N.A.	Film <i>Thirst: Fighting the Corporate Theft of Our Water</i>
November 27	N.A.	N.A.	Thanksgiving Break!
December 3	Use implications and challenges	N.A.	Unit 3 Summary and Assessment
December 5	Course wrap up	N.A.	Synthesis of course material and concepts—what does the future hold for water resources management? Review of Unit III assessment, evaluations; etc.
TBD	N.A.	N.A.	Optional paper OR final exam

Spring 2014
GEOG 463/563 –Public Land Management
3 credits; Wednesday
3:00-5:30 p.m.; Dane Smith Hall 333

Instructor: Melinda Harm Benson
Assistant Professor, Department of Geography and Environmental Studies
Office Hours: T/H 11:30-12:30, W 1:30-2:00 and by appointment
Bandelier Hall West Room 223
Email: mhbenson@unm.edu

Readings: Dyan Zaslowsky and Tom H. Watkins. 1994. These American Lands: Parks, Wilderness, and the Public Lands: Revised and Expanded Edition

Martin Nie. 2008. The Governance of Western Public Lands: Mapping Its Present and Future.

Joseph Sax. 1980. Mountains without Handrails: Reflections on the National Parks.

All other readings will be available through online platform.

Recommended/Required for 563:

Bob Keiter. 2013. To Conserve Unimpaired: The Evolution of the National Park Idea

Char Miller 2012. Public Lands, Public Debates: A Century of Controversy

Description: This course will examine and discuss the nature of public land management issues and challenges. Students will apply their critical thinking skills to a variety of policy approaches and apply those skills to contemporary environmental and natural resource problems.

Objectives: This course contributes to the Geography Department's mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. The Geography Department has broad learning goals for students in its BA degree which this course contributes to most directly. The goals are:

A. Students will develop an ability to see meaning in the arrangement of things in space.

B. Students will develop an ability to see relationships between people, places, and the environment.

C. Students will become geographical problem solvers capable of using qualitative, quantitative and/or spatial methods of analysis.

D. Students will become clear and effective communicators.

Effective written and oral communication is a key part of a good education (Goal D). Written communication will be evaluated through student problem-based work assignments and the case study paper. Oral communication will be evaluated through class

discussion and case study presentations. The case study paper will also be used to evaluate student's abilities to analyze geographic problems (Goal C). A spatially literate student (Goal A, B and C) will know and understand the following core concepts and themes used in geography. Core concepts and themes are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

Place and regions. A spatially literate student knows and understands: a. the physical and human characteristics of place; b. that people create regions to interpret earth's complexity; and c. how culture and experience influence people's perceptions of places and regions. Examples of concepts useful in understanding place and region include: regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems, and etc.

Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

Human Systems. A spatially literate student knows and understands: a. the characteristics, distribution, and migration of human populations on the earth's surface; b. the characteristics, distribution, and complexity of earth's cultural mosaics; c. the patterns networks and economic interdependence on the earth's surface; d. the processes patterns and functions of human settlement; and e. how the forces of cooperation and conflict among people influence the division and control of earth's surface. Examples of concepts useful in understanding human systems include: location, scale, spatial change and spread, spatial association, perception, and etc.

Spatial Representation. A spatially literate student knows and understands: a. how to use maps and other geographic representations, tools and technologies to acquire, process and report information from a spatial perspective; and b. how to use mental maps to organize information about people, places, and environments in a spatial context. Tools used include: GIS, remote sensing, GPS, and etc.

Geographic Analysis. A spatially literate student knows and understands: a. how to analyze the spatial organization of people, places, and environments on the earth's surface; and b. how to apply geography to interpret the past and present, and to plan for the future. Methods used for spatial representation are a cornerstone of geographic analysis. In addition, broad concepts useful in analysis include: Location (distribution, density, pattern, clustering, and dispersion); Scale (distance, hierarchies, and changes in scale and interpretation); Spatial change and spread (diffusion and dispersion, spatial flows, and regional evolution); Perception; Place (regions, regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems); Spatial association/interaction (proximity and adjacency, distance decay, and geographic features as points, networks or regions, site, situation); and Spatial alignment, orientation, and direction.

For this course, a smaller subset of these themes and concepts is relevant. These themes will be a central part of the course. Student knowledge and understanding of these themes and concepts will be evaluated through the quality of their participation, problem-based

work assignments and reading reactions, case studies, and mid-term and final examinations. Students will:

- learn the history of public lands and their development in the United States;
- gain a basic understanding of the current types of public land designations, including Bureau of Land Management lands, U.S. Forest Service Lands, National Parks, etc.;
- explore current public land management challenges facing New Mexico and other states, including protection of biodiversity, oil and gas development, grazing, and recreational use; and
- increase critical thinking skills and challenge common assumptions with regard to natural resource problems.

Prerequisites: None

Grading:	Attendance and Participation	33%
	Reading Reflection Assignments ¹	33%
	Case Study Paper ²	34%

Grading will be on a straight scale:

A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%.

Course Organization and Assignments

Attendance and Participation

This course requires active participation from all class members. You will be expected to share your thoughts and ideas with the class. Good participation is a matter of both quality and quantity. More information on what constitutes “quality” participation will be provided in class. Attendance is required. Student with more than **two absences** will result in a grade reduction, and students may be dropped from the course at the instructor’s discretion if they miss more than three classes.

Reading Reflection Assignments, etc.

Reading reaction assignments are designed to prepare students for engaged discussion. More information regarding these assignments will be provided in class. Examples include: bringing discussion questions to class, in-class writing assignments, etc. Graduate students are expected to review supplemental materials and initiate class discussion based on these materials. **Students must bring a physical copy of the day’s assignment AND at least three discussion questions for each class to hand in at the end of class.**

Case Study

Each student will conduct their own research on a contemporary public land management challenge. More information on this assignment will be provided in a separate handout.

A note about late assignments

To do well in this course, you must turn in your assignments on time. Late assignments will be penalized by reducing the maximum points achievable by twenty percent (20%) for each day the assignment is late. Extensions will be granted on a limited basis and must be

¹ For graduate students, this will include a book review. More information will be provided.

² For graduate students, this will also include an in class presentation.

Course syllabus-- subject to change at Instructor's discretion

requested well in advance of the deadline. **Late reading reflections will not be accepted.**

A note about field trips

As you can see from the course schedule, there are field trips that will take place during the semester. If you are unable to attend, alternative assignments will be provided for you.

Student Support

If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation to, the Information Accessibility Resource Center: <http://as2.unm.edu>; (505) 277-3506.

Student Code of Conduct

1. Students should exhibit respectful classroom values and behavior by:
 - engaging in appropriate communication, interaction and preparedness;
 - demonstrating trust, respect and civility;
 - approaching course content as important and necessary;
 - meeting all deadlines for assignments and team member obligations;
 - turning off cell phones in class;
 - avoiding unnecessary talking; and
 - not reading outside material or doing other work during class.
2. Students should contribute to a positive learning environment by:
 - arriving, attending and departing class in a respectful manner;
 - taking responsibility for team and individual assignments; and
 - developing cooperative relationships with other students and faculty.
3. Students should support a professional learning environment by:
 - avoiding inappropriate language;
 - refraining from unrealistic expectations in dealing with administration, faculty and staff; and
 - communicating with the instructor if changes could be made to improve the learning environment.
4. Students must uphold the academic integrity standards expected by the University of New Mexico. Academic integrity is conceptualized as doing and taking responsibility for one's own work. This includes individual assignments and, for group assignments, the assumption of responsibility for work that is turned in as the "work product" of a team. Each team member is equally responsible for the work presented as the output of that team's effort. For more information on UNM's standards for academic integrity, see the policy on academic dishonesty at <http://www.unm.edu/~sac/policies.html#academicdishonesty>.

Geog 464/564: Food and Natural Resources

Instructor: Chris Duvall

Office: 220 Bandelier West

Mail box: 111 Bandelier West

E-mail: duvall@unm.edu

Fall 2014

Office hours: Wed 2-3:30 pm, Thurs 2-3:00 pm or by appointment

Class meetings: Tues-Thurs, 12:30–1:45 pm

Classroom: 224 Dane Smith Hall

Course description:

This course provides an advanced introduction to the environmental meanings of food. Human activities have altered all of the Earth’s ecosystems. Yet humans are also components of ecosystems, because we are entirely reliant upon plants, animals, fungi, and bacteria for food. Food is a direct and ubiquitous connection all humans share with the Earth’s biophysical environment. Every day, everyone makes choices about which foods to eat, how to prepare and eat these foods, and how to dispose associated wastes. Cumulatively, our daily food choices have profound ecological effects for Earth’s natural environments, and also link us to farmers and other people around the world. This course examines both why we eat what we eat, and how our food choices affect other people and places around the world.

Learning objectives for undergraduate and graduate students:

- 1) Describe causes of spatial, temporal, and cultural variation in modern or historic diets.
- 2) Explain how and why food has been used to produce differences between people based on race, gender, ethnicity, class, birthplace, and other factors.
- 3) Identify common food plants, and summarize the cultural histories of these plants.
- 4) Explain effects of the prevailing global food system on natural and human resources.
- 5) Summarize concerns about the future of the global food system, and assess the likelihood of possible changes.
- 6) Describe and assess personal values associated with food choice.
- 7) Discuss and analyze academic and popular media about food.
- 8) Communicate about agricultural and food systems in oral formats.

Additional learning objectives for graduate students:

- 9) Conduct independent research on agricultural and food systems.
- 10) Communicate research findings in a written format.

Course materials:

- There are four REQUIRED books for this class, listed below in the order we will use them:
- Millstone, E. (2011) *The Atlas of Food*. [earlier editions of this book are acceptable]
 - Clapp, J. (2012) *Food*.
 - Guthman, J. (2011) *Weighing In*.
 - Belasco, W. (2006) *Meals to Come: A History of the Future of Food*.

These books are available at the university bookstore, though you may be able to find cheaper copies online.

You will also be REQUIRED to read several academic journal articles and book chapters in addition to these books. These articles and chapters will be provided via UNM Learn, or provided to you in class. **BRING REQUIRED READING MATERIALS TO CLASS EVERY DAY.**

This class is open to undergraduate and graduate students, but with different requirements for undergraduate and graduate students. *In order to pass this course, you must complete all required assignments.*

REQUIRED ASSIGNMENTS FOR UNDERGRADS	Percent of total	Points	REQUIRED ASSIGNMENTS FOR GRAD STUDENTS	Percent of total	Points
Attendance and participation (percent of meetings attended)	25%	250	Attendance and participation (percent of meetings attended)	17.86%	250
Food journal	18.75%	187.5	Food journal	12.5%	175
Food diversity exam	18.75%	187.5	Food diversity exam	12.5%	175
Food system exam	18.75%	187.5	Food system exam	12.5%	175
Future of food exam	18.75%	187.5	Future of food exam	12.5%	175
			Proposal for writing assignment	7.14%	100
			First draft of writing assignment	12.5%	175
			Final draft of writing assignment	12.5%	175
SEMESTER TOTAL	100%	1000	SEMESTER TOTAL	100%	1400

Final grades will be assigned based on the following scale:

A+	≥97% of total possible points		
A	≥93% of total possible points	C	70-77% of total possible points
B+	88-93% of total possible points	D+	65-70% of total possible points
B	81-88% of total possible points	D	60-65% of total possible points
C+	77-81% of total possible points	F	<60% of total possible points

I may adjust these score ranges downward if necessary.

Exams, assignments, and other activities are due as indicated in the course calendar (below). Extensions to assignment due dates or alternate dates for exams or other activities will be granted only if a student can provide proof that an unforeseen, unpreventable situation has prevented him/her from completing and/or turning in an assignment, exam, or other activity on the scheduled due date. Any request for an extension to an assignment due date or an alternate date for an exam or other activity must be made more than 24 hours before the beginning of class on the due date for which an extension is sought, unless there is a verifiable emergency that occurs during this 24-hour period.

I take attendance for this course as a measure of participation in the course, because participation is an important component of learning. Attendance is a measure of two types of participation: 1) listening to lectures I will deliver during class meetings, and 2) interacting with other students in discussions and activities during class meetings. I will take attendance for each class meeting, and will award attendance points for the semester based on the percent of class meetings attended. Pre-arranged absences and emergency absences will dropped from the number of possible class meetings for a student, which increases the mathematical value of all other class meetings for that student. If a student has more than five pre-arranged or emergency absences, the maximum percent of attendance points that will be awarded is 90%; if a student has more than 10 pre-arranged or emergency absences, the maximum percent will be 75%.

Learning Support:

Accessibility Services (Mesa Vista Hall 2021, 277-3506) provides academic support to students who have disabilities. If you think you need alternative accessible formats for undertaking and completing coursework, you should contact this service right away to assure your needs are met in a timely manner.

Communication policies and practices:

Communication is a key to success in this, and other, courses. For this course, there are several guidelines for communication all of us must follow.

First, no comments will be tolerated that are offensive, derogatory, or disparaging to any identifiable group of people. If you have any questions about appropriate ways to express yourself when discussing course material (or other topics), please ask me for guidance. If you have concerns about how another student expresses him/herself in class, please let me know.

Second, during lecture no activities will be tolerated that distract other people in the classroom. We in this class share a single room where all activities should be directed toward learning. If you are distracting others with your behavior, I will let you know by asking you to change your behavior. If you wonder whether any particular activity may be distracting, please ask me for guidance. If another student is distracting you in class, please let me know.

Third, *let me know as soon as possible* when you have a question, or if there is something that is hindering you in class. I want you to succeed in this course (and in your others too), and it is easiest for me to help if we have some time to find a solution. *Last-minute questions/requests/comments often arrive too late for me to offer help, so please plan ahead.* If you have a schedule conflict that means you will miss an assignment due date, exam, or other activity, please *PLAN AHEAD and tell me as soon as possible.* I will work with you to resolve the conflict. If you have an emergency that affects your performance in this course, please let me know as soon as possible. I will work with you to resolve the situation. *Emergencies are rare and I trust that people tell me they have an emergency only when this is true.*

Fourth, *when communicating by e-mail*, please use your ‘unm.edu’ e-mail address. Many messages sent to me via gmail.com, yahoo.com, and other web-based e-mail services are sent to the trash by my spam filter. To eliminate the possibility that any of your messages are filtered out, use your unm.edu e-mail account. Also, I expect that all e-mail messages use a professional writing style, which means: using a subject line; signing your name at the end of the message; using proper spelling and punctuation (you’re not texting!); and using a professional, respectful tone.

Academic integrity:

UNM has strict and explicit regulations governing academic integrity, which are posted on the Internet in the *University Catalog* (<http://www.unm.edu/%7Eunmreg/catalog.htm>). **Cheating by presenting someone else’s work as your own is not tolerable in this course or anywhere at UNM.** For more information on the importance of academic integrity at UNM, see the *UNM Faculty Handbook* (<http://www.unm.edu/~handbook/D100.html>), the UNM Dean of

Students web site (http://www.unm.edu/~doso/ja_academichonesty.html), and the *UNM Pathfinder* section on student conduct (<http://pathfinder.unm.edu/policies.htm#studentcode>). If you are uncertain what is meant by “academic integrity”, including “plagiarism”, please consult the UNM Department of English information sheet (http://www.unm.edu/~english/Resources/pdf/Academic_Integrity_students.pdf), or the list of Internet resources provided by the UNM-Valencia Teaching & Learning Center (http://www.unm.edu/~tlc/contents/web_resources/integrity.html).

Please take the time to read and understand UNM’s policies governing academic integrity. *I strictly enforce these policies when grading student work.* **In this course, a student will receive zero points for any exam, assignment, or activity in which any portion violates UNM’s regulations governing academic integrity, regardless of when I discover the violation.** Additionally, a student who violates these regulations may receive a failing grade for the course, and be reported to the Dean of Students, which may lead to expulsion.

COURSE CALENDAR

All readings that are not from the required textbooks will be posted either on the public Internet, or through the UNM library’s electronic reserves system. Every day in class we will discuss the required readings for the day—**bring the readings to class!** Additionally, on some days I have other activities planned, which I indicate below.

Part 1: Overview and introduction

August 19: Course overview, syllabus, and survey

August 21: Why food and natural resources?

- **In class:** Review grad writing assignment
- **Required reading:** Millstone, *Atlas of Food* (Entire book!)

When reading this book, please compile: 1) a list of key or unfamiliar terms (such as ‘food security’), and 2) a list of key issues or topics regarding food that are most important to you. In class, we will discuss your lists and develop a master list that we will use throughout the semester. We will refer to the Millstone book throughout the semester.

Part 2: Why do people eat what they eat? Natural, cultural, and political ecologies of food

August 26: Why do people eat what they eat?

- **In class:** Food culture self-assessment; review food journal assignment
- **Required readings:**
Caplan 1996. Why do people eat what they do? Approaches to food and diet from a social science perspective. *Clinical Child Psychology and Psychiatry* 1(2): 213-227.
Menzel & D’Aluisio, *What I Eat*, pp. 7-21, and 328-329
- **Recommended readings:**
Jones 2000. What’s disgusting, why, and what does it matter? *Journal of Folklore Research* 37(1): 53-71.

August 28: Evolutionary ecology of food

- **Required readings:**
Menzel & D’Aluisio, *What I Eat*, pp. 22-121
- **Recommended readings:**
Chen 2006. Born to run. *Discover* 28 May. Online: http://discovermagazine.com/2006/may/tramps-like-us/article_print
Cordain et al. 2005. Origins and evolution of the Western diet. *American Journal of Clinical Nutrition* 81: 341-354.
Diamond 1987. The worst mistake in the history of the human race. *Discover* May: 64-66.
Diamond 2002. Evolution, consequences, and future of animal and plant domestication. *Nature* 418: 700-707.
Goff & Klee 2006. Plant volatile compounds: Sensory cues for health and nutritional value? *Science* 311: 815-819.
Krebs 2009. The gourmet ape: Evolution and human food preferences. *American Journal of Clinical Nutrition* 90S: 707S-711S.
Pimentel & Pimentel 2008. Chapters 3-6 (pp. 17-56) in *Food, Energy, and Society*, 3rd ed. Boca Raton, FL: CRC Press.
Stini 1988. Food, seasonality, and human evolution. In *Coping with Uncertainty in Food Supply* (de Garine & Harrison, eds.): 32-51. Oxford, UK: Clarendon Press.

September 2: Food cultures

- Required readings:
Menzel & D’Aluisio, *What I Eat*, pp. 122-203
- Recommended readings:
Allen & Baines. 2002. Manipulating the symbolic acceptance of meat to encourage greater acceptance of fruits and vegetables and less proclivity for red and white meat. *Appetite* 38: 118-130.
Alvarez 2007. The march of empire: Mangos, avocados, and the politics of transfer. *Gastronomica* 7(2): 28-33.
Carney 2000. The African origins of Carolina rice culture. *Ecumene* 7(2): 125-149.
Diamond 2003. The double puzzle of diabetes. *Nature* 423(5 June): 599-602.
de Garine 2001. Views about food prejudice and stereotypes. *Social Science Information* 40(3): 487-507.
Gade 1975. Horsemeat as human food in France. *Ecology of Food and Nutrition* 5(2): 1-11.
Harris 2008. The abominable pig. In *Food and culture: A reader* (Counihan & van Esterik, eds.): 54-66. New York & London: Routledge.
Mayer 1997. Historical changes in the mineral content of fruits and vegetables. *British Food Journal* 99(6): 207-211.
Meyer-Rochow 2009. Food taboos: their origins and purposes. *Journal of Ethnobiology and Ethnomedicine* 5: 18. URL: <http://www.ethnobiomed.com/content/5/1/18>.
van der Veen 2003. When is food a luxury? *World Archaeology* 34(3): 405-427.

September 4: Food, drugs, and beliefs

- Required readings:
Menzel & D’Aluisio, *What I Eat*, pp. 204-325
- Recommended readings:
Anderson 1987. Why is humoral medicine so popular? *Social Science Medicine* 25(4): 331-337.
Bordo 2008. Anorexia nervosa: Psychopathology as the crystallization of culture. In *Food and culture: A reader* (Counihan & van Esterik, eds.): 162-186. New York & London: Routledge.
Bruch 2008. Anorexia nervosa and its differential diagnosis. In *Food and culture: A reader* (Counihan & van Esterik, eds.): 104-117. New York & London: Routledge.
Dudley 2002. Fermenting fruit and the historical ecology of ethanol ingestion: Is alcoholism in modern humans an evolutionary hangover? *Addiction* 97: 381-388.
Singer 1989. Animal liberation or animal rights? *The Monist* 70(1): 3-14.
Steinbeck 1963 [1932]. Chapter IX. In *The Pastures of Heaven* (by J. Steinbeck): 155-176. New York: Viking Press.

September 9: **FOOD JOURNAL ASSIGNMENT DUE! E-mail your assignment before the end of the day.**

Anything submitted after September 9 will be late!

- UNDERGRADS: No class meeting today. Use your time to get started on the Food Diversity readings.
- GRAD STUDENTS: PROPOSAL DUE TODAY! We will meet in class to discuss your writing assignment. Bring to class your proposed topic for your encyclopedia entry, and the preliminary list of references you have identified.

Part 3: Food diversity

September 11: Food diversity: Domestication

- Required readings:
Gepts 2004. Crop domestication as a long-term selection experiment. *Plant Breeding Reviews* 24(2): 1-44.
Juniper 2007. The mysterious origin of the sweet apple. *American Scientist* 95(1): 44-51.
- Recommended readings:
Liu 2003. Health benefits of fruit and vegetables are from additive and synergistic combinations of phytochemicals. *American Journal of Clinical Nutrition* 78: 517S-520S.
Paris 1989. Historical records, origins, and development of the edible cultivar groups of *Cucurbita pepo* (Cucurbitaceae). *Economic Botany* 43(4): 423-443.
Perrier et al. 2011. Multidisciplinary perspectives on banana (*Musa* spp.) domestication. *Proceedings of the National Academy of Sciences* 108(28): 11311-11318.

September 16: Food diversity, part 1

- Required reading: Vaughn & Geissler, *Oxford Book of Food Plants*, pp. 2-55, and 124-129
- In class: We will review the assigned reading. Bring your book to class!

September 18: Food diversity, part 2

- Required reading: Vaughn & Geissler, *Oxford Book of Food Plants*, pp. 56-123
- In class: We will review the assigned reading. Bring your book to class!

September 23: Food diversity, part 3

- Required reading: Vaughn & Geissler, *Oxford Book of Food Plants*, pp. 130-209
- In class: We will review the assigned reading. Bring your book to class!

September 25: FOOD DIVERSITY EXAM TODAY!

- This will be a machine-graded exam (including multiple choice, true-false, and matching questions). The questions will test basic, factual knowledge of domestication and food plants.

Part 4: The prevailing global food system

September 30: Globalized food

- Required reading: Clapp, *Food*, Chapters 1-2

October 2: Whose priorities?

- Required reading: Clapp, *Food*, Chapters 3-4

October 7: Food, finance, and commodities

- Required reading: Clapp, *Food*, Chapters 5-6

October 9: **NO CLASS — FALL BREAK!**

October 14: Spare time for the Clapp book

- In class: We will complete our discussion of the Clapp book today.

October 16: Obesity?

- Required reading: Guthman, *Weighing In*, Chapters 1-3

October 21: What causes obesity?

- Required reading: Guthman, *Weighing In*, Chapters 4-5

October 23: What might solve obesity?

- Required reading: Guthman, *Weighing In*, Chapters 6-7

October 28: Whose food?

- Required reading: Guthman, *Weighing In*, Chapters 8-9

October 30: Spare time for the Guthman book

- In class: We will complete our discussion of the Guthman book today.

November 4: FOOD SYSTEM EXAM

- This will be a machine-graded exam (including multiple choice, true-false, and matching questions). The questions will test: 1) basic, factual knowledge of the global food system; 2) conceptual understanding of the energy-balance model and associated arguments regarding diet-related health; and 3) conceptual understanding of Guthman's arguments regarding diet-related health.

November 6:

- UNDERGRADS: No class meeting today. Use your time to start reading Belasco, *Meals To Come*.
- GRAD STUDENTS: **YOUR FIRST DRAFT IS DUE TODAY.** Bring a printed copy to class, and be prepared to discuss your research and writing, and to review the research and writing of other students.

Part 5: The future of food

November 11: Views of the future

- Required reading: Belasco, *Meals To Come*, Preface and Chapter 1

November 13: The cupboard is bare: Discourse and arguments

- Required reading: Belasco, *Meals To Come*, Chapters 2-3

November 18: Utopian and dystopian visions

- Required reading: Belasco, *Meals To Come*, Chapters 4-5

November 20: Future scenarios

- Recommended reading: Belasco, *Meals To Come*, Chapters 6-8

November 25: Spare time for the Belasco book

- In class: We will complete our discussion of the Belasco book today.

November 27: **NO CLASS – THANKSGIVING BREAK**

December 2: Food in 2050

- COURSE EVALUATIONS IN CLASS TODAY
- In class: Analyzing predictions and discourse

December 4: Food in 2050

- In class: Analyzing predictions and discourse

The FUTURE OF FOOD EXAM is scheduled for Thursday, December 12, 10:00 a.m. to 12:00 p.m.

This will be a blue-book exam, in which you will be asked to evaluate discourse about the future of food, and to summarize and explain the three views presented in the Belasco book.

GRAD STUDENTS: You *should* turn in the final draft of your research paper on December 4, but you *must* turn in the final draft of your research paper in **no later than 10:00 a.m., Thursday, December 12.**

The City as Human Environment

Geography 466-566 - Spring 2013

Tuesday/Thursday 11:00AM-12:15PM

Bandelier West 104

INSTRUCTOR:

John Carr, J.D., Ph.D. carrj@unm

Office Hours: Tuesdays 1:00-2:00PM, Thursdays 10:00-11:00AM

Office: Geography 201

COURSE DESCRIPTION:

This course provides an overview of the cultural, economic, political, legal and environmental vectors that animate urban form and life, with an emphasis on the ways that issues of difference are reinforced, frustrated, and/or complicated within the trans-border setting of the Southwest. Subject areas include migration, race, gentrification, neoliberalism, and urban ecology.

STUDENT LEARNING OUTCOMES

- A1. Students will be able to explain the way that different vectors of difference animate urban form and life using core geographic concepts.
- B1. Students will be able to analyze the relationships that influence human-environment interaction in a specific location at a specific time, namely the contemporary Southwest city.
- C1. Students will be able to identify the geographic contexts of the urban Southwest relevant to inquiries into those environments.

TEXTS:

- Course pack available through "UNM Learn" web portal and also available through on-line text reserves. The password for online text reserves is: Lobo466

400 LEVEL EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

- 1) **Attendance & Participation:** This course will be conducted as a seminar, which means that we will engage in collective discussion of the issues at hand. That means that students are expected to do the reading *before* each class session, and to come to class prepared to ask questions and offer commentary. In particular, you will be asked to **contribute constructively** to group discussions, which will take place during most class sessions. Given the importance of preparation and discussion, class participation will comprise a significant component of your final grade.
 - a. **FIELD TRIP:** One of the non-negotiable requirements of this class will be attendance during a one-day field trip to Santa Fe on Saturday, March 30.
- 2) **Response Papers:** you are required to hand in a brief, **one page (maximum)** reflection paper analyzing and discussing the assigned readings. Students signed up for 500 level credit will have a maximum of **two pages**. Specifically, you are to address the following four items in each response paper:

- 1. What is the **puzzle** the author is addressing? (the larger question/debate he or she is engaging?)
- 2. What is the **main argument** of the paper or book? (his/her main response to that large puzzle?)
- 3. What is the **main factual support** that the author relies upon in making that argument? How does he/she construct the argument? What are some examples/cases she provides, or the logic he employs?
- 4. In what ways do you find the author’s argument **convincing** (what are the author’s strengths) or **unconvincing** (what are the author’s weaknesses?)? How do you evaluate this piece in the larger context of themes we have been discussing in this course?

For classes where two readings have been assigned, I will let you know whether you should focus on one or both readings. The purpose of this assignment is threefold. First, it is intended to engage you with the readings in a meaningful manner. Second, it is intended to prepare you for in-class discussions and exercises. And third, it is intended to help develop the skills of critical textual analysis and terse written presentation of that analysis. Accordingly, you will be graded on the thoroughness with which you support your critique, and NOT on the position you adopt OR on your emotional attachment to that position. Said another way, we will be evaluating your ability to discern and assess an author’s argument, and make an argument of your own.

Again, **you will have a paper due at the beginning of *each* lecture, in person, in class.** Response papers will *not* be accepted over email or after the beginning of class, absent a verifiable medical emergency. Although each paper will be collected, you will only receive grades and comments on a selection of papers.

- 3) **Field Projects:** You will be required to complete four field assignments developed by the professor. The first three will involve observations of sites in Albuquerque to investigate how ideas from class play out (or do not) in a real city. Additionally, this class will culminate in an additional field assignment of the student’s design. Students will be asked to pick a site, and describe and analyze the ways that social difference arises in and impacts that site.

400 LEVEL GRADING:

Your papers, projects, attendance and participation will be given the following weights in the calculation of final grades:

Attendance & Participation:	10% of final grade
Reflection Papers:	20% of final grade
Field Project 1:	15% of final grade
Field Project 2:	15% of final grade
Field Project 3:	15% of final grade
Final Student Designed Field Project	25% of final grade
<hr/>	
TOTAL:	100%

500 LEVEL EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

The requirements for 500 level credit in this class are the same as those for 400 level credit, with the following exceptions:

- 1) **Attendance & Participation:** I will draw heavily on the experience and abilities of the 500 level students in this class. In addition to looking to them to make a particularly robust contribution in class discussion, 500 level students will also be called upon to engage in the following activities:
 - a. 500 level students will periodically be called upon to lead small group discussions in class
 - b. Each 500 level student will be called upon to research and do a brief presentation on at least one site in Santa Fe for the March 30 Field Trip
 - c. Each 500 level student will be called upon to take the lead in teaching a given topic during one class period, based on consultation with the professor. The readings, structure, and activities for that day will be the responsibility for the 500 level student, with the input and approval of the instructor.
- 2) **Response Papers:** the page maximum for response papers is **two pages**.
- 3) **Supplemental Reading and Fourth Field Projects:** Each class period will have at least one supplemental reading. While you are not required to have read this work before class, I will expect you to use a substantial number of these readings (at least 5) as part of the Final Student Designed Field Project, and to integrate your knowledge of these readings into your contributions to class discussions.

500 LEVEL GRADING:

Your papers, projects, attendance and participation will be given the following weights in the calculation of final grades:

Attendance & Participation:	15% of final grade
Reflection Papers:	15% of final grade
Field Project 1:	15% of final grade
Field Project 2:	15% of final grade
Field Project 3:	15% of final grade
Final Student Designed Field Project	25% of final grade
<hr/>	
TOTAL:	100%

Class Periods

WEEK ONE

Tuesday, January 21: Intro – The Promise and Perils of Difference in The City
- Video: *Gathering up again: Fiesta in Santa Fe* by Jeanette DeBouzek, Diane Reyna.
Available at:

http://www.folkstreams.net/video/gathering_up_again/gathering_up_again_en.mov

Thursday, January 23: Social Order and Difference

- Lofland, Lyn, “The Normative or ‘Legal System’” ch. 2, in “The public realm: exploring the city's quintessential social territory”
- Shearing & Stenning; “Say cheese!: The Disney order that is not so Mickey Mouse”

Alternate Readings:

- Stéphane Tonnelat “The sociology of urban public spaces” In Wang Hongyang, Savy Michel and Zhai Guofang (eds.), “Territorial Evolution and Planning Solutions: Experiences from China and France,” Paris, Atlantis Press, 2010
- Nancy Fraser “Rethinking the Public Sphere: A Contribution to the Critique of Actually Existing Democracy” Social Text, No. 25/26 (1990), pp. 56-80
- Michael Sorkin (ed.) “Variations on a Theme Park: The New American City and the End of Public Space” Hill and Wang, 1992

WEEK TWO

Tuesday, January 28: The Meaning of Difference to Place I - Class

- Dreier, Mollenkopf and Swanstrom, “Place Matters: Metropolitcs For The Twenty-First Century” 2nd Ed. ch. 2*

Alternate Readings:

- David Harvey “Social Justice and the City: Revised Edition” (2009)
- Nezar Alsayyad and Ananya Roy “Medieval Modernity: On Citizenship and Urbanism in a Global Era” Space and Polity, Vol. 10, No. 1, 1–20, April 2006
- Robert Fishman “Bourgeois Utopias: The Rise and Fall of Suburbia” Basic Books, 1989
- Kenneth T. Jackson “Crabgrass Frontier: The Suburbanization of the United States” Oxford University Press 1987

Thursday, January 30: The Meaning of Difference to Place II - Race

Gregory D. Squires and Charis E. Kubrin – “Privileged Places: Race, Uneven Development and the Geography of Opportunity in Urban America” Urban Studies, Vol. 42, No. 1, 47–68, January 2005

Alternate Readings:

- Gregory Weiher “The Fractured Metropolis: Political Fragmentation and Metropolitan Segregation”
- “Karyn R. Lacy” Black spaces, black places: Strategic assimilation and identity construction in middle-class suburbia,” Ethnic and Racial Studies, Volume 27, Issue 6, 2004

- John B. Strait “Poverty Concentration In The Prismatic Metropolis: The Impact Of Compositional And Redistributive Forces Within Los Angeles, California, 1990–2000,” (2006), Journal of Urban Affairs, Volume 28, Number 1, pages 71–94.

WEEK THREE

Tuesday, February 4: The Meaning of Difference to Place III – National Origin & Legality

-Pablo Vila (1999). Constructing social identities in transnational contexts: the case of the Mexico-US border. International Social Science Journal 51 (159), 75–87.

Alternate Readings

- Nicholas De Genova, “The Legal Production Of Mexican/Migrant ‘Illegality’” Latino Studies 2004, 2, (160–185) 2004
- David G. Gutiérrez – “Walls and Mirrors: Mexican Americans, Mexican Immigrants, and the Politics of Ethnicity” - University of California Press, 1995
- Garcia-Acevedo, Maria Rosa “Politics across borders: Mexico's policies toward Mexicans in the United States,” Journal of the Southwest. 2003.
- Zaragosa Vargas “Crucible of Struggle: A History of Mexican Americans from the Colonial Period to the Present Era” Oxford University Press 2010

Thursday, February 6: First Field Project: *Order and difference I*

WEEK FOUR

Tuesday, February 11: Urban Form and Planning

- Carr, J. (2012). Public Input/Elite Privilege: The use of participatory planning to reinforce urban geographies of power in Seattle. *Urban Geography*, 33(3). 420-441.

Alternate Readings

- Bent Flyvbjerg, Rationality and Power: Democracy in Practice, 1998, Chicago, USA: The University of Chicago Press.
- Arnstein, S. R., 1969, A ladder of citizen participation. *Journal of the American Planning Association*, Vol. 35, 216–224.
- Brooks, M. P., 2002, *Planning Theory for Practitioners*. Chicago, IL: Planners Press.
- Elwood, S., 2005, Perspectives on participation, urban research, and the transformation of “local” urban geographies. *Urban Geography*, Vol. 26, 261–65.
- Maginn, P. J., 2007, Deliberative democracy or discursively biased?: Perth’s dialogue with the City Initiative. *Space & Polity*, Vol. 11, 331–352.

Thursday, February 13: First Field Project: *Order and difference II*

WEEK FIVE

Tuesday, February 18: The Creation of Place in the Face of Difference I – Traditional Forms and Appropriation

- The Myth of Santa Fe: Creating a Modern Regional Tradition" by Chris Wilson. Pp 2-45

Alternate Readings

- Sylvia Rodríguez Art, Tourism, and Race Relations in Taos: Toward a Sociology of the Art Colony *Journal of Anthropological Research* Vol. 45, No. 1, University of New Mexico Centennial 1889-1989 (Spring, 1989), pp. 77-99
- Hal Rothman The Culture of Tourism, The Tourism of Culture: Selling the Past to the Present in the American Southwest University of New Mexico Press 2003
- Hal Rothman “Devil's Bargains: Tourism in the Twentieth-Century American West” University Press of Kansas 2000
- Marguerite Shaffer “ See America First: Tourism and National Identity, 1880-1940” Smithsonian Books 2001

Thursday, February 20: The Creation of Place in the Face of Difference II – Traditional Forms and Appropriation(continued)

- The Myth of Santa Fe: Creating a Modern Regional Tradition" by Chris Wilson. Pp 80-104, 311-329

Alternate Readings

- Costas Spirou. “Urban Tourism and Urban Change: Cities in a Global Economy” Routledge, 2011
- Stephen J. Page “Urban Tourism” Routledge 1995
- Martin Selby – “Understanding Urban Tourism: Image, Culture and Experience” - I. B. Tauris 2004

WEEK SIX

Tuesday, February 25: First Field Project Due – In Class Discussion of Field Project

Thursday, February 27: Second Field Project: *The creation of place I*

WEEK SEVEN

Tuesday, March 4: The Creation of Place in the Face of Difference – The role of order and Economics

- Mitchell, D., & Staeheli, L. (2005). Turning social relations into space: Property, law and the plaza of Santa Fe, New Mexico. *Landscape Research*, 30(3), 361-378.

Alternate Readings:

- Tim Cresswell "In Place, Out of Place" Univ Of Minnesota Press, 1996 (especially chapters 1, 2, 3 and 5)
- Beckett, K & Herbert, S "Banished: The New Social Control In Urban America" Oxford University Press, 2011
- Jeanne Flavin "Race, Gender, and Punishment: From Colonialism to the War on Terror" - Rutgers University Press (November 16, 2006)

Thursday, March 6: Second Field Project: *The creation of Place II*

WEEK EIGHT

Tuesday, March 11: The City and Indigenous Experience – I - Overview

- Troy R. Johnson. "The Relocation Program, Urban Indians, and Alcatraz": Chapter 1 in *The Occupation of Alcatraz Island*, University of Illinois Press, 1996

Alternate Readings:

- Roots of the Native American Urban Experience: Relocation Policy in the 1950s Larry W. Burt *American Indian Quarterly* Vol. 10, No. 2 (Spring, 1986), pp. 85-99
- Susan Applegate "What Came out of the Takeovers: Women's Activism and the Indian Community School of Milwaukee" *American Indian Quarterly*, Vol. 27, No. 3/4,

Thursday, March 13: Second Field Project Due – In Class Discussion of Field Project

WEEK NINE

Tuesday, March 18 – NO CLASS, SPRING BREAK

Thursday, March 20 – NO CLASS, SPRING BREAK

WEEK TEN

Tuesday, March 25: The City and Indigenous Experience – II - Impacts

- Jackson, Deborah Davis. "This hole in our heart": Urban Indian identity and the power of silence. *American Indian Culture and Research Journal*. Los Angeles: 1998. Vol. 22, Iss. 4; p. 227-258
- Susan Lobo "Urban Clan Mothers: Key Households in Cities" *American Indian Quarterly*, Vol. 27, No. 3/4,

Alternate Readings:

- Natalie J. K. Baloy, "We Can't Feel Our Language": Making Places in the City for Aboriginal Language Revitalization" *The American Indian Quarterly* Volume 35, Number 4, Fall 2011
- James Bell; Nicole Lim, "Young Once, Indian Forever: Youth Gangs in Indian

- Country” *American Indian Quarterly*; Summer 2005; 29, 3/4; pg. 626
- Hokulani K. Aikau “Resisting Exile in the Homeland: He Mo'oleno No LÄ•'ie” The American Indian Quarterly, Volume 32, Number 1, Winter 2008, pp. 70-95 (Article)

Thursday, March 27: Third Field Project: *Constructing race and culture I*

WEEK ELEVEN

Tuesday, April 1: Suburbanization and Erasing Difference In the City I – Sprawl and Boosterism

- Michael Logan (1995) Fighting Sprawl and city Hall pp 95-130 (Introduction to Part 2 and Ch. 6 & 7)

Alternate Readings:

- Rosalyn Baxandall and Elizabeth Ewen “Picture Windows: How the Suburbs Happened” Basic Books 2000
- Stephen B. Goddard “Getting There: The Epic Struggle between Road and Rail in the American Century” University Of Chicago Press 1996
- Don Luymes “The fortification of suburbia: investigating the rise of enclave communities - Landscape and Urban Planning, Volume 39, Issues 2–3, 30 November 1997, Pages 187–203

Thursday, April 3: Third Field Project: *Constructing race and culture II*

WEEK TWELVE

Tuesday, April 8: NO CLASS – Association of American Geographers Conference

Thursday, April 10: NO CLASS – Association of American Geographers Conference

WEEK THIRTEEN

Tuesday, April 15: Third Field Project Due – In Class Discussion of Field Project

Thursday, April 17: Suburbanization and Erasing Difference In the City II – Resistance and Racial Tension

- Michael Logan (1995) Fighting Sprawl and city Hall. Ch. 8 & 9 pp 131-158

Alternate Readings:

- Gonzalez, George “Urban Sprawl, Global Warming, and the Empire of Capital” State University of New York Press, 2009
- Renaud Le Goix – “Gated communities: Sprawl and social segregation in southern California.” Housing Studies, Volume 20, Number 2, March, 2005 , pp. 323-343(21)

Richardson Dilworth, *The Urban Origins of Suburban Autonomy* Harvard University Press, 2005.

Saturday, April 19: FIELD TRIP DAY

WEEK FOURTEEN

Tuesday, April 22: Public/Private Space and Community Gardening

- L. Knigge, "Intersections between public and private: community gardens, community service and geographies of care in the US City of Buffalo, NY" *Geographica Helvetica* Jg. 64 2009
- V. Lawson "Geographies of Care and Responsibility" *Annals of the Association of American Geographers*, 97(1), 2007, pp. 1–11

Alternate Readings:

- Saskia Sassen, *The Global City: New York, London, Tokyo* Princeton 2001
- David Harvey *Rebel Cities: From the Right to the City to the Urban Revolution* Verso, 2012
- Mike Davis (Ed.) *Evil Paradises: Dreamworlds of Neoliberalism* The New Press, 2008

Thursday, April 24: Environmental Futures and The City

- H. Ernstson "Urban Transitions: On Urban Resilience and Human-Dominated Ecosystems" *Ambio* (2010) 39: 531-545

Alternate Readings:

- George Gonzalez (2009) "Urban Sprawl, Global Warming, and the Empire of Capital" SUNY press. Chapters 1 and 6.
- Marc Reisner (1993) *Cadillac Desert: The American West and Its Disappearing Water* Penguin
- Brian Stone Jr. (2012) *The City and the Coming Climate: Climate Change in the Places We Live* Cambridge University Press
- Peter Calthorpe (2010) *Urbanism in the Age of Climate Change* Island Press
- M. Nils Peterson, Tarla Peterson, Jianguo Liu (2013) *The Housing Bomb: Why Our Addiction to Houses Is Destroying the Environment and Threatening Our Society* Johns Hopkins Press

WEEK FIFTEEN

NO CLASS

WEEK SIXTEEN

Thursday, May 8: Wrap up & discussion of final student-directed fieldwork project
- FINAL FIELD PROJECT DUE TODAY

POLICIES:

Ethics and Academic Dishonesty:

The course emphasizes ethical practices and perspectives. Above all, students and instructors should strive to communicate and act, both in class interactions and in assigned coursework, in a manner directed by personal integrity, honesty, and respect for self and others. Included in this focus is the need for academic honesty by students as stated by the UNM Pathfinder. Students need to do original work and properly cite sources. For example, be aware of plagiarism—directly copying more than 3 or 4 words from another author without quoting (not just citing) the author is plagiarism.

Accordingly, I consider Academic Dishonesty, including plagiarism to be unacceptable. The University's official definition of Academic Dishonesty may be found at:

<http://pathfinder.unm.edu/>

This is an upper-level course for students who have developed a strong set of intellectual and work skills, and who are familiar with university policy on academic dishonesty. One of the non-negotiable requirements for passing this course is turning in your own, original, non-plagiarized work for all assignments submitted and properly citing sources. If you plagiarize, you will fail this class. Additionally, plagiarism and/or other forms of academic misconduct may lead to the system of institutional penalties outlined at the above website

Late Work: Assignments may not be submitted by e-mail. Field-project papers will be marked down 1.0 (out of a 4.0 grade) for every day they are handed in late. In addition, you will not have a chance to rewrite your work after it has been turned in. However, you are encouraged to meet with the professor in advance to discuss and ask questions about your assignments in progress.

Missed Exams: Make-ups for a missed exam will be allowed only in situations where the student has contacted the professor considerably in advance of the exam with a documented university-approved excused absence, which are limited to 1) illness documented by a physician, 2) death in the family with requisite documentation, 3) religious observance, and 4) University-sanctioned activity.

Email responsibility: Check your UNM email account regularly, as we will use this account to keep in touch with you about course requirements or updates. If you use

another email address, please set up your UNM account to forward your UNM account email to that address.

Technology: Be respectful of each other's learning by turning off cell phones and not using the internet while in class.

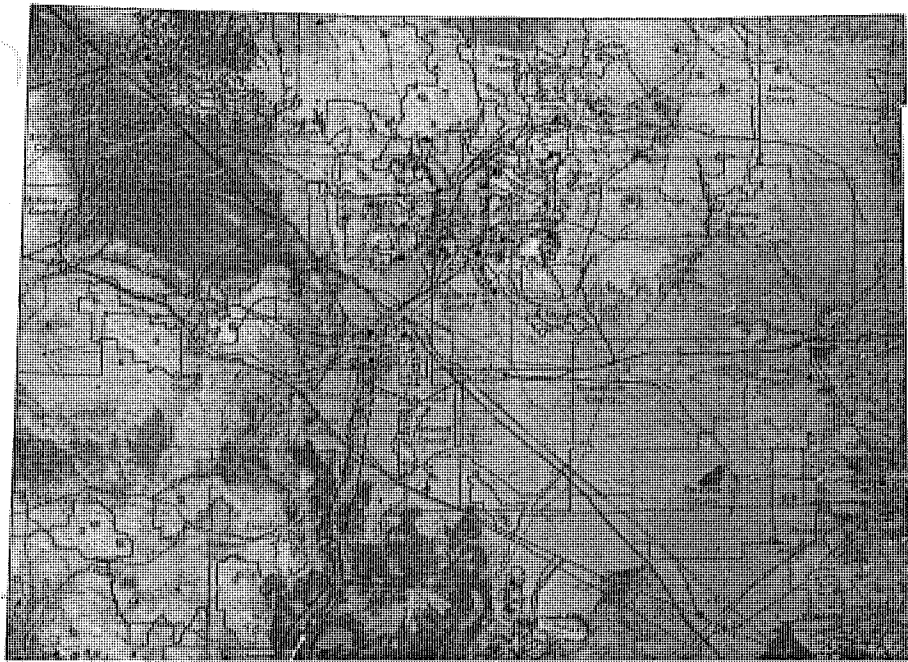
Diversity: This course encourages different perspectives related to such factors as gender, race, nationality, ethnicity, sexual orientation, religion, and other relevant cultural identities. This course seeks to foster understanding and inclusiveness related to such diverse perspectives and ways of communicating.

ADA Accessibility: Qualified students with disabilities needing appropriate academic adjustments should contact me as soon as possible to ensure your needs are met in a timely manner. Handouts are available in alternative accessible formats upon request.

Grade Appeals Policy: If you feel that I have made an error in grading your test or paper, you may bring it to my attention in the following way:

1. Carefully read the my comments;
2. Wait at least 24 hours and re-read the comments;
3. Write a clear and specific statement (typed), highlighting specific illustrations of why you believe you were graded unfairly. This should be a compelling argument that both fairly assesses your paper/exam, and objectively compares that work to the expected response;
4. Schedule a meeting with me to discuss your paper at either my office hours or a mutually agreed upon time and place, to further discuss your work and your statement;
5. If warranted, I may decide to will re-read the exam/paper and return it to you during the next section;
6. The statute of limitations on grade complaints is one week after the return of the work.

Office Hours: Office hour times and locations are subject to change. If you intend to visit me during an office hour I STRONGLY recommend that you inform me in advance to confirm time and place.



GIS
Fundamentals

GEOG 581L
Spring 2015
MW 4-5:15
SMLC B59

Course Description & Objectives

This course introduces the concepts underlying Geographic Information Systems and its utilization for the input, storage, manipulation, query, display, and analysis of geographical data.

Prerequisites

No prior GIS knowledge is assumed for this course but there is an assumption that students are computer literate and have a good working knowledge of the Windows PC environment. A basic working knowledge of Microsoft Word, Excel and PowerPoint is also assumed.

Course Objectives

To provide an understanding of the methods by which geographic features are referenced on the earth and of the methods by which we can digitally represent such features for mapping and analysis purposes.

To familiarize students with the major sources of digital spatial data available in the United States and to acquaint them with different data structures and data formats.

To provide experience of a major GIS software applications (ArcGIS).

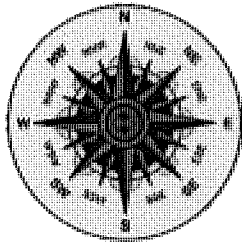
To provide a thorough understanding of the relationship between methods of digital spatial data storage and the relationship of such methods to analytical functionality within GIS.

To familiarize students with the range of applications of GIS and some of the innovative research areas associated with the technology.

To provide students with skills and techniques to independently solve geospatial problems and find solutions to software questions.

Course Schedule

A detailed course schedule will be handed out and made available on the UNM Learn website. The schedule will contain the course topics and readings for each lecture and deadlines for assignments. The course schedule is subject to change – changes will be announced in class, but students are responsible for accessing the most recent version of the schedule. If UNM is closed due to a weather issue this class will also be canceled, please check the UNM Homepage for closure information. Or sign up for the UNM text alert system.



GIS

"The application of GIS is limited only by the imagination of those who use it".

Jack Dangermond,
ESRI

"GIS is a form of digital mapping technology. Kind of like Google Earth, but better."

Arnold Schwarzenegger at the Government Technology Conference's 2008

INSTRUCTOR: DR. SHAWN L. PENMAN

Office: Bandelier Hall West Room 123
Office Telephone: (505) 277-3622 x227
Email: spenman@edac.unm.edu

Email is the easiest way to reach me

Office Hours: Thursday 12:00-1:00 pm
and by appointment. Just send me an email

Course Requirements

GRADING

50%

Five Assignments

25%

One Final Project

20%

Two exams

5%

Class Attendance & Participation

Assignments and Exams

Standard enrollment and successful completion of GEOG 581L yields three (3) credits. Grades will be based on 5 exercise assignments (50%), two exams (20%) and one final project (25%) and class attendance and participation (5%). Evaluation of performance is dependent on students submitting products of good quality and meeting all submission deadlines.

Grading Policy

The plus/minus grading system will be used to assign student grades. Grading scale is as follows:

- A+ (98-100), A (94-97), A- (90-93),
- B+ (88-89), B (84-87), B- (80-83),
- C+ (78-79), C (74-77), C- (70-73),
- D+ (68-69), D (64-67), D- (60-63)
- F (59 and below).

Exercise Assignments

In total, 5 exercise assignments have to be completed. Each of these 5 exercise assignments will count towards 10% of the final grade. Specific deadlines for each assignment are provided in the course schedule. Late submission of exercise reports will result in a reduction of the grade for that assignment of 10 points (out of 100 total) per day. Details on the expected format and content of exercise reports will be provided in class.

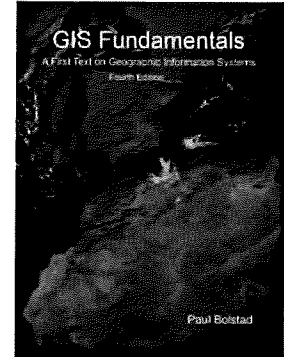
Exams

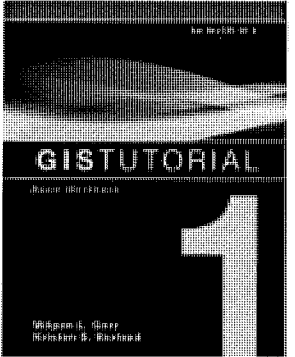
Exams will be held during regular class times on the dates indicated in the course schedule. Example exams will be distributed and discussed in class ahead of time.

Class Participation

Thoughtful class participation will not only improve the class, but will reinforce the subject being discussed. Please come with all assigned reading completed. Please inform me ahead of time through email or phone if you will be absent.

TEXTBOOKS





Required Readings

The two required textbooks for the course are:

- P. Bolstad. 20012. GIS Fundamentals, 4th Edition. Eider Press. This book is available in the UNM bookstore. Also available as pdf for \$25 from BryteWave.
- W.L. Gorr and K.S. Kurland. 2013. GIS Tutorial for ArcGIS 10.1. ESRI Press. Redlands, CA. This book is available in the UNM bookstore.

Additional readings will be posted on the UNM Learn website.

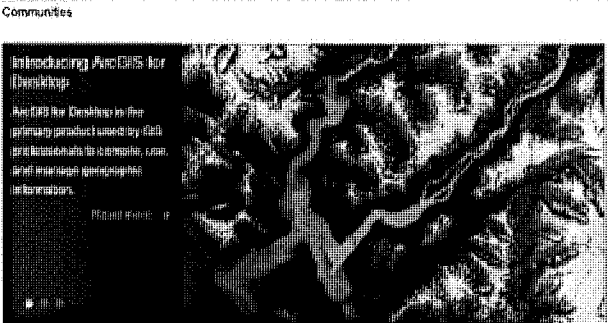
GIS LAB ACCESS & SOFTWARE

The Geography GIS lab and most UNM open use computing Pods have the necessary software (ArcGIS 10.1) to complete the lab assignments. Students will also be given a free copy of the student version of ArcGIS 10.1 that can be installed on a personal computer. Students will have access to the Geography GIS lab (Bandelier East 106) during posted open use times which are posted on the Geography webpage. Many of the UNM Computer Pods have ArcGIS installed; be careful some have an older version installed, make sure you know which version you are using. This page <http://it.unm.edu/pods/> has a map and listing of the UNM computer pods and software available in each pod. In our classroom it is ArcGIS 10.1. It is the student's responsibility to become familiarized with the operation and rules of the GIS lab and UNM Pods. Students will need to access this lab or another computing facility outside of scheduled lab sessions to complete the exercise assignments.

Helpful Equipment

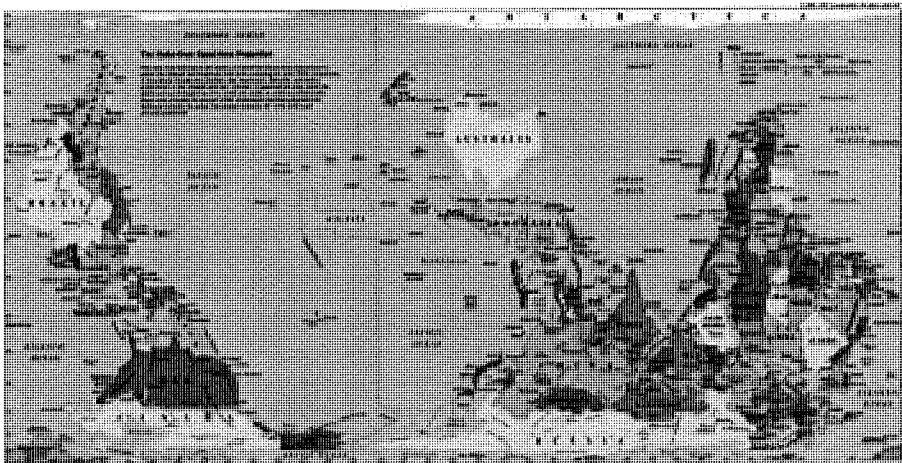
An external hard drive or a flash drive with at least 16GB of space is useful for this class. GIS data can be large and take up lots of space and you don't want to run out of disk space in the middle of an exercise. You might also want to consider a cloud backup like Dropbox for data and project backup. There's nothing worse than losing or forgetting your flash drive in the lab computer and having to start again at the beginning.

ArcGIS for Desktop



UNM Learn

Most course materials will be made available to the students through the course page on UNM Learn. It is the student's responsibility to access UNM Learn frequently to obtain course materials and check any announcements. The URL is <https://learn.unm.edu/>, please become familiar with its functionality. The instructor will typically not send out e-mails to everyone in the course with any announcements but instead post them on UNM Learn. Most questions regarding the course content and exercise assignments can also be posted in UNM Learn, with replies posted by other students and the instructor. Students should e-mail the instructor with any personal matters (such as absences) but should post general questions to UNM Learn.



Course Fine Print

Class Environment

It is important to recognize that the classroom is an environment that requires respect for all participants. Therefore, students are expected to conduct themselves in a considerate manner. All participants in the class must respect the classroom environment by being on time, turning off cell phones, pagers, and headphones, avoiding extraneous talking and chat, refraining from reading non-class material, and by not eating during classroom time.

Accommodations

Individuals who have any disability, either permanent or temporary, which might affect their ability to perform in this course, are encouraged to inform the instructor at the start of the semester. Please consult with me immediately at the beginning of the course so we can design adaptations of methods, materials, or testing as required for equitable participation.

Make-Up Exams

Make-up exams are only allowed under special circumstances and at the discretion of the instructor. These circumstances include: (1) death or illness in the student’s family or of a friend; (2) illness of the student; (3) three or more final examinations on the same day; (4) participation in a university sponsored activity at the time of a regularly scheduled examination. Make-up examinations will be granted only if circumstances are documented, and advance arrangements are made.

Incomplete Grades

Incomplete grades (I) will not be given in the course except under exceptional circumstances, based on written documentation, and at the discretion of the instructor.

Religious Preference Absence

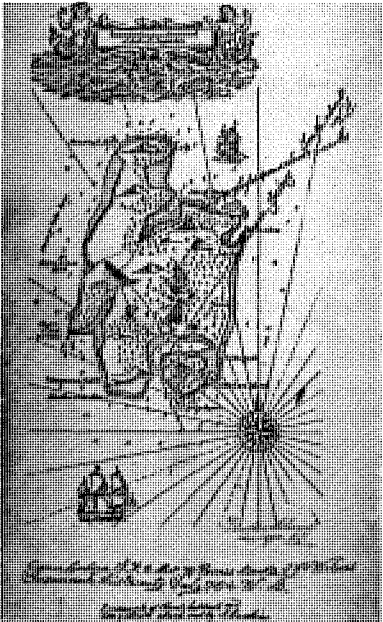
Students who anticipate being absent from class due to the observation of a major religious activity must provide written notice of the dates to the instructor by the second week of the semester.

Tapes and Notes

It is not permitted to sell notes or tapes from this class without the expressed written consent of the instructor.

Academic Dishonesty

Cheating is defined as follows: (a) the unauthorized granting or receiving of aid during the prescribed period of a course-graded exercise: students may not consult written materials such as notes or books, may not look at the paper of another student nor consult orally with any other student taking the same test; (b) asking another person to take an examination in his/her place; (c) taking an examination for or in place of another student; (d) stealing visual concepts, such as drawings, sketches, diagrams, musical programs and scores, graphs, maps, etc., and presenting them as one’s own; (e) stealing, borrowing, buying, downloading from the Internet, or disseminating tests, answer keys, or other examination material except as officially authorized, research papers, creative papers, speeches, etc.; (f) stealing or copying of computer programs and presenting them as one’s own. Such stealing includes the use of another student’s program as obtained from the magnetic media or interactive terminals or form cards, print-out paper, etc.



“I am told there are people who do not care for maps, and I find it hard to believe.”

Robert Louis Stevenson,
The Art of Writing on Treasure Island

Course Schedule

Lecture Topics / Deadlines		Exercise Assignments	Readings
Week 1			
Jan 12	Course Introduction & Intro to GIS	Exercise 1 – Spatial Data	Bolstad Ch. 1
Jan 14	GIS Data Models		Bolstad Ch. 2
Week 2			
Jan 19	No Class	Martin Luther King Jr. Holiday	
Jan 21	GIS Data Formats		
Week 3			
Jan 26	Coordinate Systems	Exercise 1 – Spatial Data	Bolstad Ch. 3
Jan 28	GIS Data Sources		
Jan 30		Exercise Report 1 due at 5:00 pm	
Week 4			
Feb 2	Data Visualization	Exercise 2 – Data Visualization	Bolstad Ch. 7
Feb 4	Data Visualization		
Week 5			
Feb 9	Presenting Data	Exercise 2 – Data Visualization	Bolstad Ch. 9 p332-339
Feb 11	Presenting Data		
Feb 13		Exercise Report 2 due at 5:00 pm	
Week 6			
Feb 16	Creating & Editing Data	Exercise 3 – Creating & Editing Data	Bolstad Ch. 4
Feb 18	Geocoding		
Week 7			
Feb 23	GPS / Remote Sensing	Exercise 3 – Creating & Editing Data	Bolstad Ch. 5 & 6
Feb 25	GPS Data Processing		
	Mid-Term Exam Preview		
Feb 27		Exercise Report 3 due at 5:00 pm	
Week 8			
Mar 4	Project Proposal Preview		

Mar 6	Mid-Term Exam		
Mar 9	No Class	UNM Spring Break	
Mar 11	No Class		
Week 10			
Mar 16	Querying Data	Exercise 4 – Vector Analysis	Bolstad Ch. 8
Mar 18	Working with Tables		
Week 11			
Mar 23	Vector Analysis	Exercise 4 – Vector Analysis	Bolstad Ch. 9
Mar 25	Vector Analysis		
Mar 27		Project Proposal due 5:00 pm	
Week 12			
Mar 30	Raster Analysis	Exercise 5 – Raster Analysis	Bolstad Ch. 10
Apr 1	Model Builder		
Apr 5		Exercise Report 4 due at 5:00 pm	
Week 13			
Apr 6	GIS Ethics, Standards, Metadata		Bolstad Ch. 14
Apr 8	TBD (Guest Lecture)		
Week 14			
Apr 13	Raster Analysis	Exercise 5 – Raster Analysis	Bolstad Ch. 11
Apr 15	Raster Analysis		
Apr 17		Exercise Report 5 due at 5:00 pm	
Week 15			
Apr 26	Final Exam Preview & Project Questions	Project work	
Apr 28	Project Presentations		
Week 16			
Apr 27	Project Presentations		
Apr 29	Project Presentations		
May 1		Project Report due at 5:00pm	
Final Exam Week			
	Final Exam		

Geography 483L/583L
Remote Sensing Fundamentals
Fall 2014
Dr. Christopher Lippitt (Chris)

Office: Bande-215
E-mail: clippitt@unm.edu
Class Meets: T & TH 1530-1645 in Bande 106
Office Hrs. T 1-2 & F 1-2 or by appt.

Course Syllabus

Objective: To introduce theoretical, technical and applied aspects of remote sensing as a tool for monitoring and managing earth resources.

Scope: Emphasis on: electromagnetic radiation transfer; data collection with aerial photographic and satellite sensor systems; and visual interpretation of air photos and satellite imagery.

Texts: Required: Jensen, J.R., 2007. Remote Sensing of the Environment: An Earth Resource Perspective, 2nd Edition, Prentice Hall (New Jersey).
Optional: Jensen, J.R. 2004. Introduction to Digital Image Processing: A Remote Sensing Perspective, 3rd Edition, Prentice Hall (New Jersey).

Exams and Graded Assignments:	% of grade
Midterm	25%
Labs and exercises	45%
Final exam	30%

Lecture Topics and Readings: The following is a provisional outline and estimated schedule for the topics to be covered each week of the semester. To make the lectures and lab sessions of maximum benefit it is useful to complete the assigned reading prior to class.

CLASS SCHEDULE

Week	Tuesday	Thursday	Reading	Homework
1	Intro. to RS	History of RS	Ch. 1 & 3	Annotated Bibliography of a news article highlighting Remote Sensing
2	Elements of Image Interpretation	Lab 1: Image Interpretation	Ch. 5	Lab
3	Principles of EMR	EMR: Atmospheric Interactions	Ch. 2 & Ch. 12	Math, Units, and Quantities Worksheet
4	EMR: Target Interactions	Lab 2: EMR Principles	Ch. 15	Lab
5	Lab 3: Spectral Signature Concepts	Air photo Geometry	Ch. 2, 12, & 15	Lab
6	Air photo Geometry	Mensuration and Photogrammetry	Ch. 4 & 6	
7	Mensuration and Photogrammetry	Platforms	Ch. 3	Object Heights Worksheet
8	Sensors	Data Acquisition and Mission Planning	Ch. 7	
9	Midterm Review (Oct. 7 th)	Fall Break: No Class		
10	Midterm Exam (Oct. 14 th)	Lab 4: Data Acquisition and	Ch. 4	Lab

		Mission Planning		
11	Intro. to Digital Image Processing	SWAAG: No Class	Mather Ch. 3 (photocopy)	Lab
12	Lab 5: Intro. to Digital Image Processing	Land Satellite Remote Sensing Systems	Ch. 3 & 7	Lab
13	Land Satellite Remote Sensing Systems	Active RS	Ch. 8, 9 & 10	
14	No Class	Thermal RS	Ch. 11	
15	Remote Sensing of Vegetation	Land Use and Land Cover	Ch. 13	
16	DIP Primer	Thanksgiving		
17	Final Review (Dec. 2nd)	Final Exam (Dec. 4 th)		

POLICY AND PROCEDURES

(1) Class Attendance and Participation

Roll will not be taken after the first week or so of class; attendance is expected and highly recommended.

(2) Textbook and Other Class Materials

Textbook: Jensen, J.R., 2007. Remote Sensing of the Environment: An Earth Resource Perspective, 2nd edition, Prentice Hall (New Jersey), is required for the course. Readings from the text are used to supplement the lecture, in terms of more detailed explanations and in providing examples and illustrations.

(3) Exams and Grades

The mid-term exam and the final exam will be based only on the lecture, lab, and reading material. A greater emphasis will be placed on materials covered in the lectures and labs. The exam format will be variable, consisting of multiple choice, true/false, matching, image interpretation, and problem solving. The final exam will be cumulative and will contain short answer essay questions.

Missing exams will not be made up, (and therefore, will count as zero points), unless the instructor is notified prior to the exam and the student receives prior approval to make up the exam. If a sudden illness or emergency occurs, make every attempt to contact the instructor before the exam. Illness or emergency excuses must be verified by a note from a responsible person (i.e., a doctor).

Make-up exams are discouraged and no student should count on the option of a make-up exam. Consecutive exams or vacation travel during final exams week is not a sufficient reason for arranging make-up exams. If a make-up exam is required and agreed to by the instructor, the student must take the exam after it is administered to the rest of the class. The make-up exams will be different from and generally be more extensive than the regular exam.

Cheating on an exam constitutes a violation of university rules and students caught cheating will automatically receive a zero grade for the exam and will be reported to the University for possible disciplinary action. Two incidences of cheating will result in expulsion from and a failing grade in the class.

Final grade decisions will be based on a flexible curve. The instructor reserves the option to raise a grade by one half to a whole grade based on consistent improvement in class performance.

(4) Labs and Homework

Remote sensing problem solving and image interpretation labs are an integral part of the course. Lab exercises will consist of some take-home exercises. All Labs are due at the beginning of the class period one week from when they are issued. Late labs will be penalized by 10% of the original point total for each day they are late (i.e., after 10 days handing in the lab will not get you any points) and are not considered submitted until in the instructors hands. Labs will be handed out and described at the beginning of each lab period.

(5) Classroom Conduct

As with all classes, respectful and honest discourse during all classroom and course related interactions and respect for the rights of fellows students to learn unhampered by distraction is expected. Non-course related communication (i.e., side conversations, cell phone calls, texting, emailing, etc.) should be reserved for outside of class time.

(6) Communication

Communication is essential to the success of this course, both for you as a student and for me as an instructor. The best way to communicate with me outside of class is by email. You are also encouraged to come to office hours or to make an appointment to see me if you are not available during that time.

(7) Helpful Tips

- Come to class (and come on time!).
- Visit me during office hours! I'm happy to answer any and all questions and love the opportunity to get to know students a little better.
- Utilize your classmates. Take a moment to exchange names and contact info with a few students at the beginning of the semester. Take the initiative to schedule group study sessions prior to exams.

Acronyms (a very partial listing)

On-line glossary: <http://www.ldeo.columbia.edu/res/fac/rsvlab/glossary.html>

Satellites and Sensors

Landsat:	Land satellite (Formerly ERTS: Earth resources technology satellite)
RBV	Return beam video camera
MSS	Multi-spectral scanner
TM	Thematic Mapper
ETM+	Enhanced Thematic Mapper Plus
OLI	Operational Land Imager
TIRS	Thermal Infrared Sensor
SPOT:	Système Pour l'Observation de la Terre
XS	Multi-spectral mode
Pan	Panchromatic mode
AVHRR	Advanced very high resolution radiometer
TIROS	Television infrared observational satellite
GOES	Geosynchronous observational environmental satellite
DMSP	Defense meteorological satellite program
ERS-1	European remote sensing satellite #1
JERS-1	Japanese earth remote sensing satellite #1
RADAR	Radio detection and ranging
RADARSAT	Canadian radar satellite
SIR	Shuttle imaging radar
ERBS	Earth radiation budget satellite
TOMS	Total ozone mapping spectrometer
SeaWiFS	Sea-viewing wide field of view sensor
EOS:	Earth Observing system (a small sample of EOS sensors)
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
MODIS	Moderate resolution imaging spectroradiometer
EOSP	Earth observing scanning polarimeter
ETM	Enhanced thematic mapper
LIS	Lightning imaging sensor
MISR	Multi-angle imaging spectrometer
MOPITT	Measurements of pollution in the troposphere
SeaWinds	Scatterometer
ADAR	Airborne data acquisition and registration system
AVIRIS	Airborne visible and infrared imaging spectrometer
SAR	Synthetic aperture radar
IFSAR	Interferometric synthetic aperture radar

Agencies and projects

BLM	Bureau of Land Management
CIESIN	Consortium for International Earth Science Information Network
EOS	NASA's Earth Observing System
EPA	Environmental Protection Agency
EROS	Earth Resources Observations Systems
ESA	European Space Agency
GSFC	NASA Goddard Space Flight Center
JPL	NASA Jet Propulsion Laboratory

NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
Pathfinder	NASA program to provide high quality global change data sets
TOPEX	Ocean topography experiment
USDA	United States Department of Agriculture
USGS	United States Geological Survey

Geography 484/584 – Applications of Remote Sensing
Spring 2014
Lecture: Tu/Th 3:30 – 4:45, BandE-106
Office hours: Tu & Th 2:30-3:30 or by appt.

Christopher Lippitt (Chris)
Email: clippitt@unm.edu
Office: Bandelier West – 215

COURSE SYLLABUS

Objectives: To build upon the theory and principles covered in GEOG 483 by exploring:
(1) computer-assisted image processing and (2) remote sensing systems that produce image data by capturing non-visible electromagnetic radiation.

Scope: The techniques and processing sequences of digital image processing will be introduced through lectures, laboratory exercises, and a class project.

Grade Basis:	Lab Exercises	40%
	Class Project	20%
	Midterm Exam	20%
	Final Exam	20%

Required Text: Jensen, 2005, Introductory Digital Image Processing: A Remote Sensing Perspective (3rd edition)
Optional Text: Jensen, 2007, Remote Sensing of the Environment: An Earth Resource Perspective (2nd edition)

Exams and Grades:
The mid-term and ½ of the final exam will be based only on the lecture and reading material. A greater emphasis will be placed on materials covered in the lectures. The exam format will be variable, consisting of multiple choice, true/false, matching, and problem solving.

Missing exams will not be made up and count as zero points, unless the instructor is notified prior to the exam and the student receives prior approval to make up the exam. If a sudden illness or emergency occurs, students must make every attempt to call the instructor before the exam and verify the excuse by a note from a responsible person. Make-up exams are discouraged. Consecutive exams or vacation travel during final exams week is not a sufficient reason for arranging make-up exams. If a make-up exam is required, the student must take the exam after it is administered to the rest of the class. The make-up exam will generally be more extensive than the regular exam. Cheating on an exam constitutes a violation of university rules and students caught cheating will automatically receive a zero grade for the exam. Two incidences of cheating will result in expulsion from the class and possible university disciplinary action.

The final class grade will be based on the cumulative point total for the class project, all exams, and all lab exercises. Final grade decisions will be based on a flexible curve. The instructor reserves the option to raise a grade by one half to a whole grade based on consistent improvement in exam performance.

Lab Content: Hands-on image processing experience will be gained with the aid of ERDAS Imagine and IDRISI Selva image processing software packages. Lab exercises will be conducted in teams and a class project will be completed by each student.

Class Project: The project for this class will consist of a complete remote sensing project, including data acquisition, preprocessing, processing, and accuracy assessment. The deliverable for projects will be a 10-

minute presentation to the class complete with slides. Attendance of class presentations is mandatory and will determine 10% of your final project grade.

Grading: All assignments are due one week after they are assigned at the beginning of class, unless stated otherwise by the instructor. Completed labs should be uploaded to UNM Learn, with questions and any required map products attached together in a single PDF. Include your name and your partners name at the top of the lab. To receive maximum points on labs, make sure to answer all questions in complete sentences, provide plenty of examples to clarify your answers, and turn in your best effort for map and image products. Late assignments will be marked off 10% per day so make sure to use the lab class time effectively when you can work with classmates and ask your instructor questions.

Lecture/Lab Schedule:

Note: This schedule is tentative, approximate, and subject to change.

Week	Tuesday	Thursday	Reading	Notes
1	Course Intro & Intro to Imaging Radiometers	Intro to Imaging Radiometers & Lab1: Intro to IP Software	Ch. 1 & Ch. 2 pg. 44-104	
2	Intro to Digital Image Processing	Image Enhancements	DIP Ch. 3 & Ch. 5 pg. 151-163	
3	Image Enhancements	Lab 2: Image Enhancements	Ch. 8 pg. 255-275	
4	Radiometric Image restoration	Geometric Image Restoration	Ch. 6 & 7	
5	Geometric Image Restoration Continued....	Lab 3: Geometric Correction	Ch. 8 pg. 276-287 & 322-329	
6		Lab 4: Spatial Filtering		
7	Classification and Thematic Mapping	Spatial Filtering and Texture	Ch. 9	Class Project Summary Due (March 6)
8	Midterm Review	Midterm Exam (March 13 th)		
9	Spring Break – No Class	Spring Break – No Class		
10	Classification and Thematic Mapping	Lab 5: Supervised Classification	Ch. 9	
11	Classification and Thematic Mapping	Classification and Thematic Mapping	Ch. 13 & Ch. 8 pg. 301-321	
12	Accuracy Assessment	Lab 6: Unsupervised Classification	Ch. 12	
13	Final Project Work Period	Final Project Work Period		
14	Multi-temporal	Lab 7: Data Pre-		

	Analysis	processing		
15	Final Project Presentations	Final Project Presentations		Final Projects Due (May 1st)
16	Final Review (May 6 th)	Final Exam (May 8 th)		

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Geography 485L/585L - Internet Mapping Syllabus

Course Instructor

Karl Benedict

Director, Earth Data Analysis Center

Research Assistant Professor, Department of Geography, University Libraries

kbene@unm.edu

(505) 277-3622 x234

Office hours prior to the class session on Wednesday afternoons (4:00-5:00 pm), and by appointment

Course Description and Objectives

Internet mapping technologies are an important component of geospatial data capture, sharing, visualization, and delivery. This course provides a survey of current and emerging internet and geospatial interoperability standards, technologies, and capabilities. The emphasis of the work in this class will be hands-on experience in four critical aspects of Internet-enabled mapping:

- The basic concepts behind web mapping technologies that enable the delivery of maps and mapped data through web browsers
- The Open Standards that facilitate the exchange of map images and geospatial data over the internet
- The use of published standards-based services in desktop mapping applications that implement those standards
- The deployment of standards-based geospatial map and data services that other systems and users may make use of

The specific class objectives that relate to these activities and departmental curriculum objectives for undergraduate and graduate students in the Geography Department include the following:

- Students will understand the concepts geospatial data and service interoperability
- Students will be able to define the specific requirements of a particular analysis or project and identify the interoperability standards that are capable of meeting those requirements
- Students will be knowledgeable in the core technologies that they may use to produce their own internet-enabled mapping capabilities
- Students will understand the strengths and limitations of current internet mapping technologies for generating cartographically effective map products.

Course Format

The general weekly structure of the class will consist of the following schedule:

Monday (by 8:00 am) Release of the week’s class module, including the recorded lecture, any required reading, portfolio milestone information, and any associated peer-review assignments.

Wednesday (5:00 - 6:15 pm) *Collaboratory* with Dr. Benedict - in-class session for demonstrations and problem-solving.

Friday (by 5:00 pm) *Due date* for *peer-review* submissions

The class will consist of the following components:

Lecture (weekly) A recorded presentation that provides an overview of high-level concepts and reference information

Portfolio Milestones (weekly) Hands-on experiences with the technologies and capabilities described in the lectures and readings. The milestones will be exploratory, in that in many instances the work will be problem based with an emphasis on creative use of concepts and reference materials in answering questions and solving practical problems.

Deep Dives (4 over the course of the semester) Activities based upon small projects that reinforce the hands-on activities undertaken in the milestones.

Peer Review of Developing Portfolio Provision of substantive feedback and discussion around products generated by peers in the class.

Mid-term & Final Examinations Take-home examinations that comprehensively cover materials introduced in class.

Readings Background and reference materials that should be reviewed in conjunction with each week’s materials.

Course Readings

Readings for the class are derived from a combination of designated course texts and online resources. While the specific readings for each week will be provided as part of the information about each class module, they will fall into two broad categories:

Required Readings that cover core knowledge required for success in the course’s activities.

Reference Readings that should be reviewed so that they may be effectively used as reference materials when working on lab and homework assignments and exams.

There are three texts that are being used in the course as core resources and are therefore listed as *required* texts.

HTML Manual of Style: A Clear, Concise Reference for Hypertext Markup Language (including HTML5), Fourth Edition (4th Edition). Larry Aronson. Addison-Wesley Professional. 2010. AKA *HTML Manual of Style* in class reading assignments. Available at the UNM Bookstore and on *1-day reserve* at Centennial Science and Engineering Library.

Beginning Google Maps API 3. Gabriel Svennerberg. Apress. 2010. AKA *Google Maps API* in reading assignments. Available through the *Books 24x7 Library Database* and on *1-day reserve* at Centennial Science and Engineering Library.

OpenLayers 2.10 Beginner's Guide.. Erik Hazzard. Packt Publishing. 2011. AKA *OpenLayers Beginner's Guide* in reading assignments. Available as an ebook through the University Libraries, and on *1-day reserve* at Centennial Science and Engineering Library.

In addition, there is an additional text that has been ordered for the class as a *recommended* text as it provides useful background and descriptive information about web site development and strategies for building more effective online resources.

Designing with Web Standards (3rd Edition). Jeffrey Zeldman & Ethan Marcotte. New Riders Press. 2009. AKA *Designing with Web Standards* in reading assignments. Available at the UNM Bookstore and on *1-day reserve* at Centennial Science and Engineering Library.

Evaluation and Grading

Class grades will be based upon the number of points acquired throughout the semester. The grade breakdown will be as follows:

- A** 360 - 400 points
- B** 320 - 359.9 points
- C** 280 - 319.9 points
- D** 240 - 279.9 points
- F** < 240 points

Points for the class will be earned through a combination of portfolio milestones, deep dives, peer-review, and exams.

As an ongoing exercise in working with the web-based technologies upon which the course is based, all milestone and deep dive activities (*after the first week's exercise*) will be completed as individual web pages within your web portfolio developed in the class.

You will use the GitHub <https://github.com> as the collaborative platform for developing and hosting your portfolio as you develop it over the term. We will review the process for setting up your GitHub accounts during the first class session.

Portfolio Milestones There will be 13 weekly milestones. While there are no formal weekly due dates for the milestones, you must keep up if you expect to successfully complete the course. *If you fall behind it will be very difficult to catch up.* I will evaluate your portfolio milestones at mid-term (40 points) and at the end of the term (40 points) for completeness, functionality, creativity and accuracy (i.e. correct answers for milestone questions when asked).

Deep Dives There will be 4 deep dive assignments during the semester. These will be small project-focussed activities that will be added to your portfolio and will reinforce the hands-on activities undertaken as part of the portfolio milestones. Each homework assignment will be worth an additional 25 points (100 points total). Evaluation of the deep dive assignments will also take place a mid-term and at the end of the class as part of the portfolio review.

Peer Review There will be 4 points during the semester that you will be asked to perform a peer review of specific components within the portfolios of your peers. Each peer review will contribute up to 5-points to your overall score for the course. The peer-review points you earn will be based upon the *substantive* feedback that you provide to other students as part of the assignment. I will review the peer-review procedures in more detail when we have our first peer-review activity.

Exams There will be two exams: a midterm and final. The midterm will be a take-home exam that will be released on Monday March 10 and due on Wednesday March 12 by the end of the class session. The final exam will be a take-home exam which will released on Monday May 12 and due on Wednesday May 14 by 5:00 pm. Each exam will be worth 100 points (200 points total).

While students are encouraged to collaborate in their work on their portfolio milestone and deep dive assignments, submitted work must be original and written and submitted by each individual student. Both exams will be individual - each student must complete their exam individually. All assignments and exams are open book and online resources may also be used in completion of the assignments and exams. BUT, again, all submitted work must be original and created by each student.

Please refer to the Pathfinder for detailed student conduct policies, and in particular the following Policy on Academic Dishonesty.

POLICY ON ACADEMIC DISHONESTY ALSO SEE FACULTY HANDBOOK D100 Adopted by the President June 15, 1992

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Technical Requirements

As an hybrid in-person/online course that is focused on the integration of online resources with desktop tools there are some specific hardware and software requirements for successful completion of the class.

Hardware Requirements

- At least 2 GB RAM
- At least 20 GB of available disk space
- Internet Connection (broadband [>728 Kb/sec] recommended)

Software Requirements

Operating System (one of the following) Microsoft Windows Vista or above

Mac OS 10.6 or above

Linux (*speak to Dr. Benedict*)

Geographic Information System (GIS) Quantum GIS (platform specific download)

ArcGIS 10 (*optional* - request free student version installation code from Dr. Benedict - *Windows Only*)

Geographic Data Processing/Analysis (one of the following) FWTools (*Windows & Linux* - free download)

GDAL and related frameworks (*Mac* - the current “GDAL Complete” convenience package available here)

You will need the following classes of software, check with Dr. Benedict if you would like to use an alternative to the ones suggested below.

Text Editor Notepad (*Windows* - included with operating system)

Notepad++ (*Windows* - free download)

TextEdit (*Mac* - included with operating system)

TextWrangler (*Mac* - free download)

Secure File Transfer Protocol Client WinSCP (*Windows* - free download)

Fugu (*Mac* - free download)

Secure Shell (SSH) Client PuTTY (*Windows* - free download)

Terminal (*Mac* - included with operating system)

Web Browser (at least one of the following) Firefox (*All Operating Systems* - free download)

Chrome (*All Operating Systems* - free download)

A desktop GitHub client for your operating system of choice The “Official” GitHub client <https://github.com>

SourceTree <http://www.sourcetreeapp.com>

Course Outline

Module 1 - *Introduction and Outline* Week 1 - January 21-24.

Module 2a - *Web-based Mapping Clients* Week 2 - January 27-31. Introduction to HTML, CSS, and Javascript

Weeks 3, 4 - February 3-14. Google Maps API

Module 3 - *GIS and Services Oriented Architectures (SOA)* Week 5 - February 17-21.

Module 4a - *Interoperability Standards* Week 6 - February 24-28. WMS, KML, and XML

Week 7 - March 3-7. WFS & WCS

Mid-term Exam and Portfolio Review Week 8 - March 10-12 (*Exam Due by end of class on March 12*)

Spring Break - No Class Week 9 - March 17-21.

Module 2b - *Web-based Mapping Clients* Weeks 10, 11 - March 24 - April 4. OpenLayers Javascript Framework

Module 4b - *Interoperability Standards* Week 12 - April 7-11. Desktop GIS Integration

Module 5 - *Developing and Hosting OGC Services* Week 13 - April 14-18. Platforms and GeoServer Introduction

Week 14, 15 - April 21 - May 2. OGC services and styling in GeoServer

Module 6 - *Integrating OGC Services into Web Mapping Clients* Week 16 - May 5-9.

Final Exam and Portfolio Review Week 17 - May 12-14 (Exam due by 5:00 pm May 14)

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Geography 586 GIS Applications
Spring 2014
Lecture&Lab: W2:00-4:30, Bandelier East 106
Office hours: T TR 2:00-3:30 or By Appointment

Danqing (Dana) Xiao
Email: dxiao@unm.edu
Office: Bandelier West 213

COURSE SYLLABUS

Objectives: Review and application of core principles of Geographic Information Science and the intermediate level operation of Geographic Information Systems.

Scope: The techniques of ArcGIS will be introduced through lectures, laboratory exercises, and a class project.

Grade Basis:	Lab Exercises	50%
	Class Project	30%
	Project Presentation	10%
	Attendance	10%

Required Text: Allen, David W. (2010) *GIS Tutorial 2: For Arcgis 10*, Esri Press, Redlands, CA. Eleventh Edition.

Project presentation: Missing project presentations will not be made up and count as zero points, unless the instructor is notified prior to the presentation and the student receives prior approval to make up the exam/presentation. If a sudden illness or emergency occurs, students must make every attempt to call the instructor before the presentation and verify the excuse by a note from a responsible person. Vacation travel during the academic term is not a sufficient reason for arranging make-up presentations.

Lab Content: Hands-on experience will be gained with the aid of ArcGIS 10 software packages. Lab exercises will be conducted individually and a class project will be completed by each student. Attendance will be recorded and is strongly recommended if you wish to be successful in this class.

Grading: Most assignments are due one week after they are assigned at the beginning of class, unless stated otherwise by the instructor. Labs need to be in soft copy format, with questions and any required map products in the same file (*.doc or *.PDF). Include your name at the top of the lab. To receive maximum points on labs, make sure to answer all questions in complete sentences, provide plenty of examples to clarify your answers, and turn in your best effort for map products. Late assignments will be marked off 10% per day so make sure to use the lab time effectively when you can work with classmates and ask your instructor questions. The final class grade will be curved.

Lecture/Lab Schedule:

Note: This schedule is tentative, approximate and subject to change.

Week	Wednesday	Reading	Lab
1	Introduction; Mapping where things are	Chap. 1	Exercise 1-3
2	Mapping Quantities	Chap. 2	Exercise 2-3, 2-4
3	Mapping Density	Chap. 3	Exercise 3-3
4	Finding what's inside	Chap. 4	Exercise 4-2
5	Selecting what's nearby	Chap. 5-1~5-3	Exercise 5-3
6	Buffering	Chap. 5-4~5-6	Exercise 5-6
7	Distance Calculation	Chap. 5-7~5-9	Exercise 5-9
8	Mapping change	Chap. 6	Exercise 6-3
9	Spring break; No class on Wed		
10	Calculating Centers	Chap. 7-1~7-3	Exercise 7-3
11	Calculating spatial distribution	Chap. 7-4~7-5	Project Proposal
12	Analysing Patterns	Chap. 8	Exercise 8-3, 8-4
13	Identifying clusters	Chap. 9	
14	Project Presentations		Project Help Period
15	Project Presentations		Project Help Period
16	Project Presentations <i>Project Due on Friday</i>		Project Help Period

GEOG 487/587: Spatial Analysis and Modeling

Instructor: Dana Xiao
Email: dxiao@unm.edu

Office: Bandelier West, Room 213
Office Hours: TR 1:45-3:00

Course Description:

This course is designed for people who have basic statistical knowledge and wish to explore further into the more advanced spatial analysis. This course focuses the formal definitions of statistical analyzes, and illustrate them with SPSS labs. Lectures cover statistical basics in geography, hypothesis testing, correlation analysis, factor analysis, and spatial pattern analysis.

Textbook

Statistical Techniques in Geographical Analysis, Third Edition, Dennis Wheeler, Gareth Shaw, Stewart Barr. Routledge Press.

Course Goals and Objectives:

- Introduce students to the basic statistical principles in geography;
- Learn spatial analysis algorithms and how to apply them to study geographical events;
- Learn SPSS basics and ArcGIS Model Builder;

Grading:

Assignments: 50%
Midterm: 15%
Final Project: 25%
Class participation: 10%

Late assignments: A late submission of the written summary after the due date will be docked 10 percent per day and will not be accepted for credit after a week.

ACADEMIC INTEGRITY: All labs should be done independently. Academic dishonesty includes cheating, plagiarism and all forms of misrepresentation in academic work, and is unacceptable at the University of New Mexico. Plagiarism (the submission of another's work without appropriate attribution) and cheating are violations of the Student Conduct Code.

The Department of Geography & Environmental Studies assesses a curriculum fee of \$50 on every undergraduate class (excluding independent study and internship credits). Because you have enrolled in this course and have paid a curriculum fee, you are entitled to access a variety of departmental resources and facilities, as detailed on our website:
<http://geography.unm.edu/resources/for-students/how-are-course-fees-spent.html>

	Lecture	Assignment	Readings
Week 1	Intro to Statistics and Computer Applications		Chap 2
Week 2	Data Collection and Descriptive Statistics	Lab 1	Chap 3&4
Week 3	Probability Distribution Samples and Population	Lab 2	Chap 5&6
Week 4	Hypothesis Testing I	Lab 3	Chap 7.1 ~7.8
Week 5	Hypothesis Testing II: ANOVA	Take-home Midterm	Chap 7.9 ~7.17
Week 6	Correlation Analysis	Lab 4	Chap 8
Week 7	Linear Regression	Lab 5	Chap 9
Week 8	Multiple Regression	Lab 6	Chap 10
Week 9	Spring Break		
Week 10	Factor Analysis	Lab 7	Chap 11
Week 11	Cluster Analysis	Lab 8	Chap 12
Week 12	Pattern Analysis	Lab 9	Chap 13
Week 13	ArcGIS Model Builder	Lab 10	
Week 14	ArcGIS Model Builder+Python	Lab 11	
Week 15	Presentations		
Week 16	Presentations	Final Project due on Friday 10:00pm	

GEOG488/588: GIS Concepts and Techniques

Instructor: Xiao, Danqing (Dana)

Office: Bandelier West, Room 213

Office Hours: TR 3:15-4:15

Course Description: Theoretical and cognitive foundation for representation of knowledge in GIS; Fundamental concepts necessary to design and implement geographical information systems. Logic programming as a tool for fast design and prototyping of data models. Formal languages and formal models, conceptual modeling techniques, methods for data abstraction, object-oriented modeling and database schema design. Relational data model and database query languages, including SQL.

Course Goals and Objectives:

- Introduce students to the theoretical foundation for representing knowledge in GIS
- Use logic-based programming as a tool for fast prototyping and design of data structures
- Introduce major database models including relational and object-oriented models

Expected Outcomes:

- Understand formal languages and formal theories
- Understand the conceptual modeling for databases
- Understand the logic of formulating possibly complex queries
- Learn SQL in this course; learn other programming languages in the future with the help of formal theories.

Grading:

Assignments: 60%

Final Exam: 30%

Class participation: 10%

Late assignments: A late submission of the written summary after the due date will be docked 10 percent per day and will not be accepted for credit after a week.

ACADEMIC INTEGRITY: All labs should be done independently. Academic dishonesty includes cheating, plagiarism and all forms of misrepresentation in academic work, and is unacceptable at the University of New Mexico. Plagiarism (the submission of another's work without appropriate attribution) and cheating are violations of the Student Conduct Code.

	Lecfure	Assignment	Readings
Week 1	Introduction to Spatial Data Models		
Week 2	Basic Set Theory and Logics	Assignment 1 Math Exercises	Set theory, Wikipedia
Week 3	Topology		Smith, 2001
Week 4	Topological Relations	Assign 2: Defining a Spatial Relation	Egenhofer and Franzosa, 1991
Week 5	Qualitative Spatial Relations		Freska, 1991
Week 6	Information System	Assign 3: Relation Matrices	Tutorial Spatial Database, Chap 1
Week 7	Database Design: Classes		Tutorial Spatial Database, Chap 2
Week 8	Database Design II: Abstractions Fall break: No class on Thu		Mark and Frank, 1992
Week 9	Relational Data Model	Assign 4: Family Tree	Relational database, wikipedia
Week 10	Relational Operators		Base Tutorial 123: Chap 1-3
Week 11	SQL		Base Tutorial 123: Chap 4-6
Week 12	SQL 2	Assign 5: SQL Queries	Base Tutorial 123: Chap 7-9
Week 13	Spatial Database		Tutorial Spatial Database, Chap 3-4
Week 14	Spatial Database		Tutorial Spatial Database, Chap 5-6
Week 15	Oracle Spatial Thanksgiving: No class on Thu		Oracle Spatial Database Document
Week 16	Final Exam due on Friday 10:00pm of the Exam Week	Final Exam (Take-home)	

Seminar: Race and Environmental Justice
Geography 518

INSTRUCTOR: _____

Email: _____

Office: _____

Office Hours: _____

CLASS MEETINGS: _____

COURSE DESCRIPTION: This course is intended to introduce graduate level students with both theoretical backgrounds to, and contemporary examples of research interrogating the imbricated nature of race, natural hazards, and environmental justice.

STUDENT LEARNING OUTCOMES

1. Students will be able to demonstrate a clear understanding of foundational and contemporary approaches to understanding race
2. Students will be able to demonstrate a clear understanding of foundational and contemporary approaches to human-environment interrelations
3. Students will be able to demonstrate a clear understanding justice as a normative principal
4. Students will be able to identify the ways that race animates and contemplates contemporary issues of environmental, natural hazard, and/or health inequality.

TEXTS:

The books to purchase are as follows:

EXPECTATIONS, ASSIGNMENTS, AND EXAMS:

1) **Class Participation:** Because much of the learning in this course comes from thoughtful discussion, listening, and interacting around the topics of the course, you are expected to attend and to participate during each class meeting. If you are not here to be a participant along with your classmates, everyone loses. Both your attendance and the quality of your participation will be considered in determining final grades.

- a. **Timely completion of the following weekly analysis assignments.** If you have not submitted a timely analysis, I will ask you to leave the class in which the covered readings are discussed. As mentioned below, you may opt out of this requirement once during the semester.

- b. **Respectful dialog.** This is a non-negotiable requirement of this class. Practices to ensure this include: listening closely and respectfully; refraining from ridicule or interruption; retaining modesty and humility. I particularly stress the “golden rule”; if you introduce an author or a concept not otherwise covered in class, this is an opportunity for you to introduce helpful supplementary substance. In other words, contribute expansively in the learning experience, avoiding name- or concept-dropping. There is much to explore in the course and many arguments to be heard, so let’s work to create an environment where explorations are encouraged and enjoyable.
- 2) **Weekly Analyses:** Every week each student will compose and transmit a reaction to each week’s reading and post it to the entire class via WebCT by _____. This reaction can take many forms: a critical reaction to one or more of the readings; a set of questions to be explored in class; the isolation of a line of tension between different readings; a proposed set of connections to other readings. Other possibilities exist, and deserve to be explored, but the principal goals of the reaction are two: to develop a critical response to the readings, and to contribute to building a constructive class discussion. You may opt out of one of these papers over the course of the semester and still be allowed to attend the relevant discussion.
- 3) **Final Paper:** You must write a final paper 20-25 pages long (typed, double-spaced, normal margins, twelve-point font), not including title page and/or bibliography. I expect this paper to engage with a substantial portion of the course readings and concepts from our in-class discussions. The “big idea” is to use the resources available from this class – including the literature, in class discussions, and my knowledge and feedback – to help frame, or otherwise address a problem or project. And this is why I REQUIRE you to engage with a substantial portion of the literature from this class (even if it is not the only, or even the majority of the literature you address), so that you have the opportunity to draw on those tools to the fullest. Thus, the page limits act primarily as a guideline. Ultimately what is most important is substantially engaging with broader explanatory concepts from class. That said, I hope your work in this class will help you in your existing course of study and research. Thus the final paper is open to a wide array of topics and projects. To ensure that you are able to use this opportunity to the fullest, you are required to meet with me during my office hours to discuss your final paper topic at some point prior to the last week of classes. The final paper is due on _____.

GRADING:

Your paper, exams, attendance and participation will be given the following weights in the calculation of final grades:

Participation & Weekly Analyses:	50% of final grade
Final Paper:	50% of final grade
<hr/>	
TOTAL:	100%

Class Schedule

UNIT 1: HISTORICAL AND THEORETICAL FOUNDATIONS

Week 1 - Introduction
READING: No reading assignment

Week 2 Theoretical Backgrounds: Conceptualizing the Environment
READING:

Week 3 Theoretical Backgrounds: Conceptualizing Justice
READING:

Week 4 Critical Race Theory I – an Introduction
READING:

Week 5 Critical Race Theory II – Race, Spatiality, and Justice
READING:

Week 6 Marxist Geography
READING:

Week 7 Feminist Geography
READING:

Week 8 Critical Legal Theory
READING:

Week 9 Indigenous Meaning Systems
READING:

Week 10 Deep Ecology and Post-Human approaches
READING:

UNIT 2: CONTEMPORARY APPLICATIONS

Week 11 Race and Environmental Pollution I
READING:

Week 12 Race and Environmental Pollution II
READING:

Week 13 Race and Natural Hazards I
READING:

Week 14 Race and Natural Hazards II
READING:

Week 15 Race and Crime
READING:

Week 16 Race and Health
READING:

POLICIES:

Ethics and Academic Dishonesty:

The course emphasizes ethical practices and perspectives. Above all, students and instructors should strive to communicate and act, both in class interactions and in assigned coursework, in a manner directed by personal integrity, honesty, and respect for self and others. Included in this focus is the need for academic honesty by students as stated by the UNM Pathfinder. Students need to do original work and properly cite sources.

Accordingly, I consider Academic Dishonesty, including plagiarism to be unacceptable. The University's official definition of Academic Dishonesty may be found at:

<http://pathfinder.unm.edu/>

This is a graduate course for students who have developed a strong set of intellectual and work skills, and who are familiar with university policy on academic dishonesty. One of the non-negotiable requirements for passing this course is turning in your own, original, non-plagiarized work for all assignments submitted and properly citing sources. If you plagiarize, you will fail this class. Additionally, plagiarism and/or other forms of academic misconduct may lead to the system of institutional penalties outlined at the above website

Late Work: Late work will not be accepted. Turn in your work in a timely manner by deadline. In addition, you will not have a chance to rewrite your work after it has been turned in. However, you are encouraged to meet with the professor in advance to discuss and ask questions about your assignments in progress.

Email responsibility: Check your UNM email account regularly, as we will use this account to keep in touch with you about course requirements or updates. If you use another email address, please set up your UNM account to forward your UNM account email to that address.

Technology: Regularly check your UNM email account as we will use this account regularly for the course. If you use another email address, please forward your UNM email to that address. Of course, turn off cell phones and do not internet surf in class.

ADA Accessibility: Qualified students with disabilities needing appropriate academic adjustments should contact me as soon as possible to ensure your needs are met in a timely manner. Handouts are available in alternative accessible formats upon request.

Diversity: This course encourages different perspectives related to such factors as gender, race, nationality, ethnicity, sexual orientation, religion, and other relevant cultural identities. This course seeks to foster understanding and inclusiveness related to such diverse perspectives and ways of communicating.

Office Hours: Office hour times and locations are subject to change. If you intend to visit me during an office hour I STRONGLY recommend that you inform me in advance to confirm time and place.

Grades: All grades assigned are final and non-negotiable. No incompletes for the semester will be given unless you can demonstrate valid and compelling reasons for your inability to complete the work. No extra-credit or make-up assignments will be offered.

OILS 515 - Introduction to Spatial Data Management - Syllabus

Many data products are inherently spatial. Obviously spatial data include data collection locations, but many other data may also be considered spatial: locations in space that documents pertain to and locations of historic or literary events illustrating just a few. While maps are a familiar product derived from spatial data, there is significant understanding of the underlying data – the processes to which it has been subjected, the actual values within the data, the originator of the data, any limitations in the appropriate use of the data, and the nature of the dataset itself (format, scale, coordinate system, units) – that is required before it can be productively used for research or applications. This course is designed to provide graduate-level students with the necessary skills and knowledge to meet this challenge through hands-on work in *discovering*, *creating*, *managing*, *using*, *documenting* and *sharing* spatial data. After completing this course students will be better prepared to develop a plan for the management of their spatial data, locate and evaluate data sources that they need for their research, create and structure data that they collect for maximum value both during and after their research project, and document their data throughout their research projects, maximizing the impact of their research and the value of the data they generate and share with other researchers.

Course Instructor

Karl Benedict

- Associate Professor, College of University Libraries and Learning Sciences
- Affiliated Faculty, Department of Geography
- Adjunct Professor, Department of Anthropology

Email: kbene@unm.edu

Phone: (505) 277-5256

Office Hours: Wednesdays from 4-5 pm in CSEL L173 and by appointment.

Office Location:

Centennial Science and Engineering Library - CSEL L173

Course Description and Objectives

An understanding of core spatial data concepts and principles is increasingly important in the current world of collaborative, spatially enabled research and applications. We are no longer working in a vacuum as individual researchers

that only need to understand and use the data that we create and use in our separate research projects. Successful research depends upon being able to integrate data generated by others with our own and by extension being able to share our data with others, both during our research projects and also for posterity (and to meet the requirements of funding agencies). This class will focus on the following aspects of spatial data management that relate to this need for effective integration, use, collaboration and sharing:

- The *Research* and *Data Lifecycles*
- Types of spatial data
- Spatial database design and management
- Working with and managing gridded data
- Spatial data documentation standards and practices
- Data management planning
- Ethical, legal and privacy issues as they relate to spatial data
- Emerging topics

Upon completion of the course students will have improved their knowledge and skills in the following areas:

- Locating and evaluating spatial data based upon knowledge of formats, content models and documentation standards
- Structuring data (both in terms of format selection and content) from a variety of sources to enable integrated research
- Evaluate data products to determine which elements of a dataset might raise ethical, legal or privacy issues if released or shared with others
- Documenting data as an ongoing process throughout the research cycle
- Producing machine- and human-readable documentation for data to support discovery, understanding, and use of data that they produce

Course Format

The course is structured as a combination of short lectures/demonstrations (presented as part of our concurrent collaborative sessions) that set the stage for the technical topics covered in the readings, hands-on work with data and data documentation, and data management planning exercises. While offered as an online course, several online web conferences (collaboratory sessions) are required as part of the class participation. These sessions are plananed for Wednesday evenings from 5:00-6:30 pm and listed under the “Collaboratory” column in the class calendar.

Readings

Nikos Mamoulis (2012), Spatial Data Management. Synthesis Lectures on Data Management #21. Morgan & Claypool Publishers. DOI10.2200/S00394ED1V01Y201111DTM021. [http://unm.worldcat.org/title/spatial-data-management/oclc/767844616&referer=brief_results\[SDM\]](http://unm.worldcat.org/title/spatial-data-management/oclc/767844616&referer=brief_results[SDM])

Michael J. Hernandez (2003). Database Design for Mere Mortals: a Hands-on Guide to Relational Database Design. 3rd ed. Addison-Wesley. [http://unm.worldcat.org/title/database-design-for-mere-mortals-a-hands-on-guide-to-relational-database-design/oclc/872560697?ht=edition&referer=di\[DBD\]](http://unm.worldcat.org/title/database-design-for-mere-mortals-a-hands-on-guide-to-relational-database-design/oclc/872560697?ht=edition&referer=di[DBD])

Additional online readings will also be assigned over the course of the semester.

Evaluation and Grading

Course grades will be based on a combination of participation in live and online discussions and peer-review, the smaller assignments (listed under the “Assignment” column in the class calendar), and the semester-long class project. The grade for the class will be weighted according to the following breakdown:

- Class Participation: 20%
- Small Assignments: 40%
- Class Project: 40%

While students are encouraged to collaborate in their work on the project and homework assignments, submitted work must be original and written and submitted by each individual student.

Please refer to the Pathfinder for detailed student conduct policies, and in particular the following Policy on Academic Dishonesty.

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Technical Requirements

Software

- Recent Windows, Mac or Linux Operating System
- GIS - Quantum GIS <http://www.qgis.org/>
- Spatial Database - SpatiaLite
 - <http://www.kyngchaos.com/software/frameworks>[Mac OS X]
 - <http://www.gaia-gis.it/gaia-sins/>[Windows & Source (Linux)]
- Python (possible, based upon interest)

Hardware

Relatively recent laptop or desktop computer with at least 4GB ram and 50 GB free hard disk space

Headset with integrated microphone and headphones (strongly recommended) or microphone and speakers (not recommended but can work in some circumstances) for participation in remote collaboration sessions

Network Connectivity

Broadband internet connectivity. Some wireless networks may not be sufficient and should be tested prior to participation in web conferences.

Weekly Schedule

Week	Assignment				
	Date	Topic	Collaboratory	Project	
1	tbd	Course Overview - Introduction to the Data Lifecycle	Class Introduction -	-	
2	tbd	Types of Spatial Data - Vector	-	Domain specific literature review	Define data management focus for term
3	tbd	Types of Spatial Data - Raster	-	-	-

Week	Date	Topic	Collaboratory	Assignment	Project
4	tbd	Database design I	Discuss literature review results	Post literature review to discussion	-
5	tbd	Database design II	-	Locate and describe data and review for documentation, usability and understanding	-
6	tbd	Geodatabase design	-	-	-
7	tbd	Managing raster data	-	-	-
8	tbd	Fall Break	-	-	-
9	tbd	Data formats for Analysis and Archiving	<i>Presentations</i> of data - review		Enumerate specific data (\geq three datasets) to be used in the project
10	tbd	Documenting data - the interview	-	-	Create initial data
11	tbd	XML Document creation, editing and validation	-	-	-
12	tbd	Metadata Standards - FGDC	-	-	Document Data
13	tbd	Metadata Standards - ISO and Dublin Core	Data management planning process Q&A	Create a data management plan	-

Week	Date	Topic	Collaboratory	Assignment	Project
14	tbd	Data management planning	-	-	-
15	tbd	Data management planning (continued)	-	Data management plan peer review	Project data and documentation peer review
16	tbd	Emerging concepts/ Ethical, legal and privacy issues	<i>Project Presentations</i>	-	Present project results and peer review outcome
17	tbd	Finals Week	-	-	-

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Geography 524

Adv. Topics in Remote Sensing
Fall 2016
Dr. Christopher Lippitt (Chris)

Office: Bande-203
E-mail: clippitt@unm.edu
Class Meets: F 0930-1200 in Bande 106
Office Hrs. T 1-2 & F 1-2 or by appt.

Course Syllabus

Objective: To explore theoretical, technical and applied advancements in remote sensing as a tool for monitoring and managing earth resources.

Scope: Student selected topics

Texts: Optional: Jensen, J.R., 2007. Remote Sensing of the Environment: An Earth Resource Perspective, 2nd Edition, Prentice Hall (New Jersey).
Optional: Jensen, J.R. 2004. Introduction to Digital Image Processing: A Remote Sensing Perspective, 3rd Edition, Prentice Hall (New Jersey).

Graded Assignments:	% of grade
Subject Presentations	30%
Participation	20%
Final Project Presentation	20%
Final Project Paper	30%

Learning Outcomes:

1. Students will be able to discuss the frontiers of Remote Sensing innovation and research
2. Students will be able to apply an advanced remote sensing technique/method to their own field of expertise
3. Student will have a working knowledge of how remote sensing has been successfully applied to their own field of expertise
4. Students will be able to orally present complex technical remote sensing topics in a clear and concise manor
5. Students will be able to report complex technical remote sensing topics, clearly and concisely, in writing

Subject Presentations: Each class meeting will start with 2 student lead subject presentation and discussions. Each student will be responsible for researching the topic, providing the class with relevant readings developed in consultation with the instructor. Topics and dates will be selected at the first class meeting. Presenters are expected to provide the class with reading materials at least 1 week prior to their scheduled time to present and lead discussion. The student will present core concepts and considerations of their topic for approximately 20 minutes and then lead a ~30-40 minute discussion of the topic with the class. Participation by all students is expected.

Project: Each student will complete a remote sensing project of scientific merit, meaning that it contributes novel scientific knowledge. The project's innovation may be methodological or application focused, but each must employ remote sensing to answer a novel, defined research question. Project results will be presented in professional paper presentation format, with 20 minutes for presentation and 10 minutes for questions. Presentations and papers are expected to be of professional quality sufficient for presentation and publication at national meetings and their proceedings.

COURSE SCHEDULE:

Week 1: Introduction – selection of topics and dates

Weeks 2-10: Student subject presentations – Readings to be assigned by student facilitators

Week 11: No Class – SWAAG conference

Week 12: Peer evaluation of First Full Draft of final Paper

Week 13: Final project workgroups

Week 14: No Class – Thanksgiving

Weeks 15-16: Student Presentations of Final Projects

POLICY AND PROCEDURES

(1) Class Attendance and Participation

Attendance is expected. This is a seminar course where participation is required to obtain many of the core benefits of the course. Participation represents a significant portion of the grade for this course because it is critical to the success of the course for all participants.

(2) Textbook and Other Class Materials

There are no required textbooks for this course. Readings will be provided by peers in hard or soft copy format.

(3) Classroom Conduct

As with all classes, respectful and honest discourse during all classroom and course related interactions and respect for the rights of fellows students to learn unhampered by distraction is expected. Non-course related communication (i.e., side conversations, cell phone calls, texting, emailing, etc.) should be reserved for outside of class time. Enthusiastic debate of course topics is encouraged.

(4) Communication

Communication is essential to the success of this course, both for you as a student and for me as an instructor. The best way to communicate with me outside of class is by email. You are also encouraged to come to office hours or to make an appointment to see me if you are not available during that time.

(5) Helpful Tips

- Come to class (and come on time!).
- Visit me during office hours! I'm happy to answer any and all questions and love the opportunity to get to know students a little better.
- Utilize your classmates. Take a moment to exchange names and contact info with a few students at the beginning of the semester. Take the initiative to schedule group study sessions prior to exams.

GEOG 4/527: Introductory Programming for GIS

Course Description:

This course is designed for people who are familiar with ArcGIS 10 (and later versions) but who are new to programming. As a high level programming language with a variety of built in spatial tools, Python has become the de facto programming language of the GIS user community. ArcGIS therefore supports both control and custom tool development through Python scripting. This course introduces programming with python, primarily through interaction with ArcGIS, and explores the core of spatial analysis functions in ArcGIS using Python modules.

Textbook (Required):

GIS Tutorial for Python Scripting, David W. Allen, ESRI Press 2014

Building Skills in Python, Steven F. Lott, opensource textbook:

<http://www.itmaybeahack.com/homepage/books/>

Prerequisite:

GEOG 381: Intro to GIS

or

GEOG 581: Fundamentals of GIS

Course Goals and Objectives:

- Introduce students to basic programming principles;
- Learn the basics of programming in Python;
- Introduce ArcGIS ArcPy and how it works with Python;

Learning Outcomes:

- Students will have an understanding of the basic concepts of programming, including data structure and functions ;
- Students will be able to write and execute simple, standalone programs in Python;
- Students will be able to CUSTOMIZE advanced functions using Python and ArcGIS ArcPy for a specific research purpose.

Grading:

Assignments: 60%

Final Project: 30%

Class participation: 10%

Final Project: Students will work on final projects in groups of 2-3. Each group needs to develop a tool for ArcGIS written in Python. The tool shall provide a function that is currently not offered by ArcGIS (e.g., a new hexagonal binning map tool). The tool needs to have a GUI interface to enable interaction in ArcGIS. When grading, the complexity of the tool will be considered as well as robustness.

Late assignments: Late submission of assignments will be penalized 10 percent of the total available points per day and will not be accepted for credit after a week.

ACADEMIC INTEGRITY: All labs should be done independently. Academic dishonesty includes cheating, plagiarism and all forms of misrepresentation in academic work, and is unacceptable at the University of New Mexico. Plagiarism (the submission of another’s work without appropriate attribution) and cheating are violations of the Student Conduct Code.

	Lecture	Assignment	Readings
Week 1	Programming Language Basics: Why Programming? Why Python? Why ArcGIS?		
Week 2	Programming Language Basics: Expressions and Variables		
Week 3	Programming Language Basics: Logic Operators and Looping		
Week 4	Data Types: Strings, Tuples, and Lists		
Week 5	Data Types: Sets and Exceptions		
Week 6	Data Types: Classes & Files		
Week 7	Functions: Functions and Modules		
Week 8	Fall break		
Week 9	Functions: Recursion		
Week 10	ArcGIS and Python: Using Python in Field Calculation		
Week 11	ArcGIS and Python: Table Operations and Hashing		
Week 12	ArcGIS and Python: Arcpy toolboxes I		
Week 13	ArcGIS and Python: Arcpy toolboxes II		
Week 14	Project Presentation		
Week 15	Project Presentation Thanksgiving	All labs due	
Week 16	Final Project due on Friday 10:00pm of the Exam Week		

GEOG 4/528: Advanced Programming for GIS

Course Description:

More and more GIS programmers are turning to Python and this course focuses on the creation of standalone, distributable programs in Python. A number of advanced data structures and applications are explored. Real-world applications of the various coding topics are also presented. An emphasis is placed on developing robust, documented code that is ready for distribution to other users. Building on GEOG 4/5XX, this course gives programmers a foundation in the fundamentals of abstraction and data structures in the Python language.

Textbook (Required):

Data Structures and Algorithms Using Python, Rance D. Necaise, 1st Edition, Wiley 2010

Prerequisite:

GEOG 4/527 Introductory Programming for GIS

Course Goals and Objectives:

- Learn advanced Python topics;
- Become proficient in Pyscripter programming environment;
- Learn to collaborate on advanced Python + GIS projects.

Expected Outcomes:

- Students will be able to understand advanced concepts of programming, including data structures and algorithms;
- Students will be able to code advanced programs in Python, and COLLABORATE;
- Students will be able to build readable, documented python code for distribution and reuse.

Grading:

Assignments: 50%

Final Project: 40%

Class participation: 10%

Final Project: Students will work on final projects independently. The student can either develop an extension for an existing software package (e.g., an extension to use R modules in ArcGIS), or update an existing spatial algorithm to improve the efficiency (e.g., an efficient Kriging). Either path will require supporting documentation and legible, properly annotated code. When grading, the complexity, efficiency, and robustness of the resulting code will be considered, in addition to the supporting documentation and annotation. .

Late assignments: Late submission of assignments will be penalized 10 percent of the total available points per day and will not be accepted for credit after a week.

ACADEMIC INTEGRITY: All labs should be done independently. Academic dishonesty includes

cheating, plagiarism and all forms of misrepresentation in academic work, and is unacceptable at the University of New Mexico. Plagiarism (the submission of another’s work without appropriate attribution) and cheating are violations of the Student Conduct Code.

	Lecture	Assignment	Readings
Week 1	Abstract Data Types		
Week 2	Arrays		
Week 3	Sets and Maps		
Week 4	Algorithm Analysis		
Week 5	Searching and Sorting		
Week 6	Linked Structures		
Week 7	Stacks & Queues		
Week 8	Fall Break		
Week 9	Recursion		
Week 10	Hash Tables		
Week 11	Advanced Sorting		
Week 12	Binary Trees		
Week 13	Search Trees		
Week 14	Voronoi Diagram		
Week 15	Point in Polygon Algorithm	All labs due	
Week 16	Final Project due on Friday 10:00pm of the Exam Week		

GEOG550: Plant Geography

Draft syllabus — Chris Duvall, 4 November 2015

1. Learning outcomes:

- Students will be able to explain advanced theories of geographic change and difference in plant communities.
- Students will be able to summarize major patterns of current plant geography.
- Students will be able to describe major processes of ecological change in plant communities.
- Students will be able to formulate and execute field-based research projects on plant communities.
- Students will build proficiency in communicating research findings and advanced theoretical concepts in oral and written formats.

2. Grading/expectations:

- Participation (attendance and contribution to in-class discussions) is worth 50% of a student's score for the course.
- Assignments are worth 50% of a student's score. There are three assignments: 1) Exam on basic principles (see week 4, below); 2) Independent research on historical biogeography (see weeks 7 and 8, below); and 3) Group, field-based research on vegetation (see weeks 9, 12, 13, and 16, below).

3. Course outline:

- Week 1: The course begins with an overview and basic review of genetics, evolution, and taxonomy, biological fields that are central to biogeography.
- Week 2: This week focuses on broad-scale patterns of plant geography by examining the difference between vegetation, flora, and ecosystems, and identifying correlations between vegetation, climate, and land surface features, and between flora, fauna, and dispersal barriers.
- Week 3: This is the first of two weeks that examine key theories in biogeography. This week focuses on island biogeography, by examining key texts and case studies.
- Week 4: This week focuses on biogeographic theories of system behavior. Course materials provide overviews and critiques of ideas such as ecological succession, non-equilibrium theory, stability/instability, and general systems theory. This week includes an exam on the material covered thus far.
- Week 5: This is the first of four weeks focused on historical biogeography. This week focuses on evolutionary processes, focusing on the geographic processes that can lead to speciation, and the patterns of genetic variation these processes can produce.
- Week 6: In this second week on historical geography, the course focuses on phylogeography, or the distribution of genetic lineages. Course materials provide an overview of analytical methods, and major findings in the field.

- Week 7: In this third week on historical biogeography, the course explores actual biogeographic patterns that are associated with past events, such as Pleistocene climate change, transatlantic human migrations, and uplift of the Rocky Mountains. Students select actual course content by leading discussion of the topic of their first research assignment in class.
- Week 8: In this final week on historical biogeography, student-led discussions of research findings continue and conclude.
- Week 9: During this week, the course takes a field trip to a local site. Students will observe vegetation and flora, and work in groups to develop testable hypotheses related to plant geography. These hypotheses are the basis of the assignment that will be completed during weeks 12, 13, and 16. Course materials will review basic methods of field data collection, some of which will be practiced during the field trip.
- Week 10: This week is the first of two on ecological processes of change. This week focuses on plant geomorphology, or the relationship between surface processes and vegetation. Course materials will cover basic principles and select case studies.
- Week 11: This week focuses on the processes through which climate change can affect vegetation and floras. Course materials focus on the most recent findings related to current global climate change.
- Week 12: This week, the course reviews basic methods of statistical analysis used in association with field data collection. In conjunction with this topical content, students have time to work in class on their group research project.
- Week 13: During this week, the course takes a field trip, returning to the site visited during week 9. Student groups will collect data to test their research hypotheses.
- Week 14: This week is the first of two on human–plant relationships. This week focuses on vegetation management practices. Course materials will provide an overview of principles related to invasive plants, wildfires, and forestry.
- Week 15: This week focuses on social–cultural meanings plants have to humans. Course materials consider economic botany, agriculture, ethnobotany, and plants as expressive symbols.
- Week 16: During this week, student groups present and discuss the results of their research projects, including reflections on the research process.

GEOG551: Drylands

Draft syllabus — Chris Duvall, 4 November 2015

1. Learning outcomes:

- Students will be able to explain the formation and persistence of drylands.
- Students will be able to identify major biological adaptations to dry environments.
- Students will be able to explain advanced theories of geomorphology in dryland environments.
- Students will be able to describe human activities and impacts in major global dryland areas.
- Students will build proficiency in communicating research findings and advanced theoretical concepts in oral and written formats.

2. Grading/expectations:

- Participation (attendance and contribution to in-class discussions) is worth 50% of a student's score for the course.
- Assignments are worth 50% of a student's score. There are four assignments: 1) Exam on basic principles (see week 8, below); 2) Exam on global dryland regions (see week 16, below); 3) Independent research: first draft of research paper (see weeks 4 and 9, below); and 4) Independent research: first draft of research paper (see weeks 12 and 16, below).

3. Course outline:

- Week 1: The course begins by specifying the geographic region covered in the course, by defining "dryland" and related terms, and by identifying the relevant global biomes and climate regions. Broadly, "dryland" refers to areas with very low absolute levels of average annual precipitation, and areas with over 50% of average annual precipitation concentrated in less than four months.
- Week 2: This week, the course examines the climate patterns and processes associated with drylands, in order to recognize and understand climatic variability between different dryland areas, and the persistence of drylands through geological time.
- Week 3: The course focuses on organism and ecosystem adaptations to dryness this week. Course materials will provide an overview plant and animal physiologic adaptations, and periodic ecosystem structural changes related to seasonal aridity.
- Week 4: This week is the first of four related to dryland geomorphology. The course focuses on soil formation processes this week, and compares these processes to those observed in other environments. Course materials include key theoretical works, and select case studies. Additionally, students will work in peer groups in class to develop their individual research projects.

- Week 5: Course materials focus on temporary fluvial processes this week. Students will learn about landforms produced by ephemeral to seasonal drainage events, such as alluvial fans, bajadas, and playas.
- Week 6: This week the course focuses on geomorphic processes associated with exotic rivers, or those that flow through drylands. Course materials will focus on basic theories, and also review case studies associated with major exotic rivers including the Nile, Niger, and Colorado.
- Week 7: This final week of dryland geomorphology will focus on aeolian processes. Students will learn about erosion and deposition caused by wind, and how these processes are related to aridity.
- Week 8: This week the course includes a review of material covered thus far, and an exam on this material.
- Week 9: During this week, students work in peer groups in class to finalize and evaluate the first drafts of their research papers.
- Week 10: This is the first of six weeks that examine conditions in dryland areas in each continent. Topical materials will include: identification and description of major dryland areas; formative physical geographic processes for these areas; and past and present human impacts on these areas. The focus this week is on North American drylands, particularly the Mojave, Sonora, and Chihuahuan deserts, the Colorado Plateau, Great Basin, and Great Plains.
- Week 11: During this week, the course continues its focus on North American drylands, including a field trip to a local site.
- Week 12: The six-week course component that examines drylands in each continent continues by focusing on South America, particularly the Atacama Desert, Patagonia, and the Andean highlands. Also during this week, students will work in peer groups in class to continue developing and revising their individual research projects.
- Week 13: The continental focus of this week is Eurasian drylands, which extend primarily in a broad band from western China to the eastern Mediterranean.
- Week 14: This week focuses on African drylands, including the Sahara, Kalahari, and Somali deserts, as well as the continent's extensive savanna woodlands.
- Week 15: This week considers Australian drylands, particularly the Great Victoria Desert, as well as the Polar drylands, particularly Antarctica.
- Week 16: During this week, students will complete their individual research projects by presenting their findings in class. Also, during finals week there will be an exam on material covered during weeks 10 through 15.

GEOG 590
Qualitative Methods

TBA

Instructor: Melinda Harm Benson
Assistant Professor, Department of Geography
Office Hours: MW from 2:00-3:00 p.m. and by appointment
Bandelier Hall West Room 211
Email: mhbenson@unm.edu

Readings: Readings will be provided on UNM Learn. In addition, there are the following required texts available at the bookstore and online vendors:

- Maggi Savin-Baden and Claire Howell Major (2013), *Qualitative Research: the Essential Guide to Theory and Practice*
- Melanie Limb and Claire Dwyer, eds. (2001), *Qualitative Methodologies for Geographers: Issue and Debates*
- Shawn Wilson (2008), *Research as Ceremony: Indigenous Research Methods*

All other readings will be provided on UNM Learn.

Description: This course is designed to expose students to the underlying theories, purpose, scope, and procedures of qualitative research, especially as applied to human geography. It is not a template or “how to” course, because qualitative work is very context dependent. Instead the course will give you a framework for proceeding with your own qualitative research, as well as for evaluating qualitative research. Readings will draw on a variety of work in the social sciences, especially anthropology, geography, sociology, and women’s studies. We will examine a range of qualitative methods, including interviews, participant and non-participant observation, ethnography, action research, and discourse analysis. Through case study readings, we will examine how scholars employ these methods in different research contexts, with particular attention to the ethical and practical considerations of doing so. The course will engage theoretical debates relevant to qualitative research by addressing questions such as:

- How does qualitative research challenge the practice of social "science" and the search for "universal truths"?
- How do we represent the world, or multiple understandings and perspectives of it?
- What are the implications of using qualitative data for the researcher, the research product, and the "researched"?
- How do we interpret qualitative data and present it to scholarly audiences?

This course is open to all graduate students, ideally those who have already had some exposure to the major theoretical and epistemological debates in their own disciplines.

Objectives: This course contributes to the Geography Department’s mission and goals. Our overarching mission is to promote, develop, and improve spatial literacy through all our programs. Our goals for the M.S. degree program are as follows:

- A. Students will learn to conduct legitimate and original research on geographical topics.
- B. Students will develop an ability to communicate clearly and effectively.
- C. Students will prepare themselves for professional careers in Geography.

Student Learning Outcomes (SLOs) for this Degree Program related to those goals are:

- A.1. Students will be able to state an original research question appropriate for geographic analysis.
- A.2. Students will be able to state how a research project contributes to an existing body of geographic literature.
- A.3. Students will be able to design legitimate geographic methodology.
- A.4. Students will be able to implement legitimate geographic methodology.
- A.5. Students will be able to explain and assess the results of original geographic research.
- B.1. Students will be able to communicate clearly and effectively in a written format.
- B.2. Students will be able to communicate clearly and effectively in an oral format.
- C.1. Students will be able to enter professional positions or Ph.D. programs related to geography or environmental management.

Core concepts and themes in the program are:

Human-Environmental Interaction (environment and society). A spatially literate student knows and understands: a. how human actions modify the physical environment; b. how physical systems affect human systems; and c. the changes that occur in the meaning, use, distribution, and importance of resources.

Place and regions. A spatially literate student knows and understands: a. the physical and human characteristics of place; b. that people create regions to interpret earth's complexity; and c. how culture and experience influence people's perceptions of places and regions. Examples of concepts useful in understanding place and region include: regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems, and etc.

Physical Systems. A spatially literate student knows and understands: a. the physical processes that shape the patterns of the earth's surface; and b. the characteristics and spatial distribution of ecosystems on the earth's surface. Examples of processes useful in understanding physical systems include: the hydrologic cycle, infiltration, run-off, erosion, deposition, and etc.

Human Systems. A spatially literate student knows and understands: a. the characteristics, distribution, and migration of human populations on the earth's surface; b. the characteristics, distribution, and complexity of earth's cultural mosaics; c. the patterns networks and economic interdependence on the earth's surface; d. the processes patterns and functions of human settlement; and e. how the forces of cooperation and conflict among people influence the division and control of earth's surface. Examples of concepts useful in understanding human systems include: location, scale, spatial change and spread, spatial association, perception, and etc.

Spatial Representation. A spatially literate student knows and understands: a. how to use maps and other geographic representations, tools and technologies to acquire, process and report information from a spatial perspective; and b. how to use mental maps to organize

information about people, places, and environments in a spatial context. Tools used include: GIS, remote sensing, GPS, and etc.

Geographic Analysis. A spatially literate student knows and understands: a. how to analyze the spatial organization of people, places, and environments on the earth’s surface; and b. how to apply geography to interpret the past and present, and to plan for the future. Methods used for spatial representation are a cornerstone of geographic analysis. In addition, broad concepts useful in analysis include: Location (distribution, density, pattern, clustering, and dispersion); Scale (distance, hierarchies, and changes in scale and interpretation); Spatial change and spread (diffusion and dispersion, spatial flows, and regional evolution); Perception; Place (regions, regionalization, spatial classification, boundaries, spatial shape and form including topology and geometry, integrative approaches to complex systems); Spatial association/interaction (proximity and adjacency, distance decay, and geographic features as points, networks or regions, site, situation); and Spatial alignment, orientation, and direction.

By the end of the course, students should be able to distinguish different epistemological underpinnings within qualitative research; articulate the strengths and weaknesses of different qualitative methodologies for particular research questions; and should feel confident using qualitative methods in their own research projects. In order to work on feeling confident with different methods, we will practice them in different ways –in assignments (see below), and in seminar activities.

Prerequisites: None

Grading:	Attendance and participation	25%
	Reading reflections	25%
	Learning Activities	25%
	Final Research Design	25%

Grading will be on a straight scale:
A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%.

Course Organization and Assignments

Attendance and Participation

This course is a discussion-based seminar that requires active participation from all class members. You will be expected to share your thoughts and ideas with the class. Good participation is a matter of both quality and quantity. More information on what constitutes “quality” participation will be provided in class. Attendance is required, and a student with more than two absences may be dropped from the course at the instructor’s discretion. Being late to class is the equivalent of ½ of an absence.

Reading Reflections

You will come to each class with your reactions to the week’s reading assignments. This is your opportunity to demonstrate that you have read and thought about the assigned text for the day. Unless you are given specific guidance for the week’s reflection paper, please organize your reaction with three sections (clearly label

them with headings). (1) Summary: provide a two-three sentence summary for each of the readings—distilling the author’s thesis to its essence. (2) General reaction and application. Briefly share your general reaction to the readings. You might address such things as whether you liked the reading and why or why not. What ideas stood out to you? What did it make you think about? Apply the reading material to the course’s main theme and/or other readings and discussions related to the course. You may opt out of one of these papers over the course of the semester and still be allowed to attend the relevant discussion. (3) Discussion Leads. Finally, put *at least* three questions down that can facilitate our class discussion—critical points you want the class to engage and so forth. This way, everyone should have several items to help initiate discussion in class.

These weekly assignments will be **due at the beginning of each class, and you will need to bring a copy to class** in order to facilitate discussion and hand in for assessment.

Learning Activity Assignments

One focus of this class is to examine how, on a practical level, qualitative research is conducted. It is therefore essential that students learn how to apply what they are learning to problem-based scenarios. Class assignments will include both in class and outside activities. Learning activities (LAs) are designed to prepare students for discussion and to actively engage the material and assist in the development of their research methods and design.

Research Design

Each student will work independently to develop a research design using qualitative methods. More information on this will be provided in a separate handout. Depending on the class, this may involve an in-class presentation.

A note about late assignments

To do well in this course, you must turn in your assignments on time. Late assignments will be penalized by reducing the maximum points achievable by twenty percent (20%) for each day the assignment is late.

Student Support

If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation to, the Information Accessibility Resource Center: <http://as2.unm.edu>; (505) 277-3506.

Student Code of Conduct

Students should exhibit respectful classroom values and behavior by:

- engaging in appropriate communication, interaction and preparedness;
- demonstrating trust, respect and civility;
- approaching course content as important and necessary;
- meeting all deadlines for assignments and team member obligations;
- turning off cell phones in class;
- avoiding unnecessary talking; and
- not reading outside material or doing other work during class.

Students should contribute to a positive learning environment by:

- arriving, attending and departing class in a respectful manner;
- taking responsibility for team and individual assignments; and
- developing cooperative relationships with other students and faculty.

Students should support a professional learning environment by:

- avoiding inappropriate language;
- refraining from unrealistic expectations in dealing with administration, faculty and staff; and
- communicating with the instructor if changes could be made to improve the learning environment.

Students must uphold the academic integrity standards of the University of New Mexico.

Academic integrity is conceptualized as doing and taking responsibility for one's own work. This includes individual assignments and, for group assignments, the assumption of responsibility for work that is turned in as the "work product" of a team. Each team member is equally responsible for the work presented as the output of that team's effort. For more information on UNM's standards for academic integrity, see the policy on academic dishonesty at <http://www.unm.edu/~sac/policies.html#academicdishonesty>.

Tentative Course Schedule, Subject to change at instructor's discretion. ALWAYS check the lecture from the previous class regarding class assignments.

Date:	Topic:	Readings:	Topics, deadlines, etc.
January 16	Introduction	N.A.	Course business and expectations; Situating Qualitative Research; overview of methodologies and orientations
January 23	Ethical Reflections	Limb & Dwyer, ch. 55, Savin-Baden & Major ch 21	Issues of ethics in qualitative research; discussion regarding research design project
January 30	Epistemological Stances	Savin-Baden & Major ch 12 ch 4, Foucault (1970), TBD	Western paradigms-positivism, structuralism, post structuralism; new materialism
February 6	Epistemological Stances	Willson (2008); Schwandt T. (2000)	Indigenous research methods
February 13	Theoretical Orientations	Limb & Dwyer, ch. 3	Feminism and new materialist
February 20	Theoretical Orientations	Savin-Baden & Major ch 12	Grounded theory
February 27	Methods	Limb & Dwyer, ch. 12, Savin-Baden & Major ch 13	Ethnography
March 6	Methods	Limb & Dwyer, ch. 10, Savin-Baden & Major ch 25	Participatory Action and observation; draft research designs due
March 13	N.A.	NA.	N.A.
March 20	Methods	Savin-Baden & Major ch 23	Interviews
March 27	Methods	Limb & Dwyer, chs. 8, 9	Focus groups
April 3	Data analysis and coding	Limb & Dwyer, ch. 13	Field notes and coding
April 10	Data analysis and coding	Savin-Baden & Major chs 27, 28	Data and discourse analysis

April 17	N.A.	N.A.	In class presentations of research design; final research designs due
April 24	N.A.	N.A.	In class presentations of research design.
May 2	N.A.	N.A.	Course wrap, evaluations, etc.; final papers due.

New Mexico Joint Doctoral Program
Plan for Assessment of Student Learning Outcomes
College of Arts and Sciences
The University of New Mexico

A. College, Department and Date

1. College: Arts & Sciences
2. Department: Geography & Environmental Studies
3. Date: January 2016

B. Academic Program of Study*

Ph.D. Geography

C. Contact Person(s) for the Assessment Plan

Constantine Hadjilambrinos, hadjilam@unm.edu

D. Broad Program Goals & Measurable Student Learning Outcomes

1. Broad Program Learning Goals for this Degree/Certificate Program

- A. Students will demonstrate broad capability in the discipline of geography, with a critical understanding of how their specific areas of theoretical, methodological, and practical expertise relate to scholarship in other areas of the discipline.
- B. Students will show advanced competency in the design and implementation of original and significant basic and applied research.
- C. Students will display professional knowledge skills in communication, teaching, and mentorship.

2. List of Student Learning Outcomes (SLOs) for this Degree/Certificate Program

Program SLOs	UNM Learning Goals		
	Knowledge	Skills	Responsibility
A.1. Students will discuss the historical development of geographic thought and critically evaluate contemporary philosophical approaches in geography	X	X	
A.2. Students will demonstrate expertise in concepts, methods, and trends in three chosen specialty areas as well as in synthesizing multi-	X	X	

* Academic Program of Study is defined as an approved course of study leading to a certificate or degree reflected on a UNM transcript. A graduate-level program of study typically includes a capstone experience (e.g. thesis, dissertation, professional paper or project, comprehensive exam, etc.).

variable human-environment interactions			
B.1. Students will design and conduct independent research for answering relevant geographic questions using appropriate quantitative and/or qualitative methods	X	X	X
C.1. Students will make original and significant scholarly contributions and communicate them effectively orally and in writing both to the scientific community and the general public	X	X	X
C.2. Students will demonstrate professional knowledge and skills that will allow them to enter careers in academia, government agencies, or the private sector	X	X	X

E. **Assessment of Student Learning Three-Year Plan**

1. **Timeline for Assessment**

Year/Semester	Assessment Activities
Year 1, Fall	A.1.a, A.1.b, A.2.b, B.1.a., B.1.b, C.1.b, C.2.a
Year 1, Spring	A.1.b, A.2.a, A.2.b, B.1.a., B.1.b, C.1.a, C.1.b, C.2.b
Year 2, Fall	A.1.a, A.1.b, A.2.b, B.1.a., B.1.b, C.1.b, C.2.a
Year 2, Spring	A.1.b, A.2.a, A.2.b, B.1.a., B.1.b, C.1.a, C.1.b, C.2.b
Year 3, Fall	A.1.a, A.1.b, A.2.b, B.1.a., B.1.b, C.1.b, C.2.a
Year 3, Spring	A.1.b, A.2.a, A.2.b, B.1.a., B.1.b, C.1.a, C.1.b, C.2.b

2. **How will learning outcomes be assessed?**

What will be assessed?

- SLO A.1: Students will discuss the historical development of geographic thought and critically evaluate contemporary philosophical approaches in geography.*
- a. Assessment method #1
 - i. Rubric-based evaluation of student performance on a paper in the required core course GEOG 601 Geographic Theory and Practice. (Note: rubric will be developed as part of the program planning process, after the syllabi for these courses have been further developed.)
 - ii. The measure is direct. The faculty member responsible for the course will rate each student.
 - iii. We expect that ≥ 85% of the students taking the course each year will earn a grade of B or higher on their papers.
 - b. Assessment method #2
 - i. Rubric-based evaluation of all students’ written and oral comprehensive exams, as related to the history of geographic thought and current philosophical approaches in geography. (Note: rubrics will be developed as part of the program planning

process, after the exam formats have been finalized by the joint steering committee .)

- ii. The measure is direct. Geography faculty members of the examination committees will complete the evaluation.
- iii. We expect that $\geq 85\%$ of the students taking their comprehensive exams each year will give responses that are acceptable or better.

SLO A.2: Students will demonstrate expertise in concepts, methods, and trends in three chosen specialty areas as well as in synthesizing multi-variable human-environment interactions.

a. Assessment method #1

- i. Rubric-based evaluation of student performance on a project in the required core course GEOG 602 Integrative Research Design. (Note: rubric will be developed as part of the program planning process, after the syllabi for these courses have been further developed.)
- ii. The measure is direct. The faculty member responsible for the course will rate each student.
- iii. We expect that $\geq 85\%$ of the students taking the course each year will earn a grade of B or higher on their projects.

b. Assessment method #2

- i. Rubric-based evaluation of all students' written and oral comprehensive exams, as related to the students' ability to apply the specialist-synthesis approach for geographic problem solving. (Note: rubrics will be developed as part of the program planning process, after the exam formats have been finalized by the joint steering committee .)
- ii. The measure is direct. Geography faculty members of the examination committees will complete the evaluation.
- iii. We expect that $\geq 85\%$ of the students taking their comprehensive exams each year will give responses that are acceptable or better.

SLO B.1: Students will design and conduct independent research for answering relevant geographic questions using appropriate quantitative and/or qualitative methods.

a. Assessment method #1

- i. Rubric-based evaluation of all students' written and oral comprehensive exams, as related to the students' competency in geographic research design and the use of tools for geographic research, including qualitative and/or quantitative methods.
- ii. The measure is direct. Geography faculty members of the examination committees will complete the evaluation. (Note: rubrics will be developed as part of the program planning process, after the exam formats have been finalized by the joint steering committee .)
- iii. We expect that $\geq 85\%$ of the students taking their comprehensive exams each year will give responses that are acceptable or better.

b. Assessment method #2

- i. Rubric-based evaluation of all students' performance on their written proposal and the oral defense of their proposal. (Note: rubrics will be developed as part of the program planning process, after the proposal requirements and formats have been further developed and finalized by the joint steering committee.)
- ii. The measure is direct. Geography faculty members of the dissertation advisory

Adapted from Kansas State University Office of Assessment

committees will complete the evaluation.

- iii. We expect that $\geq 85\%$ of the students defending their dissertation proposals each year will do so successfully.

SLO C.1: Students will make original and significant scholarly contributions and communicate them effectively orally and in writing both to the scientific community and the general public.

a. Assessment method #1

- i. Rubric-based evaluation of all students' performance on their written dissertation and the oral defense of their dissertation. (Note: rubrics will be developed as part of the program planning process, after the dissertation and defense requirements and formats have been further developed and finalized by the joint steering committee.)
- ii. The measure is direct. Geography faculty members of the dissertation advisory committee committees will complete the evaluation.
- iii. We expect that $\geq 85\%$ of the students defending their dissertations each year will do so successfully.

b. Assessment method #2

- i. Review of students' record of publications and conference presentations.
- ii. The measure is indirect. Each students committee chairperson will complete this evaluation.
- iii. We expect that all students receiving a Ph.D. will have presented their research at one professional meeting or have one paper accepted for publication by a peer-reviewed journal.

SLO C.2: Students will demonstrate professional knowledge and skills that will allow them to enter careers in academia, government agencies, or the private sector.

a. Assessment method #1

- i. Rubric-based evaluation of student performance in the required core course GEOG 603 Professional Practice.
- ii. The measure is direct. The faculty member responsible for the course will rate each student on aspects of professionalism and professional preparation.
- iii. We expect that $\geq 85\%$ of the students taking the course each year will earn a grade of B or higher in the course.

b. Assessment method #2

- i. Evaluation of all students' post-graduate job placement.
- ii. The measure is indirect. Members of the joint doctoral program graduate committee will complete this evaluation.
- iii. We expect that $\geq 85\%$ of the students who graduate each year will enter jobs related to their area of interest upon graduation.

Who will be assessed?

SLO A.1: Students will discuss the historical development of geographic thought and critically evaluate contemporary philosophical approaches in geography.

c. Assessment method #1

- Evidence will come from all students who take GEOG 601 Geographic Theory and Practice each year.

d. Assessment method #2

Adapted from Kansas State University Office of Assessment

- Evidence will come from all students who take their comprehensive exams each year.

SLO A.2: Students will demonstrate expertise in concepts, methods, and trends in three chosen specialty areas as well as in synthesizing multi-variable human-environment interactions.

- c. Assessment method #1
 - Evidence will come from all students who take GEOG 602 Integrative Research Design each year.
- d. Assessment method #2
 - Evidence will come from all students who take their comprehensive exams each year.

SLO B.1: Students will design and conduct independent research for answering relevant geographic questions using appropriate quantitative and/or qualitative methods.

- c. Assessment method #1
 - Evidence will come from all students who take their comprehensive exams each year.
- d. Assessment method #2
 - Evidence will come from all students who defend their dissertation proposals each year.

SLO C.1: Students will make original and significant scholarly contributions and communicate them effectively orally and in writing both to the scientific community and the general public.

- b. Assessment method #1
 - Evidence will come from all students who defend their dissertations each year.
- c. Assessment method #2
 - Evidence will come from all students who have received their Ph.D. degree each year.

SLO C.2: Students will demonstrate professional knowledge and skills that will allow them to enter careers in academia, government agencies, or the private sector.

- c. Assessment method #1
 - Evidence will come from all students who take course GEOG 603 Professional Practice each year.
- d. Assessment method #2
 - Evidence will come from all students who have graduated each year.

3. What is the unit's process to analyze/interpret assessment data and use results to improve student learning?

- Each year, a joint steering committee drawn from the Geography faculties at both universities will analyze, synthesize, and critically evaluate the results from both the assessments described above as well as the diagnostic entrance surveys, graduate student annual reviews, and exist assessments described below. A faculty meeting will be held to discuss the assessment outcomes with the entire faculty. The

assessment will be used to guide improvements to the program (e.g., assessment mechanisms, curriculum, and pedagogy), or affirm successes.

- **Diagnostic Entrance Survey**
 - Assess preparedness and goals of new students
 - Collect information on: primary research interests, academic strengths and weaknesses, courses already completed and relevant to dissertation research interests, courses to be taken at UNM and NMSU that are relevant to dissertation research interests, goals and objectives for the joint doctoral program, career objectives following receipt of doctoral degree
- **Graduate Student Annual Review**
 - Assess progress of students toward earning their doctoral degrees
 - Collect information on: dissertation advisor and other advisory committee members, dissertation title, proposal status, preliminary exam fields of study, coursework completed, funding obtained, accomplishments (publications, scholarly presentations, awards, service, etc.), goals for the upcoming year
- **Exit Assessment**
 - Assess achievements and success of students who have earned their doctoral degrees
 - Collect information based on: CV and first job attained

Employer Focus Group to discuss New Mexico Joint Doctoral Program

April 8, 2015, 8:30-9:30am

Bandelier West 122 and via GoToMeeting remote access

Host: Shirley Baros, Earth Data Analysis Center (UNM), Director

Facilitator: Maria Lane, Geography & Environmental Studies (UNM), Department Chair

Participants:

Lisa Arnold, Heritage New Mexico (UNM), GIS Analyst

Amy Ballard, Central New Mexico Community College, Applied Technologies Program Chair

Brad Brackel, Sanborn Mapping Services, Director of Strategic Accounts, Western Region

Larry Brotman, NM Taxation and Revenue Department, IT Division

Gar Clarke, State of New Mexico, Geospatial Information Officer

Daniel Estrada, NM Office of the State Engineer, GIS Division

Richard Koehler, NM Energy, Minerals & Natural Resources Dept, GIS Coordinator

Leland Pierce: NM Department of Game and Fish, Volunteer GIT Coordinator

Esther Worker, ESRI, Education Account Manager

Questions and Summaries of Response Commentary

Who needs this program?

- There are many people working in New Mexico's geospatial industry who would like PhD training
- Clearly some who would be moving straight from bachelor's program, but many others who already have Master's training, can go straight to PhD easily

Where are they?

- They are not necessarily in Albuquerque or Las Cruces
- Need to consider people throughout the state, best access is through branch campuses
- We should also seek potential students from locations in western Texas or tribal areas that extend beyond NM borders

What program structure would be most effective for potential students?

- Keep it small
- Need a valid option for students to work and complete program on a part-time basis
- Pay attention to first few cohorts (needs, characteristics) and then adapt to meet their needs
- This looks like a very marketable set of content, but might want to check with specific employers in region to verify

What do Employers Need?

- statistical training
- computing sophistication
- research design expertise
- how to set research objectives
- experience with big data approaches
- leadership skills + technical background
- PhD credential helps agencies get contracts

How can we get more info re employer needs?

- Recommendation: do our own detailed employer survey
- Current effort through NMGIC = Pathways survey to better understand relationship between academic/practical training and geospatial industry needs
- Survey still evolving; could potentially add a few questions
- Should also consider direct discussion with individual employers: especially Sandia, USGS, State of NM agencies (re total PhD employment needs)
- Contact human resources people for direct data
- USGS would be an excellent resource

What is your overall response to the draft program concept?

- Really excited about focus on professionalism
- Professional geographic practice is a key contribution
- Excitement about integrative focus
- Encouraged us to focus on paths to employment
- Take needs of part-time students seriously
- Individual organizations warrant detailed discussion

GEOSPATIAL TECHNOLOGY

I ndustry Snapshots

- Revenues from the public sector lead geospatial market growth and account for more than one-third of total revenue. While federal governments were among the early adopters of GIS technology, recent trends toward devolving more responsibilities to states and localities have spurred those entities to become important consumers of GIS. While industries in the regulated sector, such as utilities, telecommunications, transportation and education, are the largest consumers of GIS/geospatial solutions, private-sector growth remains dependent upon business adoption based on the added-value these technologies provide. (Daratech, GIS/Geospatial Markets and Opportunities)
- Geospatial products and specialists are expected to play a large role in homeland security activities. Information gathering needs to protect critical infrastructure have resulted in an enormous increase in the demand for such skills and jobs. (Lorraine Castro, NIMA Human Resources Department)
- Because the uses for geospatial technology are so widespread and diverse, the market is growing at an annual rate of almost 35 percent, with the commercial subsection of the market expanding at the rate of 100 percent each year. (Geospatial Information & Technology Association)

High Growth INDUSTRY PROFILE

W orkforce Issues

Skills, Competencies, and Training

Emerging occupations within the geospatial technology industry require developing competency models for new applications of geospatial technology. Aligning training in geospatial applications with industry developed competency models is essential to developing the necessary pipeline of skilled workers. This approach is necessary for preparing entry-level workers with basic skills to ensure career success.

Increasing demand for readily available, consistent, accurate, complete and current geographic information and the widespread availability and use of advanced technologies offer great job opportunities for people with many different talents and educational backgrounds. (U.S. Geological Survey and U.S. Bureau of Labor Statistics)

Image and Outreach to the Public

The public is not aware of the necessary skill sets and competencies needed to prepare for the diverse career opportunities available within the geospatial technology industry. Reaching an industry-wide consensus that defines "geospatial," its technologies and its applications is of utmost

importance. There is also a need for better industry promotion by creating a national image campaign that raises awareness about the industry and dispels stereotypes and misperceptions.

Pipeline

In order to meet industry growth requirements employers need to examine alternatives to the traditional pipeline. These alternatives include recruiting young workers through apprenticeship and high school/college dual-enrollment-dual-credit agreements as well as tapping nontraditional labor pools to diversify the workforce.

S kill Sets

(Source: ASPRS: The Imaging and Geospatial Information Society)

- College preparatory courses that emphasize the sciences are suggested for individuals interested in pursuing careers in photogrammetry, remote sensing and geographic information systems (GIS).

- For individuals who do not wish to pursue an advanced degree, there is a substantial demand for technicians in geospatial information technology. Many 2-year academic and technical institutions offer education and training in photogrammetry, remote sensing and GIS and related fields. Associate degree and certificate programs in GIS, surveying, photogrammetry and similar curricula provide a sound foundation for work experience or for transfer to other academic institutions for further education.
- It is highly recommended that any individual wishing to pursue a career in photogrammetry, remote sensing and GIS participate in an internship program to obtain hands-on experience as part of their preparation for employment, in addition to formal education.

E TA in Action

In June 2003, ETA announced the High Growth Job Training Initiative to engage businesses with local education providers and the local/regional workforce investment system to find solutions that address changing talent development needs in various industries.

In October 2005, the Community-Based Job Training Grants were announced to improve the role of community colleges in providing affordable, flexible and accessible education for the nation's workforce.

ETA is investing more than \$260 million in 26 different regions across the United States in support of the WIRED

(Workforce Innovation in Regional Economic Development) Initiative. Through WIRED, local leaders design and implement strategic approaches to regional economic development and job growth. WIRED focuses on catalyzing the creation of high skill, high wage opportunities for American workers through an integrated approach to economic and talent development.

These initiatives reinforce ETA's commitment to transform the workforce system through engaging business, education, state and local governments, and other federal agencies with the goal of creating a skilled workforce to meet the dynamic needs of today's economy.

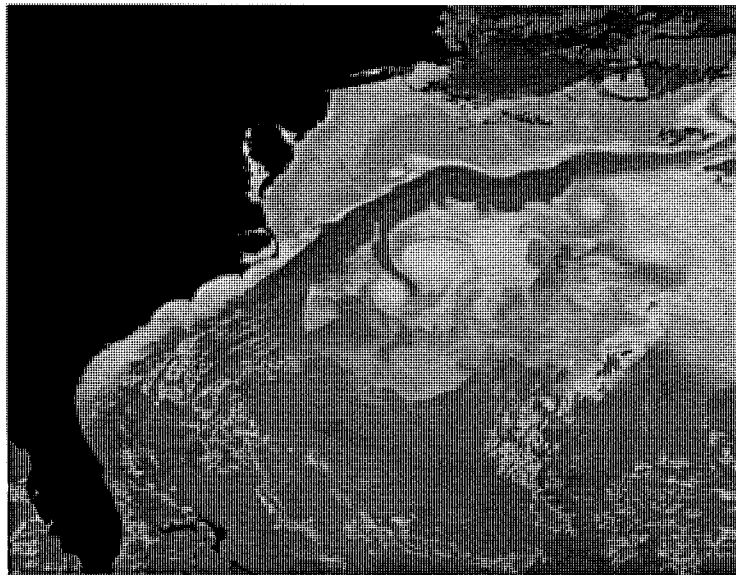
I nvestments

ETA has invested over \$8,367,110 in the geospatial industry. This includes six High Growth Job Training Initiative grants totaling \$6,438,653 and one multi-industry Community-Based Job Training Grant totaling \$1,928,457. Leveraged resources from all of the grantees total \$7,132,543.

R esources

For additional background information about the industry and details on the grants, information about employment and training opportunities and workforce development tools for employers, educators and workforce professionals, please visit: www.doleta.gov/BRG, www.careeronestop.org, and www.workforce3one.org.

**Identifying and Addressing Workforce Challenges in
America's Geospatial Technology Sector**



March 15, 2005
Revised November 2, 2005

High Growth Job Training Initiative
The U.S. Department of Labor
Employment and Training Administration

Preface

The High Growth Job Training Initiative is designed to provide national leadership for a demand-driven workforce system that ensures no worker is left behind. It is a strategic effort to prepare workers for new and increasing job opportunities in high-growth, high-demand, and economically vital industries and sectors of the American economy. Through this initiative, the U.S. Department of Labor (DOL) Employment and Training Administration (ETA) has been working with high-growth/high-demand industries, such as geospatial technology, to determine their key workforce challenges, and investing in demonstration projects that provide training in the higher and often technical skills required for individuals to get good jobs with good wages in the high growth industries.

The foundation of this initiative is the development of partnerships between the public workforce investment system, business and industry, and education and training providers, such as community colleges. The goals of this initiative have been to document the workforce development challenges and priorities of the demand side of the economy, and to propose innovative solutions that may fill gaps in education and training capacity of the targeted industries and help ensure the supply of qualified workers to these high growth/high-wage sectors.

The High Growth Job Training Initiative is a demonstration of ETA's commitment to long-term skills training and economic development in key high-growth sectors that will have a lasting impact on the American economy. To fully implement an effective training and development program for the geospatial industry, as for each of the targeted industries, ETA recognizes the need to sustain partnerships among industry, education, all levels of government, and the public workforce investment system.

This report presents the findings from an information gathering process that involved a variety of geospatial stakeholders reflecting on workforce issues and catalogs their proposed solutions. The report outlines the process where ETA, the geospatial technology business community, education, and government representatives formed partnerships and developed model solutions to address key workforce challenges.

DOL and ETA would like to thank the geospatial technology High Growth Job Training Initiative stakeholders for their leadership, commitment and participation in this process. Though not all stakeholders agreed with every model solution, recommendation, or option described in this document, the report has been made possible through their dedication to the challenges and the partnership model employed.

ETA is also pleased to have leveraged the substantial research and development work of the NASA National Workforce Development Education and Training Initiative team, making use of the significant Federal resources already invested and demonstrating federal agency cooperation and good government.

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Appendix B – Geospatial Stakeholders

Appendix C – Model Solutions Matrices

Appendix D – All Solutions

Appendix E – Online Web Tool Solutions

Appendix F – The Geospatial Technology Environmental Scan

Executive Summary

Growth Projections for the Geospatial Technology Industry

The geospatial technology sector has been selected as one of 14 targeted industries in the High Growth Job Training Initiative primarily because it currently meets many of the criteria for an emerging market sector, and is growing in additional areas as well. Geospatial technology shares concerns with the broader field of information technology and can learn from and contribute to the development of this field. The worldwide market for geospatial technologies has enormous potential. The most frequently quoted growth figures estimated the geospatial market at \$5 billion in 2001, with projected annual revenues of \$30 billion by 2005.¹ This growth is due to many factors, including the sector's importance to national economic and security interests.

As an emerging industry, geospatial technology encounters a variety of issues common to such sectors. There is not yet an industry-wide definition of the scope of the disciplines or the training and credentials required to work in the industry. There is no single organization tracking all relevant jobs within the geospatial industry and there are no comprehensive job descriptions or salary information for all relevant job opportunities.

Job opportunities in geospatial technology are growing in step with the needs of the industry. Along with this growth comes stress on the job market. A recent survey of geospatial product and service providers revealed that 87% of respondents said they had difficulty filling positions requiring geospatial technology skills.² General data provided by the Bureau of Labor Statistics (BLS) indicates that the architecture and engineering occupations group, including surveyors, cartographers, photogrammetrists and surveying technicians, which represent key geospatial occupational categories, is one of the occupational groups projected to have the fastest job growth from 2002 to 2012.

There is a lack of public awareness of the impact of geospatial technology applications on daily professional and personal activities. With greater understanding will come greater interest in entering the profession, as well as greater demand for geospatial capabilities and applications across a wide range of other sectors. The Geospatial Information & Technology Association (GITA) reports that approximately 70 to 80 percent of the information managed by business is somehow connected to a specific location—an address, street, intersection, or 'xy' coordinate. This interest in location is drawing geospatial technology into nearly every corner of the business world. Because the technology's uses are so widespread and diverse, the geospatial market is growing

¹ Gaudet, Annulus, Carr, *Workforce Development Models for Geospatial Technology*, The University of Southern Mississippi, September 2001.

² DeRocco, Emily Stover. Speech to AACC & ACCT National Legislative Summit, February 10, 2004, Washington, DC. (www.doleta.gov/whatsnew/Derocco_speeches/AACC%20-%20Legislative.cfm)

at an annual rate of almost 35 percent, with the commercial subsection of this market is expanding at the rate of 100 percent each year.³

Education and Training in the Geospatial Technology Sector

Any emerging technology introduces challenges regarding education and training. The geospatial technology sector has historically been focused on four-year and advanced degree education. College preparatory courses that emphasize sciences are suggested for individuals interested in pursuing careers in geospatial disciplines. However, to meet industry growth demands and requirements within the applications arena, employers need to explore alternatives to the traditional pipeline, including training provided by technical and community colleges.

The fastest emerging occupations within the geospatial technology industry require technical skills, yet the industry does not have enough training models or curricula to develop the necessary pipeline of skilled workers, creating significant gaps between workforce supply and demand. These gaps will likely grow unless there is a coordinated effort at the national level to study the issues, develop solutions, and implement them throughout the workforce. Recent estimates show the shortfall in advanced level of GIS-trained individuals to be around 3,000 to 4,000 in the U.S. alone, and the shortage outside the United States is even greater.⁴ The few graduate programs now in place cannot meet the needs of the marketplace and the global demand will likely continue to grow faster than the supply of qualified graduates.

Many two-year academic and technical institutions offer education and training opportunities in photogrammetry, remote sensing, GIS, and related fields. Associate degree and certificate programs in GIS, surveying, photogrammetry, and similar curricula provide a sound foundation for many jobs or further education. For those who do not wish to pursue an advanced degree, there is a substantial demand for geospatial technology technicians. The Geospatial Technology Apprenticeship Program (GTAP) certification process now being developed and validated by ETA is intended to be a national, portable certification to help address this need.

General Findings

The High Growth Initiative is a three-phase process utilized to identify the workforce challenges of the Geospatial industry, as well as potential solutions. ETA engaged more than 182 individuals representing 111 geospatial technology sector organizations from 19 states and the District of Columbia, including members of industry (40%), education (21%), user groups (15%), associations and organizations, workforce professionals (3%) and government at all levels (21%) (Appendix B) throughout the high growth process. During the first phase, an environmental scan of the industry was conducted to provide a baseline for assessing the industry's workforce needs. ETA Assistant Secretary Emily Stover DeRocco convened an Executive Forum with leaders

³ www.gita.org/about_gita/background.html

⁴ Phoenix, Michael, "Geography and the Demand for GIS Education," *American Association of Geography Newsletter*, June 2000.

in the geospatial industry to learn more about the industry's workforce challenges. Industry leaders informed ETA that the geospatial industry is experiencing workforce challenges in three areas: skills, competencies and training; image and outreach to the public; pipeline (recruitment and retention)

ETA then hosted two Geospatial Industry Workforce Development Forums and one Geospatial Technology Workforce Solutions Forum. At the Workforce Solutions Forum over 50 geospatial technology stakeholders proposed some 146 solutions. During the Geospatial Technology Industry Solutions Development Forum, stakeholders developed 48 solutions matrices, or roadmaps (Appendix C & D).

Below are the three workforce challenges with some solutions identified by the group as priority solutions to address the challenges.

1. Skills, competencies and training.

During the forums there was agreement on the need to build basic spatial literacy and other business and interpersonal competencies, and that current practices for obtaining geospatial skills, competencies and training are insufficient. Stakeholders recommended mapping competencies to other sectors, industries and applications so the geospatial literacy gaps in these areas can be understood and addressed.

Potential Solutions for this challenge include the following. *Competencies Solutions:* Develop geospatial curriculum in schools. Develop on-the-job training. *Deployment Solutions:* Conduct small business workshops to determine needs and requirements; develop training based on user needs and nurture potential users. Deploy core training in K-12 and community colleges. Deploy specialized training tracks such as business administration, information technology, research and development and/or geospatial solutions. *Mapping Solutions:* Develop skill centers, community workshops, and training programs for decision makers and managers.

2. Image and Outreach to the Public.

Geospatial Technology stakeholders felt that due to the emerging nature of the technologies, that there was a lack of understanding of what is meant by geospatial by the public as a whole. They also indicated that the industry faces an image problem among youth. A concern was substantiated that youth viewed geospatial technology careers as less compelling and exciting than other information technology careers, thus creating a challenge in developing youth interest in this field..

Potential solutions for this challenge include the following. *Data and Definition Solutions:* Link resources of academia, industry and workforce boards to address the challenges of image and integrate resources to make greater impact. Develop a message that demonstrates geospatial technologies as an enabler of other location applications. Develop an academic and industry communications strategy. Create profiles of geospatial professionals to depict the industry with a human face.

3. Pipeline.

Stakeholders report that there is a lack of qualified individuals to fill current and projected job vacancies in the geospatial industry. They felt the industry must make a commitment to the recruitment of qualified workers and develop the support to enhance their retention. They reported an industry-wide need for professional development and general access to new labor pools as areas to focus.

Stakeholders identified the following potential solutions to address these challenges.

Recruitment Solutions: Develop a national media campaign, including TV, radio, and magazine advertising, to bring more exposure to the technology, to increase public awareness, and attract potential workers. *Retention Solutions:* Develop a national system for certification, a stratification providing increased compensation, mobility across industries, and specific discipline/industry applications. Develop industry-specific survey tools to track salary, benefits, and best practices.

Next Steps

ETA supports comprehensive business, education, and workforce development partnerships to develop innovative approaches and replicate models that effectively serve the workforce needs of business while helping workers find good jobs with good pay and promising careers. Grants awarded under the High Growth Initiative are used by these partnerships to implement unique, industry-driven skills training, certification, and career ladder development programs that support identified geospatial workforce and economic development needs.

Based on the challenges identified by the geospatial technology sector and highlighted in this report, ETA has made a series of investments totaling more than \$6.4 million to address the workforce needs in the areas of skills, competencies and training; image and outreach; and pipeline of prospective workers. The demonstration projects address the needs of the sector broadly as well as specific sub-sectors.

The next steps in this process include the implementation of these demonstration projects and sharing the successful models with the public workforce investment system so that their replication by other geospatial technology partnerships may ensure job growth for this key sector of the American economy.

ETA is committed to identifying employer-driven models through the High Growth Initiative and sharing them with the public workforce system. Sharing these models and resources will enable industry stakeholders around the country to develop effective partnerships that simultaneously help the geospatial technology industry address its key workforce challenges and help prepare workers to enter a high growth industry that is vital to the economy.

Introduction

Background

As an emerging technology sector, the geospatial industry lacks a commonly accepted definition describing salient qualities of the industry, its present activities, and projected trends. The best working definitions are largely descriptive in nature, generally attempting to characterize the entire sector from the perspective of one or another of the constituent industries or disciplines. However, there is growing consensus around capabilities and business uses that are representative of the geospatial industry.

Geospatial information is finding ever-increasing applications. The federal government uses it to manage forests, develop defense strategies, establish tax valuations and employ census data to determine voting districts. Utility companies use it to automate transmission and distribution networks and to build and service pipelines and communication networks. Cities are using geospatial technologies for applications as diverse as routing sanitation and emergency vehicles, replacing water mains, and matching equipment to job requirements. Private companies use geospatial information to make more informed decisions in areas ranging from site selection, to marketing demographics, to analyzing competition. Once a tool that was affordable only to the largest organizations, geospatial systems have become a cost-effective option for even the smallest organizations.⁵

Geographic Information Systems (GIS) are one type of geospatial technology that offers a radically different way to produce and use “maps” to manage communities and industries. The technology uses computer programs to link items displayed on a map with records in a database. This combination offers the ability to manipulate data in both a proactive and reactive manner, providing government agencies, utilities, and private industries with a powerful and dynamic planning and management tool. Once considered merely a means of better map production, GIS today is rapidly becoming an integral part of the management process across a broad range of sectors and applications.

A simple example of a GIS application is combining a map of city streets with latitude and longitude-referenced traffic flow data to create a map that reveals areas of frequent accident occurrence, potential detour routes, and even alternatives to improve traffic routing and alleviate rush hour stress. The same base map also may be reused to show, for example, changes in traffic patterns across time.⁶

The geospatial technology industry and workforce are complex in composition and outlook. The organizations dedicated to geospatial technology development and use are but one facet of this industry, with many new skill sets becoming embedded in

⁵ Geospatial Information Technology Association (GITA). *About the Technology*. (www.gita.org/about_gita/background.html).

⁶ Markowitz, Kenneth J. “Legal Challenges and Market Rewards to the Use and Acceptance of Remote Sensing and Digital Information as Evidence,” *12 Duke Environmental Law and Policy F219*.

applications and across disciplines, industries, and organizations. While many of these applications are still in the developmental stage and have not yet been widely adopted, the applications sector is growing rapidly, creating the need for thousands of positions ready to be filled immediately. This growth has been spurred by the perceived need for information gathering and improved decision making following September 11, 2001.

Slow workforce and human capital development are widely recognized as a potential barrier to ensuring widespread, long-term adoption and use of these technologies. According to the American Society of Photogrammetry and Remote Sensing (ASPRS) *Ten-Year Industry Forecast*, there are insufficient numbers of graduates with training in the latest technologies and techniques ready to enter the workforce.⁷ The industry recognizes its need for improved communication to the public about the geospatial technology sector. As individuals, businesses and public sector organizations become more aware of the capabilities of geospatial technology and its contributions to everyday decision-making, even greater numbers of well-qualified workers will likely be sought.

There have been a few efforts to document geospatial technology workforce needs. In interviews for the *Ten-Year Industry Forecast*, corporate officers cited a shortage of trained workers emerging from educational programs and the lack of specific required skill sets among many graduates. All sectors agree that an educated workforce is critical to the continued growth of the industry and its contributions to the economy. The *Industry Forecast* identified some of the positions that are most difficult to fill with qualified individuals: applications developer, cartographer, software developer, cartographic technician, GIS applications analyst, and GIS technician. Respondents reported that the highest demand was in applications science in remote sensing using GIS, spatial database development and spatial statistics and analysis. Finally, the U.S. Bureau of Labor Statistics projects that the architecture and engineering occupations group, which includes surveyors, cartographers, photogrammetrists, and surveying technicians who are considered part of the geospatial industry, will be one of the top 10 fastest growing occupational groups 2002 and 2012.⁸

GITA's Industry Trends and Analysis Group (ITAG) Report for 2005 identified a number of workforce issues. There is a need to revise existing university curricula and develop new curricula to expose the industry infrastructure and GIS technology. For example, applications and the value of GIS need to be introduced into a number of engineering disciplines. It is important to broaden the geospatial network to include multiple industries, universities, and university disciplines. Education and training must be linked with careers and jobs, and training programs must keep up with the needs of this dynamic industry and the larger economy.⁹

⁷ Mondello, Charles; Hepner, Dr. George R.; Williamson, Dr. Ray A. "Ten Year Industry Forecast." *Photogrammetric Engineering and Remote Sensing*, January 2004.

⁸ U.S. Bureau of Labor Statistics quoted in DOLETA High Growth Industry Profile for Geospatial Technology.

⁹ GITA. *Industry Trends and Analysis Group (ITAG) Final Report 2005*.

About This Report

This report summarizes the process used to propose solutions to address the geospatial technology sector's workforce development challenges. It is divided into four major sections:

Section I: Background on Workforce Issues summarizes the key elements and trends in the geospatial technology industry.

Section II: The High Growth Job Training Initiative describes the process by which the High Growth Job Training Initiative engaged the geospatial technology sector.

Section III: Geospatial Technology Workforce Challenges and Solutions discusses geospatial technology workforce development needs, challenges, and priorities, and also stakeholder-proposed solutions for ETA to consider when making strategic demonstration investments.

Section IV: Implementation of Solutions and Conclusion describes ETA's investments in potential solutions and offers concluding comments.

The High Growth Job Training Initiative for the geospatial technology sector is not a comprehensive evaluation of the marketplace or workforce issues, rather a snapshot in time of the views and recommendations of the broad based geospatial technology stakeholder community.

Section I: Background on Workforce Issues

Overview of the Geospatial Technology Sector

According to a report prepared by the Geospatial Workforce Development Center at the University of Southern Mississippi, the geospatial technology industry is defined as an information technology field of practice that acquires, manages, interprets, integrates, displays, analyzes, or otherwise uses data focusing on the geographic, temporal, and spatial context. It also includes development and life-cycle management of information technology tools to support the above.¹⁰

What are Geospatial Technologies?

Remote Sensing refers to the observation and collection of data without the sensor being in physical contact with the object being studied, such as the study of the Earth from distant vantage points, via satellite or aircraft.

Geographic Information Systems (GIS) provide users the ability to display and manipulate data with interactive mapping software. GIS allows users to query a database to perform spatial analysis or communicate specific information about a location. Data gathered and provided through GIS applications can be tailored to perform critical functions in many disciplines, such as agriculture and land management, utility service and design, and intelligence gathering and analysis.

Positioning Systems (GPS) employ a geospatial technology that enables a portable device to pinpoint a precise location almost anywhere on the Earth by processing signals with the aid of satellites.

Geospatial technology stakeholders identified four key producers and users of the geospatial technology sector:

Geospatial industry suppliers are technology, systems, hardware and software developers and manufacturers, as well as data suppliers who analyze raw geospatial data and develop products and services that convert the data into meaningful information for use by other industries. These firms work in any or all of the remote sensing, GIS and GPS technology-related fields.

The federal government was largely responsible for the development and utilization of geospatial technologies during the Cold War. The industry (both private sector and public) substantially depends on federal funding, resources, policies and input for direction and growth.

State and local governments are among the largest users of geospatial information for planning, economic development, and land use management. Increasingly, they are turning to geospatial applications for critical infrastructure protection and emergency preparedness and response tasks.

¹⁰ Annulis and Gaudet. "Strategies—Outcomes—Support: A Geospatial Workforce Development Seminar." May 24, 2005.

Private industry owns the majority of the nation's infrastructure of electricity, water, gas, pipelines, and telecommunications. Assets range from electric poles to sewer lines to wireless communication towers. Utilities use geospatial data management and analysis capabilities for asset management, outage management, design, workforce management, regulatory compliance, and a host of other functions.

Secondary users can be found in any market, sector, industry or organization that utilizes geospatial information to improve decision-making, business, or organizational efficiency. These users of geospatial technology and applications may not intuitively characterize their industries as geospatial, but would say that their business model calls for key information that is obtained from geospatial sources.

Examples of Secondary Users	Application Areas
Utilities Industry	Electric, Gas, Water, Pipeline, Telecommunications
Engineering	Civil Engineers & Surveying
Transportation Industry	Logistics, Transportation Systems and Networks
Government	Disaster Management, National Security, Epidemiology, 911 Response, Economic, Development, Elections, Land Records and Cadastral Solutions, Law Enforcement, Public Safety, Sustainable Development, Urban and Regional Planning
Environmental	Climate Change, Weather Modeling, Urban Modeling, Waste Disposal, Environmental Enforcement
Business	Financial services, Real Estate, Legal, Insurance, Retail and Commercial Business, Mass Media, Entertainment
Natural Resources	Agriculture , Archaeology, Forestry, Marine and Coast Mining and Earth Science, Petroleum, Wetlands, Watersheds
Education	Universities and Community Colleges, K-12, Primary, Middle and Secondary, and Libraries and Museums

Spatially enabled information can help solve business problems within a utility in areas including: asset management, emergency preparedness, site selection, customer service, compliance, land management, logistics, operation, mobile workforce, finance, marketing, environmental, engineering and demographic analysis. In addition, business processes in every department of a utility can benefit from the integration of GIS analysis and visualization to support decision-making and communication in areas such as economic development, marketing, inventory management, debt management, employee management, fleet management, and risk management.¹¹

¹¹ ESRI Web page comments www.esri.com

Engineers who would ordinarily be limited to computer aided design (CAD) data can now see how their work relates to environmental issues, marketing concerns, and land ownership. Repair crews en route to remote sites, who in the past had no way of knowing the terrain over which they were driving, are now given GIS-generated information about access routes and areas to avoid, along with details about their destination and the nature of the repair required there. GIS gives planners of a new pipeline or power station a wide-angle view of the system their project connects.¹²

Size of the Geospatial Technology Sector and Projected Growth

The emergent nature of the geospatial technology sector has made it particularly challenging to characterize the geospatial marketplace and compile workforce related data. According to NASA's National Workforce Development Education and Training Initiative (NWDETI) 2001 Business Implementation Plan, the job market demands approximately 75,000 GIS skilled workers per year. The spatial technologies industry has more than doubled over a four-year period, creating enormous demand.¹³

Association studies on various sub-sectors of the geospatial industry, such the ASPRS/NOAA/NASA *Ten-Year Forecast* of the remote sensing industry, or URISA's *Salary Survey for IT/GIS Professionals* and *Model Job Descriptions for GIS Professionals*, offer a variety of analyses.

The BLS Occupational Outlook Handbook describes the following geospatial professions:¹⁴

Land surveyors establish official land, air space, and water boundaries; write descriptions of land for deeds, leases, and other legal documents; define airspace for airports; and measure construction and mineral sites.

Cartographers compile geographic, political, and cultural information and prepare maps of large areas.

Photogrammetrists measure and analyze aerial photographs that are subsequently used to prepare detailed maps and drawings.

Surveying technicians assist land surveyors by operating surveying instruments and collecting information in the field, and by performing computations and computer-aided drafting in offices.

Mapping technicians calculate mapmaking information from field notes, draw topographical maps, and verify their accuracy.

Geographic information specialists combine the functions of mapping science and surveying into a broader field concerned with the collection and analysis of geographic data.

¹² Dangermond, Jack in Preface to Christian Harder's *Enterprise GIS for Energy Companies*, ESRI Press, 1999.

¹³ National Aeronautical and Space Administration (NASA). "Imaging Tomorrow: NWDETI Business Implementation Plan," Stennis Space Center, Office of Education. 2002.

¹⁴ U.S. Department of Labor, Bureau of Labor Statistics. *Occupational Outlook Handbook—Surveyors, Cartographers, and Photogrammetrists and Surveying Technicians*. 2004-05 Edition.

Another approach to occupational classification in the geospatial technology industry makes distinctions within the geospatial technology end user community who are often traditional image analysts, traditional GIS users, users from other disciplines, mainstream business PC users and consumers, and non-technical business users. The first two groups have primary specialized technical skills in handling geospatial information, while the users in the other groups have primary expertise in their own subject matter areas and use geospatial technologies to enhance their business processes. Users in the latter three groups may have geospatial technical expertise ranging from very sophisticated to minimal.

The Department of Labor's Geospatial Industry Profile provides the following projections of 2000-2010 growth for geospatial-related occupations: ¹⁵	
Architectural and Civil Drafters	+20.8%
Cartographers and Photogrammetrists	+18.5%
Civil Engineering Technicians	+11.9%
Electrical and Electronic Engineers	+10.8%
Electrical Drafters	+23.3%
Environmental Engineering Technicians	+29.1%
Geoscientists	+18.1%
Industrial Engineering Technicians	+10.1%
Mechanical Drafters	+15.4%
Mechanical Engineering Technicians	+13.9%

The *Ten-Year Industry Forecast* for the remote sensing industry concludes that An estimated 175,000 people are employed in the U.S. remote sensing and spatial information industry. It is a rapidly growing segment of the much larger information industry. Growth in the remote sensing industry is expected to be approximately 9% annually over the next few years.

The majority of firms in the industry are relatively small, having less than 100 employees. The many smaller firms are less able to support internal research and development and workforce development, are more affected by governmental competition with their services, and are less able to meet foreign competition.

¹⁵ Department of Labor Geospatial Industry Profile

The age structure of workers in the geospatial technology industry is segmented into older experienced workers and younger employees who are new to the industry. The data from the much smaller segment in the mid-career range may infer that younger employees are leaving the industry for better opportunities, creating a potential shortage of mid-level personnel.

Sales estimates for the sector appear to be fairly consistent. Technology market research firm Daratech estimates that sales of GIS software totaled \$2.2 billion in 2004, up 9.7% from the previous year. Worldwide spending on GIS software, hardware and services totaled \$7.7 billion in 2001.¹⁶ Another market research firm, IDC of Framingham, Massachusetts estimates that worldwide spending on GIS software in 2004 was \$1.8 billion, of which \$544 million was spent by U.S. federal, state and local government agencies.

There are ample opportunities for growth in diverse market segments. Growth is likely in traditional applications for mapping, civil government, national defense and global security, as well as newer applications that address the needs of local and state government for homeland security, environmental assessment, and infrastructure.

Why the Geospatial Technology Sector Will Grow

The Open GIS Consortium Vision Statement suggests that, "Approximately 80 percent of business and government information has some reference to location, but until recently the power of geographic or spatial information and location has been underutilized as a vital resource for improving economic productivity, decision-making, and delivery of services."¹⁷ Another estimate suggests that 75 percent of business data has some type of geospatial content, but less than 10 percent of businesses use such data in a traditional geographic context.¹⁸ And a recent National Academy of Public Administration (NAPA) study estimates that geographic information plays a role in about one-half of the economic activities of the United States.¹⁹

The BLS *Occupational Outlook Handbook for 2004-05* says that employment of surveying and mapping technicians is expected to grow faster than average through 2012. The short training period to master operating the equipment, the absence of formal testing or licensing, the growing demand for basic GIS-related data-entry work, and relatively lower wages all fuel demand for these technicians. Growth in the use of GPS and GIS may also enhance employment opportunities for surveyors and surveying technicians who have the educational background and technical skills to work with the new systems.

¹⁶Phoenix, Michael, "Geography and the Demand for GIS Education," *American Association of Geography Newsletter*, June 2000.

¹⁷ Open Geospatial Consortium. "Vision Statement." (www.opengeospatial.org/about/?page=vision)

¹⁸ Frost & Sullivan. *World Remote-Sensing Data and GIS Software Markets*, Mountain View, CA, 1999.

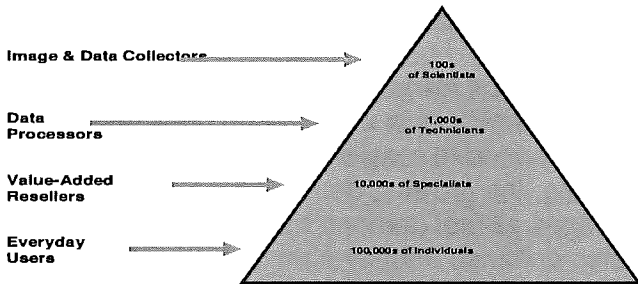
¹⁹National Academy of Public Administration (NAPA). *Geographic Information for the 21st Century*. Washington, DC. January 1998.

Opportunities for surveyors, cartographers, and photogrammetrists should remain concentrated in architectural, engineering and related services firms. Nontraditional areas, such as urban planning, emergency preparedness, and natural resource exploration and mapping, will likely experience employment growth as they produce maps for the management of emergencies and engage in updating maps with the newly available technology. Continued growth in construction through 2012 will require surveyors to lay out streets, shopping centers, housing developments, factories, office buildings, and recreation areas, while setting aside flood plains, wetlands, wildlife habitats, and environmentally sensitive areas for protection.²⁰

A survey conducted by American Forests found that GIS technology has been adopted by many public agencies throughout the U.S. The 1996 survey of 200 cities with greater than 25,000 residents and counties with greater than 50,000 residents, reports that 40% of those local governments had adopted GIS technology, with 87% indicating that they would have the technology by the end of that year. An earlier survey in 1995 by the International City/County Management Association found a 23% adoption rate in municipalities and counties, with an additional 32% considering implementation (out of 1400 respondents).²¹

As demonstrated in Figure 1: Geospatial Supply Analysis, the ultimate driver of growth is likely to be everyday users, a category which potentially includes the entire population who may be using embedded geospatial technologies such as car navigation systems and Web-based mapping and imagery display applications. An important trend fueling the industry's growth is increasing adoption of GIS technology by organizations previously unacquainted with GIS.²²

Figure 1: Geospatial Supply Analysis



²⁰ U.S. Department of Labor, Bureau of Labor Statistics. *Occupational Outlook Handbook—Surveyors, Cartographers, and Photogrammetrists and Surveying Technicians*. 2004-05 Edition.
²¹ Huxhold, William E. (Department of Urban Planning, University of Wisconsin-Milwaukee). *Certifying GIS Professionals*. URISA presentation. (www.urisa.org/GIS_CERT_PRES/sld002.htm)
²² Francica, Joe. "MapQuest.com Serves Map to the Masses, *Business Geographics*, May 2000.

Current Employment in the Geospatial Technology Sector

In the Spring 2005 *Occupational Outlook Quarterly*, the U.S. Bureau of Labor Statistics provided May 2004 employment figures for workers in the geography-related professions. There were 9,870 cartographers and photogrammetrists; 52,680 surveyors; 60,530 surveying and mapping technicians; 750 geographers; 425,890 computer applications software engineers; 96,960 database administrators; and 31,140 urban and regional planners. Others who are trained in geospatial technology work in the related occupations of computer applications software engineers and database administrators. More distant, but still related, occupations pursued by individuals with geospatial technology training include: business, real estate development, tourism, forestry and conservation science, geomorphology, climatology, and social science geography.

DOL's *Occupational Outlook Handbook* notes that architectural, engineering and related services firms provide about two-thirds of the jobs listed above. Federal, state, and local government agencies provide almost one in six jobs. Major federal employers are the U.S. Geological Survey (USGS), the Bureau of Land Management (BLM), the Army Corps of Engineers, the Forest Service (USFS), the National Oceanic and Atmospheric Administration (NOAA), the National Geospatial Agency (NGA), and the Federal Emergency Management Agency (FEMA) within the Department of Homeland Security. Most surveyors on state and local government staffs work for the highway department or urban planning and redevelopment agencies. Other employers include utilities, construction firms, mining, and oil and gas extraction companies.²³

ESRI, a leading GIS software vendor, estimated in September 2005 that it had 300,000 client sites with more than 1 million users in over 200 countries around the world. While approximately 40 percent of the users are international, that number is growing rapidly as distributors become more successful and as ESRI completes more enterprise-wide agreements with global companies.²⁴

Salary Information in the Geospatial Technology Sector

The Bureau of Labor Statistics (BLS) reports in its Spring 2005 *Occupational Outlook Quarterly* median annual earnings of \$46,080 for cartographers and photogrammetrists, \$42,980 for surveyors, \$30,390 for surveying and mapping technicians, \$58,970 for geographers, \$74,980 for computer applications software engineers, and \$53,450 for urban and regional planners.

A number of geospatial technology sector stakeholders have suggested that BLS data, although reporting national median salaries, often does not tell a meaningful story regarding opportunities in geospatial businesses and does not attract workers. They have expressed concern that the presentation of the data could do just the opposite, adversely impacting marketing to prospective employees. They have suggested

²³U.S. Department of Labor Bureau of Labor Statistics. *Occupational Outlook Quarterly*. Spring 2005.

²⁴Theodore, Jesse. ESRI Marketing, Redlands, CA. (email response to query)

combining the use of BLS data with industry-developed data. According to URISA data, the majority of private-sector GIS salaries are in the \$60,000 to \$69,999 range followed by the \$40,000 to \$49,000 range. While not disputing BLS data, such a presentation may be more appealing from a marketing perspective. In addition, the use of industry-generated job titles and descriptions for emerging professions, as alternatives to the general categories in the profiles, may enhance marketability. URISA's *Model Job Descriptions for GIS Professions* provides job descriptions within categories based on job responsibilities of managers, coordinators, specialists, programmers, analysts, and technicians.

Education and Training in the Geospatial Technology Industry

Currently, most geospatial technology occupations emphasize four-year and advanced degrees. The ASPRS study found that remote sensing and GIS programs are most often offered in departments or colleges of geography, natural resource management, forestry, and civil engineering. The interactive website created by the American Association of Geographers (AAG) (www.aag.org/Education/Intro.html) maps geography departments in the U.S. and Canada. The University of Southern Mississippi's GeoSpatial Workforce Development Center catalogs U.S. two-year and four-year programs in the U.S. at geowdc.com/root/united_states/us_map.htm. ESRI also has an online university database of colleges and universities with GIS programs at gis.esri.com/university/onlinedb.cfm

This traditional approach to education may not be most efficient for training the geospatial workforce of the future. Over the past few years, some two-year and vocational technology level training programs have emerged to support the growing need for geospatial technicians. There is also increasing interest in alternative education models, such as apprenticeships and certification programs, as these afford flexibly to respond quickly to changes in technology and skills requirements. Additionally, there is a growing demand for professionals trained in a variety of disciplines where geospatial technology could be applied, ranging from engineering, to the sciences, and to business.

DOLETA has found that apprenticeship training is, for some occupations, one of the more effective tools for preparing workers. The Geospatial Technology Apprenticeship Program (GTAP), under development by the University of Southern Mississippi (USM), will provide portable geospatial technician apprenticeship certification. GTAP combines theoretical classroom learning with on-the-job training and learning environments. The success of the effort relies on strong partnerships among several Mississippi-based geospatial businesses, NASA, ETA, USM and several local community colleges. USM is now in the process of reaching out to other potential communities and businesses to begin model replication.

URISA, ASPRS and the Board of Registration for Professional Engineers and Land Surveyors have developed certificate programs over the last 15 years. The URISA

Certification Committee was established in 1998 to develop professional certification in each of 23 disciplines. In 2004, the GIS Certification Institute (www.gisci.org) began offering a certification process for GIS professionals. Advocates believe that GIS certification will protect the public, grow the GIS profession, increase and ensure competency of GIS professionals, instill ethical behavior, and provide assistance to employers.

One of the often-stated goals of GIS certification is to assist employers with hiring decisions and personnel management and development. There is concern, however, that certification not be erroneously treated as a licensure and become a requirement in procurements. Much of the pressure for certification comes from individuals who think it will be a useful credential in building their careers and establishing professional credibility. Some believe that GIS professionals will be paid more once the profession is 'recognized' and that it may be a useful credential for demonstrating an individual's expertise.

A growing body of research points to benefits of using GIS to enhance student learning, despite implementation challenges such as teacher training in GIS software. In addition, innovative lessons are being developed by and for educators at all levels. For example, Thomson Brooks-Cole Publishing offers three GIS exploration books on the dynamic Earth, tropical cyclones, and water resources at www.brookscole.com/earthscience_d/; and the Missouri Botanical Garden has posted Mapping the Environment curricula at www.mobot.org/education/mapping/.²⁵

A study conducted at the University of Wisconsin-Madison reports that photogrammetry, remote sensing, and GIS, once considered separate areas of study, today enjoy an increasing degree of conceptual and technological symbiosis. These formerly exotic technologies have become critical to the conduct of science, government, and business. What is becoming a new geospatial information paradigm has led to multifaceted changes at the University in everything from courses, curricula, research program, and technology transfer activities to changes in administrative and financial arrangements. Such holistic restructuring may position users to reap additional opportunities from geospatial information education and training.²⁶

Continuing education is also an important source for training and staying current with the newer technologies. A 2004 survey by the online magazine, GeoPlace, found that one third of respondents reported that association workshops are the best source for continuing education and training. Vendor seminars came in a close second with 29 percent, followed by university courses at 13 percent, continuing education at 8 percent, and webcasts at 4 percent.²⁷

²⁵ Kerski, Joseph. "Titanic Exploration with GIS." *Geospatial Solutions*. May 2004.

²⁶ Lillesand, Thomas; Timothy Olsen, James Gage, Patrick McEnaney, "New Paradigm, New Approaches: Restructuring Geospatial Information Education and Training in a Traditional Research University Setting," *IAPRS*, Vol. XXXIII, Amsterdam, 2000.

²⁷ GeoPlace survey. (www.geoplace.com/uploads/georeport/040303.htm) 2004.

Section II: The High Growth Job Training Initiative

The High Growth Job Training Initiative seeks to provide national leadership to a demand-driven workforce system that ensures no worker is left behind. It is a strategic effort to prepare workers for new and increasing job opportunities in high-growth/high-demand and economically vital industries and sectors of the American economy. The initiative seeks to ensure that worker training and career development resources in the public workforce system are targeted to helping workers gain those skills and competencies required to obtain jobs and build successful careers in these industries.

The High Growth Job Training Initiative for the Geospatial Technology Industry

The High Growth Job Training Initiative for the geospatial technology sector was largely an outgrowth of NASA's National Workforce Development Education and Training Initiative (NWDETI), developed at NASA's John C. Stennis Space Center in Mississippi. The NWDETI is a customer-driven model, designed to close the gap between the geospatial industry's economic potential and workforce needs, and available jobseekers who lack the necessary qualifications. A key element of the NWDETI model is the reliance on existing education and training infrastructure to deliver the services needed for a trained geospatial workforce. At the same time, NASA has invested more than \$4 million in the initiative. Through NWDETI, NASA and the public workforce system have leveraged one another's investments to greatly increase the overall return.

The High Growth Initiative proceeded through three phases: Information Gathering, Research and Analysis, and Implementation.

Information Gathering and Executive Forums

The initial phases of information gathering started during February and March 2003, with the development of a geospatial technology industry environmental scan (Appendix F), the cataloguing and evaluation of existing workforce development and market information, other external research, and one-on-one meetings with key NASA NWDETI leaders and other potential federal partners, including the U.S. Departments of Commerce and Education. The Geospatial Executive Forum was held on April 10, 2003, at the National Space Foundation National Symposium in Colorado Springs, Colorado. ETA Assistant Secretary met with seventeen senior executives from industry and government to inaugurate a dialogue with key decision-makers and stakeholders to identify geospatial workforce needs and challenges. In Additional ongoing data gathering opportunities included NASA's National Workforce Development Education and Training Initiative Informal Program Review Panel meeting August 13-14, 2003, conference calls and one-on-one meetings with key industry and government stakeholders and an online validation with forum on proposed solutions and next steps for the geospatial High Growth Job Training Initiative (Appendix E).

Geospatial Industry Workforce Solutions Forums

On April 10, 2003, ETA held a Mini-Workforce Development Forum in Colorado Springs, Colorado, with seven industry human resources professionals to discuss workforce challenges and priorities and seek a commitment to continue in the dialogue. On July 24-25, 2003, ETA hosted a larger Workforce Development Forum in Washington, DC where the ETA Assistant Secretary met with 30 senior executives and human resources professionals representing industry, academia, the public workforce investment system and government. Participants contributed more detail regarding geospatial technology workforce needs and challenges, considered causes of the needs and challenges, and developed priorities and a plan to address them. On March 9, 2004, more than 50 stakeholders representing industry, users, academia, the public workforce investment system and government developed "model solutions" to address the geospatial technology sector's workforce development priorities at the Geospatial Industry Workforce Solutions Forum. This session utilized a modified outcome-based nominal group facilitation process to develop solution matrices containing key solution attributes, partners, resources needed, and possible policy barriers. During the Geospatial Technology Industry Solutions Development Forum, some 146 solutions and developed 48 solutions matrices, or roadmaps (Appendix C & D).

Section III: The Geospatial Technology Sector’s Workforce Challenges and Solutions

Each challenge and solution matrix presented below is designed to serve as a road map to fully develop a model solution. Geospatial technology stakeholders proposed more than 146 solutions and selected twelve of these for priority consideration. The solutions focus primarily on the key partnerships, tactics, and approaches to address the geospatial technology sector’s workforce development challenges. A proposed solution is an innovative workforce development strategy or model with positive outcomes that can be implemented, sustained and replicated at the local, regional or national level. Participants worked in groups to brainstorm and prioritize innovative workforce solutions, propose foundational models, and document the critical attributes, key stakeholders, resources, implementation barriers and other pertinent information in a “solutions matrix” to guide ETA’s investments in high growth industry strategies.

Each workforce challenge is labeled and briefly described. There follows, a brief summary of significant issues and observations. Proposed solutions follow, grouped according to the schema of: 1) competencies solutions, 2) deployment solutions, and 3) mapping solutions.

Challenge 1: Skills, Competencies, and Training	Description: Skills, competencies, and training encompasses the areas of education and training resources, tools and approaches to evaluate, develop, and implement solutions to meet the skill requirements for geospatial technology workers
Issues and Observations	
<p>There was broad agreement among stakeholders that the geospatial technology industry requires core competencies in the areas of business, interpersonal skills, technical, and analytical skills. While individual organizations may require some variation of competencies and may seek to ensure the required competencies differently, stakeholders believed that a focus on core competencies is critical to ensuring a well-trained workforce. Smaller firms also have limited funds for on-the-job training. Stakeholders look to educators to deliver new, integrated curriculum programs to meet future needs.²⁸ They noted a particular need for training for day-to-day imagery manipulation and analysis and development of GIS data layers and mapping projects. Other observations included:</p> <ol style="list-style-type: none">1. Occupational titles are inadequate.2. There is a need for clear classifications for a family of geospatial technology jobs.3. There are only the beginnings of certification in the geospatial technology sector.4. A better understanding is needed of appropriate titles and pay scales for individuals working in geospatial professions.5. There was little awareness in the industry of the publicly funded workforce investment system.6. Determining the type and method of training delivery could involve deployment decisions.7. Deployment decisions could also be required in developing flexible apprenticeship approaches.8. Evaluating the competencies in the geospatial technology user community could be of great value in planning training.	
Proposed Solutions: Skills, Competencies, and Training	Stakeholders participating in the skills, competencies and training group identified 42 potential solutions in three broad categories: 1) competencies; 2) deployment; and 3) mapping. They developed 15 solutions matrices, which are summarized below:
Competencies Solutions	
1. Develop geospatial	Stakeholders discussed the importance of developing content standards for geospatial skills,

²⁸ Mondello, Charles; Hepner, Dr. George R.; Williamson, Dr. Ray A. "Ten Year Industry Forecast." *Photogrammetric Engineering and Remote Sensing*, January 2004.

curricula in schools.	developing qualified instructors, and identifying existing instructional models. Other needs include a certifying body, accessible training, certified curricula and a champion to help institutionalize the implementation process. Stakeholders labeled this solution a priority. Stakeholders also mentioned that the NWDETI helped foster curriculum development in Mississippi and by 2005, every student in the state in grades seven to nine will receive coursework in geospatial technologies. Senior high school students will also be offered a geospatial science elective. Several leading software vendors are actively working with school districts nationwide to provide access to geospatial technologies and tools for the classroom. NASA Connect also offers an annual series of FREE integrated math, science and technology programs for students in grades 6–8. These and other ongoing efforts to develop and influence local curriculum should be leveraged wherever possible. Stakeholders noted that the public workforce investment system could serve as a vehicle to link these initiatives.
2. Develop on-the-job training.	This solution calls for building on OJT models that already exist; it was labeled a priority by the stakeholders. It would require non-four year programs, modular training, appropriate customized applications, centers for excellence to deliver the training, on-the-job training (OJT) curriculum development, apprenticeship development and cross disciplinary curriculum. OJT models are being developed by the GTAP and other high technology apprenticeship efforts. Stakeholders mentioned that customizing the OJT to meet specific applications or needs of particular users (defense intelligence, urban planning) or categories of workers (transitioning workers) may be valuable.
3. Develop programs specific to GIT competencies into public sector training.	This solution would be on improving the effectiveness of incumbent workers, which was discussed at length by stakeholders as a key issue. ETA is currently discussing how to better utilize Workforce Investment Act investments for incumbent worker training. This solution would require non-four year programs, modular training, appropriate customized applications and centers for excellence to deliver the training. Before being trained, the trainer must understand the technology's applicability. The University Consortium for Geographic Information Science curriculum has developed materials for different levels of competency (www.ucgis.org).
4. Develop competency standards used by GIT integration	Stakeholders outlined certification standards, multiple levels of trainers, users, and business owners, and trainer and train-the-trainer curricula. Standards for trainers and teachers are critical to ensuring quality education opportunities in geospatial and related disciplines. Some of the more effective local partnerships could be engaged in identifying skills needs and metrics for

trainers within target groups.	train-the-trainer initiatives.
Deployment Solutions	
5. Conduct small business workshops to determine needs/requirements, training based on user needs and nurture potential users.	This solution calls for qualified trainers, qualified curriculum, broad recognition by the community, a follow-up process (implementation/issues/usage), performance metrics, and reasonable or low cost. Understanding who would conduct the workshops is a potential barrier. The stakeholders labeled this solution a priority.
6. Deploy core training in K-12/ community colleges. Deploy specialized training tracks such as business administration, information technology, research and development, and/or geospatial solutions.	<p>This solution calls for qualified trainers, qualified curriculum recognized by a broader community, a follow-up process (implementation/issue/usage), performance metrics, teaching transferable skills rather than jobs or occupations, training including hands-on field work, and incorporating geospatial technologies into existing course work. There are significant and varied resource requirements. Barriers include state certification requirements (a new course is often a barrier), state mandated credits, creation of new curriculum and new degrees, gaining security clearances, long delays in process and conflict of regulations for immigration vs. security issues.</p> <p>Stakeholders also suggested specialized training tracks selected to meet the local workforce needs or as part of a comprehensive approach. They pointed out that this solution could be married with the skills center approach and was identified it as a priority.</p>
7. Create training programs that include classroom and field training.	<p>This solution envisions people using an application in the field, forging agreements with the existing user community, and directing classroom and field experience toward problems that are more real and less purely theoretical. The barriers include government data sharing issues, privacy issues, need for equipment for field testing/data collection, and WIB requirements (local level demand occupations). This solution could also provide community service opportunities through projects in the field.</p> <p>Several stakeholders suggested replication of the model of the EAST initiative, which has implemented high tech applications development projects for community service in K-12. It was noted that this model could leverage the Geospatial Technology Apprenticeship Program and other OJT programs.</p>
8.	Stakeholders discussed the need for information tools that are widely available, widely known,

Develop or improve a portal for jobs, education and training programs.	<p>easy to navigate, tied into existing portal systems, include powerful and easy ways to add new content, self-maintaining, and employing a standard format for content. Barriers include WIB requirements, WIA interpretation and reaching consensus.</p> <p>While www.careervoyages.gov is intended to meet many of these objectives, stakeholders were uncertain whether a site subject to some governmental requirements could meet the need for this kind of web site portal. The site should be flexible and easily updated. The Geospatial Workforce Development Center at The University of Mississippi, NASA and other private vendors maintain websites and information that should be leveraged (www.geowdc.usm.edu).</p>
9. Establish a geospatial coordinator at local one-stops.	<p>Though the workgroup labeled this a key solution, it but did not fully develop a solution matrix. ETA believes that this solution could catalyze outreach and awareness of geospatial fields and more effective use of the public workforce investment system.</p> <p>An option for executing this solution could be through local one-stops, depending on local buy-in and local geospatial technology workforce development needs. Through partnerships with states and local workforce boards, this solution seems viable.</p>
Mapping Solutions	
10. Develop skill centers, community workshops, and training programs for decision makers and managers.	<p>This solution requires skills development such as GIS, remote sensing and GPS; stakeholder groups that help define what skills are delivered; a resource gap analysis; qualified instruction; decisions on where training will take place; customizable training for walk-in clients; an assessment of skills and additional skills needed; benchmarking current use; connections to the geospatial industry to stay up to date; basic spatial literacy training; a national organizational scope; instructional centers that are WAN enabled; and the ability and capacity to support the evolution of geospatial technologies. Barriers include coordination and information sharing among the public and private sector and academic institutions. The stakeholders identified this model solution as a priority.</p> <p>This solution promotes the local and regional coordination and integration of E³ resources around skills training and applications development. Model centers could focus on specific applications areas and issues of expertise. It could also be part of a broader user or applications strategy.</p>
11. Host community forums for sharing	<p>This solution would require greater knowledge of applications than of particular data, awareness building, training for existing jobs, sharing best practices, and distance learning. Barriers include</p>

existing geospatial information.	copyrights on information. Stakeholders saw these as a means to reach user audiences and build awareness of the potential of the technology, as well as stimulate discussions about user skill set needs.
12. Define business functions and evaluate where those functions are performed.	This strategy calls for identifying business, product delivery, and production information functions; outreach to the business community and user community; a cross walk of the GTCM to identify common tasks; and listing of the skills that are required. No barriers were identified. The group suggested that this model should be federally sponsored. There was a great deal of discussion during the Geospatial Technology Solutions Development Forum regarding the need to promote the use of spatial technologies in an enterprise setting. This kind of approach promotes the integration and coordination of many business functions around spatial data and applications.
13. Create a reference guide.	This calls for easy access to easily maintained and updated information that is web based, linked to other sources of information, and provided in other languages. It would require criteria for information to be included and a timeline for completion; it could be related to one stop job posting of geospatial resumes and include links to potential educators and employers. Barriers include information sharing and a finished product online tutorial. The group also suggested that this be piloted as a regional approach and that possible uses of such a resource by training providers should be explored in developing this solution.
14. Identify target industries for training.	This solution would follow after the sequence of building skill centers and hosting community workshops. Feedback from the workshops would clarify needs; then industries and applications for training could be targeted.
15. Develop a national strategy for a geospatial non-profit.	While the workgroup did not develop this solution, the notion of a not-for-profit could be important when considering sustainability strategies and alternative funding streams. Participants recommended that such a solution could also be part of a skills center concept.

Challenge 2 Image and Outreach to the Public		Description: Image and Outreach to the Public is comprised of strategies, tactics, models, initiatives, campaigns and efforts to build awareness and improve the industry image among key audiences (youth, teachers, community colleges and technical schools, universities, the military, public and private sector user organizations and groups, and incumbent, dislocated, and transitioning workers) regarding the development, use, applications and societal benefits of geospatial technologies.
Issues & Observations One of the most urgent concerns expressed by the executives was improving the image of their industry. Stakeholders suggested that the central barrier to improving the sector's overly technical image is most likely the lack of a widely agreed upon and comprehensive industry definition. Such a definition would enable the establishment of metrics and the collection and assessment of data against those metrics that could tell a positive story about employment benefits and opportunities in the geospatial technology sector.		
Proposed Solutions: Image and Outreach to the Public		The image and outreach participants suggested 55 solutions, but focused their development of solution matrices on four priority solutions having to do with "definition and data." The 18 matrices provided different approaches to the four priority solutions and two additional areas of focus.
1. Develop a workgroup to develop and validate the conceptual industry model using a consensus approach to define the geospatial industry.		Stakeholders suggested identifying or developing a sponsoring organization with vested stakeholders comprised of industry representatives. Concerns identified include organizational barriers and possible resistance from U.S. Departments of Commerce and Labor. The Geospatial Technology Competency Model (GTCM) developed by USM and NASA already engaged a multi-stakeholder industry group to build consensus on a definition of the industry . Some stakeholders expressed interest in utilizing the GTCM definition as starting place, but believed it should be revised to include elements or sectors of the industry were left out of the definition. Agreement on a definition should include the E ³ partnership if it is to become a workable solution.
2. Develop a task force/advisory group to "vet" programs and spending.		This solution requires a clear mandate from the U.S. Secretary of Labor, active participants, and input from industry. Potential barriers include Workforce Investment Act Reauthorization, higher education policies, and insufficient input from industry. Stakeholders mentioned that this solution could be linked to the previous solution or other approaches to improving the industry's image. Any such advisory group should be related to

	all other High Growth sectors. Additionally, a group of this nature would likely fall under the Federal Advisory Committee Act, which could impose complicating requirements.
3. Develop a message that demonstrates geospatial as an enabler of other location applications.	<p>This solution requires a clear description for the layperson concerning geospatial technology, including the business case for various users or applications. A barrier could be budget constraints.</p> <p>Message development to specific audiences is a typical element of strategic communications planning; it is an essential component of the industry and academic communications strategy outlined below, and also the national campaign discussed in the pipeline section. The group suggested that the public workforce investment system could be a distribution channel in addition to other channels mentioned: web, marketing skills and career counselors.</p>
4. Develop an academic and industry communications strategy with federal, state and local partners identifying skills required and mapping to industry standards.	<p>There were common themes cutting across all of the solutions, including a decision making process based upon understanding industry skills requirements, evaluating the gaps, mapping to national standards, and openly communicating the results. The different approaches all involve multiple stakeholders and require significant funding and human resources for development and execution. The barriers identified include proprietary or confidential data, and lack of consensus on industry roles.</p> <p>Attendees discussed the need to leverage NASA's investment in the Geospatial Technology Competency Model. Outreach efforts should be directed to include foundations as a potential resource. The group also emphasized that two-way communication is a critical factor in a successful communications strategy.</p>
5. Create profiles of geospatial professionals to humanize the industry.	<p>These matrices call for creating real, practical and high visibility examples of geospatial professionals and applications in action, including key information that would attract young people and other workers to enter to the geospatial field. Political priorities and funding are identified as barriers.</p> <p>Stakeholders thought it important to reach out to a variety of target audiences; they also suggested that the profiles could serve as content for www.careervoyages.gov.</p>
6. Link academic and workforce board resources to address	<p>This solution calls for an analysis of existing federal, state and local resources, identifying key partners, developing materials such as case studies, and distributing the materials and messages through channels such as mailings, forums, and seminars. The barriers include Workforce Investment Act policy, a number of legacy policies, higher education policies at the</p>

the image challenge and integrate resources to make an impact.	state level, and privacy issues. Integration is an important concept that deserves further consideration. Linking resources will require a vehicle. Specific information on partnerships could help bolster sustainability approaches. It could also be a strategic element of communications efforts.
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Challenge 3 Pipeline	Description
	Pipeline issues are related to recruitment, retention and professional development strategies, initiatives and tools to increase and go outside traditional geospatial technology labor pools.
Issues & Observations	
<p>Geospatial technology stakeholders reported that pipeline issues present significant challenges. Insufficient communication on career opportunities, especially to components of the publicly funded workforce investment system, curriculum development and training needs at all levels, security clearance issues and diversity issues are among the barriers to developing an adequate pipeline of geospatial workers. The stakeholders also pointed out the imperative to develop non-traditional labor pools if they intend to keep up with the sector’s projected growth. In their estimation, the pipeline of workers for their industry will need to include: foreign students, dislocated workers, retirees, minority populations, transitioning veterans, youth, college students, incumbent workers, IT workers with transitional skills, and workforce re-entries. Stakeholders focused on two education vehicles to improve the pipeline:</p> <p>9. K-12 education system – Executives reported that “education is becoming very test-oriented and as a result, the practical aspects of the industry are being lost on young people.” They believe this is adversely affecting many science and technology industries and technical career opportunities. Focusing young people on science, technology, engineering and mathematics (STEM) related disciplines and careers is a key component of building a pipeline of workers. Providing K-12 systems with the tools, resources and comfort level to promote technical careers, such as geospatial, is an important first step.</p> <p>10. Community colleges and technical schools – The U.S. Department of Education Office of Vocational and Adult Education reports that outsourced training expenditures for U.S. companies nearly doubled between 1994 and 2000, growing from \$9.9 billion to \$19.3 billion annually. This demand has created a market for contract training and curriculum development that community colleges are highly qualified to meet.²⁹ The report also identified a number of key characteristics of market responsive community colleges:</p>	

²⁹ U.S. Department of Education, Office of Vocational and Adult Education. “Documented Characteristics of Labor Market-Responsive Community Colleges and a Review of Supporting Literature.” 2003.

<ul style="list-style-type: none">o Ladership committed to the goal of making the college market-responsive;o Internal response mechanisms;o Business and other partnerships; and,o Connection to the local economy.	
Solutions: Pipeline	Pipeline workgroup participants identified 47 possible solutions and developed solution matrices focusing on three priority categories: 1) recruitment, 2) retention, and 3) professional development.
Recruitment Solutions	
1. Employers and job seekers could benefit from better definitions of the geospatial industry; for example, better metrics on the industry sectors, specific employment tends, and needs.	<p>This solution requires a survey of industry need, profiles of job opportunities, and methods for measuring the awareness of job opportunities in both the private and public sectors. Human resources and funding for dissemination are also needed.</p> <p>NWDETI stakeholders reported that Mississippi State University is already updating its 1998 Industry Survey, which could become a useful resource. Stakeholders noted several "image and outreach" solutions that could be linked with this kind of information gathering exercise.</p>
2. Start with middle and high school students to provide geospatial experience by incorporating the technology in science and social science work. Train teachers to use it and teach with it. Get software in labs for student use.	<p>This solution would deliver geospatial technologies, curriculum and activities for teachers. The barriers include support from the administration. Development should consider a dual-language component.</p> <p>The State of Mississippi has developed a program that could serve as a model. NASA also provides substantial resources and access for teachers that should be leveraged and not duplicated. Participants pointed out that more detail is needed on how the public workforce investment system would fit in.</p>
3. Target outreach to professional societies	<p>This solution requires targeting geospatial societies/associations and partnering with their outreach components to reach user and applications societies and associations. The Geospatial Technology Solutions Forum participants are the primary stakeholders.</p>

involved in geospatial or related work (civil engineering, geography, geology, urban planning).	Barriers include coordination and money for development. This approach could be part of a larger national campaign or communications strategy.
4. Conduct a media recruiting campaign using TV, radio, and magazine advertising to provide more exposure to the technology, increasing public awareness.	This solution calls for a national campaign that does not limit audiences and focuses on a concise message through diverse media. Barriers include lack of funding and fragmentation of societies. Several of the solutions already discussed could be rolled up in such a campaign, including communications strategy, linking academia and workforce boards, and outreach to professional societies. This is one of the three priorities selected by the pipeline workgroup.
5. Institute a job training/transition program for veterans, retirees, and government employees. (E.g. troops to teachers. Identify military skills that translate to civilian skills. Include materials to describe characteristics and companies that are involved.)	This would require development of a web portal with occupational profiles, jobs, additional education, and credentials needed. Money and support could be barriers to implementation. USM has developed the Geospatial Technology Online Assessment Tool, which provides key information on competencies needed and links to two and four year programs available nationwide. Career profiles were included as one of the solutions under image and outreach and could be included as part of content development for www.careervoyages.gov . One option could be to include this kind information and access as part of Career Voyages content development, including access to the USM tool.
Retention Solutions	
6. Involve employees in decision making and project selection when feasible.	This solution calls for the general establishment of a team building environment, including a clear definition of goals, employee empowerment, management support and diverse products and services within the company. Labor and management issues may be a barrier. Many organizations have undertaken similar approaches to team building and the work environment, helping to retain employees through buy-in and involvement.
7. Transition training for	Necessary elements include: local access training centers (community colleges), an understanding of geospatial needs and applications, and committed employers. The barriers

“obsolete” skill sets and dislocated workers.	include the worker’s age, union issues, and company commitment. Incumbent and transitioning worker training can allow the industry and user organizations to benefit from the experience and wisdom in decision making of these non-traditional labor pools.
8. Development of agency/industry exchange programs to develop an understanding among diverse groups.	Requirements include: willing agencies, academia, and industry, as well as job shadowing rotations, development or adoption of other models, flexibility in tailoring to individual needs and conflict of interest or non-disclosure agreements. Labor laws, clearance issues, individual agency/industry policies, and non-disclosure were identified as potential barriers. This could be an innovative approach to gaining on-the-job learning experiences. Stakeholders suggested that mentorship and cooperatives should be considered as elements of this solution.
9. Develop industry-specific focused survey tools to share salary benefits and best practices.	This solution would require standard job titles, an instrument sensitive to business size across industry and regionally sensitive data, best practices, and compensation comparisons within related technologies. Privacy disclosure was identified as a barrier. Other data related issues such as compilation, validation, distribution and maintenance were mentioned. Salary information comparison and best practice sharing are among the top issues identified by stakeholders for helping to recruit and retain employees. They believe the entire sector would benefit from some form of this solution in combination with other data collection efforts. This solution was labeled a priority by workgroup participants.
10. Develop a national system of certification, including stratification, to provide increased compensation and mobility across industries and disciplines.	This solution calls for universal recognition across political boundaries and industries, certification at a number of levels of expertise, well-defined competency levels and testing, and an accreditation process for certification programs. The barriers include accreditation acceptance and industry adoption. Stakeholders noted that URISA, ASPRS and the Board of Registration for Professional Engineers and Land Surveyors have been providing certificate programs within the last ten years. The URISA Certification Committee was established in 1998 to develop professional certification in each of 23 discipline areas. None is universally recognized or as flexible as required for the diverse geospatial technology skills sets that stakeholders identified. The group reported that the SpaceTEC coalition has developed and is beginning implementation of a national aerospace technician certification.

	<p>The Geospatial Technology Apprenticeship Program (GTAP) apprenticeship certification process now being developed and validated by ETA is intended to be a national, portable certification. As part of this project, GTAP is utilizing the Spatial Technology and Remote Sensing or STARS curriculum and certification process, which has been deployed in several regions. Reconciling assorted certifications and developing a standardized, universal model certification would be valuable. This solution could be part of larger capacity building efforts and was identified as an overall priority by the group.</p>
Professional Development	
<p>11. Encourage industry focused educational institutions providing convenient on-site or on-line, affordable, customized training to geospatial employees to prepare for the next generation of skills.</p>	<p>This solution requires community colleges or other training deliverers, and financial resources for course development. Barriers include lack of recognized certification, reluctance of community colleges and universities, lack of state funds for community colleges to develop new training programs, reluctance of industry to give release time for training.</p> <p>Stakeholders suggested this solution as a delivery mechanism for the national certification discussed elsewhere. On-line access could be a vehicle to involve one-stop centers and workforce investment boards. This solution highlights the need for incumbent worker training .</p>
<p>12. Provide incentives, grants, and tax breaks for innovative applications of geospatial technology. Support partnerships linking mature and start-up programs.</p>	<p>This solution calls for a national association to lobby for these incentives. Stakeholders noted that ETA could transmit this suggestion to the Office of Management and Budget.</p>
<p>13. Establish a centralized certification body, process and nomenclature that provides for universal recognition.</p>	<p>This solution requires a national body to verify competencies that are certified, standardized, portable and transferable. A standard definition of terms would be developed around this industry. The barrier is the lack of a national body.</p> <p>“Centralized” and “easy to understand” should characterize a national certification; agreement on a common language would aid certification and professional development strategies.</p>
<p>14.</p>	<p>Requirements include: identifying applicable competencies and mastery levels,</p>

Develop a training program for geospatial technicians in higher-level skills in the geography and spatial analysis, physics, remote sensing, and math disciplines.	developing alliances between companies and educational organizations (community colleges), convenience, and affordability. Barriers include lack of industry awareness and compliance with military training requirements. This is another solution highlighting incumbent worker training.
15. Work with local colleges to establish degree and certification programs in line with current needs. Develop tuition incentives.	<p>This solution calls for developing standardized, affordable curriculum to tech critical competencies. Colleges could create a geospatial technology department and businesses could lend talent to teach the technology. Barriers include agreement on a curriculum, reluctance of universities to accommodate and adapt, and employers' reluctance to allocate education time.</p> <p>This could be an opportunity to share resources and promote public/private partnerships.</p>

Section IV: Implementation of Solutions and Conclusion

The Employment and Training Administration (ETA) supports comprehensive business, education and workforce development partnerships to develop innovative approaches and replicate models that effectively serve the workforce needs of business while helping workers find good jobs with good pay and promising careers. Grants awarded under the High Growth Job Training Initiative implement unique and innovative, industry-driven skills training, certification and career ladder development programs that support identified geospatial technology sector workforce and economic development needs.

Based on the challenges identified by the geospatial technology sector and highlighted in this report, ETA has made a series of investments totaling more than \$6.4 million to partnerships among business, community colleges, the public workforce investment system and other partners to address the needs of the geospatial technology sector. Grantees must account for and leverage key public workforce investment system capabilities. Solutions are national, state and local in scope and address key geospatial technology sector challenges in unique and innovative ways. The following highlight ETA's investments to address these challenges. Additional information is posted at: <http://www.doleta.gov/brg>.

Redefining and Communicating Geospatial Industry Workforce Demand – Geospatial Information Technology Association (GITA)

This \$695,362 grant will help to broadly develop and disseminate authoritative information regarding the geospatial technology industry's occupational and skills definitions and data. The challenge addressed in this project is the need for a consensus industry definition or method for collecting economic and workforce data to help promote career opportunities and future worker needs. The project will include outreach to the public to improve the geospatial technology sector's image and to improve basic public spatial literacy. GITA and its partners will provide a total match of \$670,927 to supplement the ETA investment.

Geo 21 Project – Kidz Online and the NASA Center for Distance Learning (CDL)

The Geo 21 project, a \$1,000,000 grant, is a comprehensive awareness and image-building effort targeting youth and adult learners. Nortel will deliver learning resources, including video programming and live web casts, provide professional development services, and integrate geospatial concepts into existing programming and ETA's Career Voyages website. The workforce challenges addressed include lack of knowledge about possibilities of employment either in the geospatial technology industry or in associated user sectors. Insufficient communication about career opportunities has been among the key barriers to developing an adequate pipeline of geospatial workers. NASA's Center for Distance Learning at Langley Research Center is a primary partner on this project. Nortel will provide a total match of \$1,002,055 to supplement the ETA investment.

**Geospatial Imagery Analysis and Practical Applications – William F. Goodling
Advanced Skills Center (ASC)**

This \$990,125 project will establish a geospatial technology education training center to support user-focused applications. ASC will develop a certificate program in imagery analysis in private and municipal applications with 2+2+2 articulation agreements with high schools, community colleges, and universities to produce imagery analysis technicians. These 2+2+2 articulation agreements provide students and/or workers with career and education advancement tracks, enabled by linked curriculum and levels of education, training and certifications at the high school, community college and university levels. The workforce challenges addressed by this project include the need for imagery analysis technician and geospatial technology user certifications. The ASC and its partners will provide a total match of \$495,000 to supplement the ETA investment.

**The Geospatial Business Hub Project: Preparing the Nation's Geospatial
Workforce – The Institute for GIS Studies and Central Piedmont Community
College (IGISS)**

This grant of \$2,000,000 will produce an industry-led, apprenticeship-based advancement ladder for specialty certificates and degrees in high-demand geospatial technical applications. The key workforce challenges addressed include the need for career ladder and education advancement approaches and standard certifications for geospatial technology applications communities in land records management and utilities. IGISS and its partners will provide a total match of \$4,387,327 to supplement the ETA investment.

**A Model for Connecting the Geospatial Technology Industry to Community
College Workforce Development: Geospatial User Needs Assessments –
Rancho Santiago Community College District (RSCCD)**

This \$187,939 initiative will create, test and deliver a replicable model whereby community colleges, in cooperation with local businesses, governments, trade associations and workforce investment agencies can assess local geospatial workforce needs and use the findings to adapt existing curriculum and career ladder systems for local geospatial user industries. RSCCD and its partners will assess the needs for geospatial skills in the natural resources, construction, manufacturing, trade/transportation and other key local geospatial technology user communities. Workforce challenges addressed include the need to evaluate what skills and competencies are required by geospatial technology user sectors. RSCCD and its partners will provide a total match of \$56,684 to supplement the ETA investment.

Conclusion

By every estimate, the geospatial sector will continue to grow, spurred by the acceleration of technology innovation and the need for location-based data of all kinds. Users of geospatial data and information will continue to increase in diverse industries, from agriculture and banking to transportation.

Building on NASA's National Workforce Education and Training Initiative, the High Growth Job Training Initiative has engaged a broad range of geospatial technology stakeholders to better understand the workforce challenges of this emerging sector. ETA has made key investments in several innovative partnerships intended to address these challenges. These partnerships will demonstrate how the public workforce investment system, by attending carefully to the emergent and changing needs of business and industry, can aid workers in securing good jobs with good wages and promising career pathways.

These investments and partnerships are just the beginning of the implementation process. ETA will continue to work with the geospatial technology sector to gather and disseminate best practices and lessons learned from its current investments and other ongoing education and training activities nationwide. ETA will also work with the grantees to ensure that the projects are sustainable and can be appropriately replicated in other areas of the country and within other high growth/high demand sectors of the American economy.

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Appendix A

A Complete List of HGJTI Industries

1. Advanced Manufacturing
2. Aerospace
3. Automotive Services
4. Biotechnology
5. Construction
6. Energy
7. Financial Services
8. Geospatial Technology
9. Health Services
10. Homeland Security
11. Hospitality
12. Information Technology
13. Retail Trade
14. Transportation

Appendix B
Academia Sector

Last Name	First Name	Organization
Annulis	Heather	The University of Southern Mississippi
Arnold	Patricia	The Space Foundation
Bednarz	Sarah Witham	Texas A&M University, Department of Geography
Bergerud	Marly	Workforce and Economic Development, De Anza College
Brey	James	University of Wisconsin Fox Valley
Brower	Robert	The Institute for the Applications of Geospatial Technology at Cayuga Community College
Campbell	Shannon	Jones County Junior College
Carr	Jon	University of Southern Mississippi, WLPC
Chase	Brian	The Space Foundation
Conner	Bill	The Institute for the Applications of Geospatial Technology at Cayuga Community College
Cunniff	Patricia	Space Tech
Dannreuther	Maggie	Mississippi State University
Davis	Robert	California Space Authority, Inc.
Dozier	Matt	East Initiative
Eisenhart	Steve	The Space Foundation
Finch	Lorna	St. Louis Community College
Flinton	Michael	Spatial Technologies Information Center at Fulton Montgomery Community College
Foil	Jennifer	The University of Southern Mississippi
Foster	Jamie	California Space Authority, Inc.
Gaudet	Cyndi	University of Southern Mississippi
George	Robert	Woodside High School, NASA Center for Distance Learning
Gershwin	Mary	Colorado Community College
Hagelston	Janeen	The University of Southern Mississippi
Hawkins	Annette	USM - Stennis
Kent	Norma	American Association of Community Colleges
McKenney	James	American Association of Community Colleges
Mitchell	Brian	The University of Southern Mississippi
Mohling	Wendell	National Science Teachers Association
Powe	David	Ole Miss/USM
Pulham	Elliott	The Space Foundation

Appendix B
Academia Sector

Last Name	First Name	Organization
Richardson	Douglas	Association of American Geographers
Ritchie	Liesel	Mississippi State University
Shao	Guofan	Purdue University/ SAF
Sims	Linda (Cherry)	Mississippi State University
Slark	Julie	Rancho Santiago Community College District
Sumner	Candace	JCJC
Thomas	Chuck	Advanced Skill Center
Williams	Heather	The University of Southern Mississippi
Zeiss	Chuck	Central Piedmont

Appendix B

Government Sector

Last Name	First Name	Organization
Allison	Sue	U.S. Department of Labor, ETA, Business Relations Group
Blake-Coleman	Wendy	U.S. Environmental Protection Agency
Bogosian	Joseph	U.S. Department of Commerce
		National Oceanic and Atmospheric Administration/NESDIS
Brauer	Douglas	
Burgess	William	NSGIC
Carpino	Christine	NOAA
Cast	Cast	U.S. Department of Homeland Security
Castro	Lorraine	National Imagery and Mapping Agency
Clapper	James	National Imagery and Mapping Agency (NIMA)
Colton	Marie	National Oceanic and Atmospheric Administration
Crowe	John	U.S. Department of Homeland Security
Dann	Liz	National Imagery and Mapping Agency
Deguara	Juan	National Imagery and Mapping Agency
Echarvarria	Fernando	U.S. Department of State
Fordyce	William	U.S. Geological Survey
Gilbert	Gay	U.S. Department of Labor, ETA, Business Relations Group
Goodson	Dennis	US Department of Labor - Apprenticeship
Groat	Charles G.	USGS
Hall	Warren	NOAA, Satellite and Information Services
Hissong	Frank	Bureau of Land Management
Kiernan	Allison	Federal Geographic Data Committee
Landvoight	Arnold	National Security Agency
Lautenbacher	Conrad	NOAA
McAlister	Sean	International Trade Administration, U.S. Department of Commerce
Osborn	Stephanie	NACo
Parker	Randy	U.S. Department of Labor
Perry	Joe	NIMA/NGA
Sharp	Kirk	NASA Earth Science Applications
Sherwood	Harla	NASA Center for Distance Learning
Soule	Helen	U.S. Department of Education
Trobia	Gene	National States Geographic Information Council (NSGIC)

Appendix B
Government Sector

Last Name	First Name	Organization
Wells	Damon	U.S. Department of State
Wells	Kim	U.S. Department of Commerce
Whitman	Christine	U.S. Environmental Protection Agency
Withee	Greg	National Oceanic and Atmospheric Administration
Woodridge	Charles	National Oceanic and Atmospheric Administration, Satellite and Information Services
Zuidema	Byron	U.S. Department of Labor, ATELS

Appendix B
Industry Sector

Last Name	First Name	Organization
Ancell	Clay	Earth Data
Arabads	Liz	Highland Geographic
Baker	Kelle	Harris Corporation
Barber	Andrew	AIA
Bosak	Betsy	Northrop Grumman Space Technology
Bush	Wes	Northrop Grumman
Campbell	Joel	ESRI
Chamberlain	Steve	Integral Systems
Cooke	Richard	Research Systems, Inc.
Corle	Fred	Spatial Technologies Industry Association
Dailey	Andrew	ESRI
Dalal	Robert	Space Imaging
Dalbello	Richard	Satellite Industry Association
Dangermond	Jack	ESRI
Davis	Robert	California Space Authority, Inc.
Dold	Sharon	Raytheon
Dougherty	Andrew	3001, Inc.
Douglass	John	Aerospace Industries Association
Eggen	Kim	Resource 21
Faintich	Marshall	Sensor Systems, Inc.
Filomeo	David	Lockheed Martin
Fisher	Norman	Raytheon Intelligence and Information Group
Foster	Jamie	California Space Authority, Inc.
Fry	Kristin	Booz Allen Hamilton
Galyean	Angela	Orbimage
Giordano	Sherry Thompson	Questerra, LLC
Graziani	Paul	Analytical Graphics, Inc.
Huddleston	Tim	Aerospace States Association
Huether	Mike	Kodak
Johnson	Ann	ESRI
Johnson	James	United Space Alliance
Karmazin	Greg	STIA
Keating	Terrence J.	ASPRS
Keebaugh	Mike	Raytheon Company
Klimkiewicz	Karen	Space Imaging
Kludt	Richard	Lockheed Martin
Lee	Angela	ESRI
Leonard	Vic	Resource 21, LLC
Levy	Karen	GITA
Logan	Bryan	EarthData Holdings, Inc.
Logsdon	David	Aerospace Industries Association
Mahone	Bruce	Aerospace Industries Association
Marsh	G. Thomas	Lockheed Martin
Mateer	Sara	Swales Aerospace

Appendix B
Industry Sector

Last Name	First Name	Organization
Milovich	Tim	Questerra, LLC
Moeller	John	Northrop Grumman
Mondello	Charles	ASPRS
Moraco	Tony	Boeing Autometric
Morrish	Brenda	Harris Corporation
Mott	Michael	Boeing
O'Connell	Matthew	Orbimage
Pajer	Pam	Research Systems, Inc.
Petersen	Kristi	Raytheon
Porter	Joel	Lockheed Martin
Prentice	Tameiko	ESRI
Roberts	Chuck	ESRI
Robinson	Brad	University of Southern Mississippi
Rodgaard	John	Boeing Autometric
Satterlee	Herbert	DigitalGlobe
Schmidt	Michael	Orbimage
Skelnik	Richard	General Dynamics
Soltis	Robert	SAIC
Sonnen	David	ISSI
Speckman	Toya	Ball Aerospace & Technologies Corp.
Stahl	Gene	BAESystems
Taylor	David	Ball Aerospace & Tech.
Thomas	Karen	Raytheon
Tietz	Lisa	Kodak
Velte	Lisa	Analytical Graphics Inc.
Vera	Glenn	Florida Space Authority
Voccola	Harry	Navigation Technologies
Wald	Bruce	Eastman Kodak

Appendix B
Users Sector

Last Name	First Name	Organization
Ancel	Susan	EPCOR
Asbury	Stewart	Byers Engineering Company - SpatialAge Solutions Division
Brower	Robert	The Institute for the Applications of Geospatial Technology at Cayuga Community College
Clark	Terry	Society of American Foresters
Conner	Bill	The Institute for the Applications of Geospatial Technology at Cayuga Community College
DiSera	Dave	EMA, Inc.
Duffy	Greg	Woodfield Consulting
Gomez	J. Peter	Xcel Energy
Jarreau	Bert	National Association of Counties
Jones	Brent	Energy & Telecom Services - James W. Seawall Company
Kumar-Rubock	Wilma	Washington Gas
Kuykendall	Richard	GITA
Lees	Joseph	Homeland Protection Institute
Levy	Karen	GITA
Lombard	Martha	URISA
Lopez	Xavier	Oracle Corporation
Richardson	Douglas	Association of American Geographers
Samborski	Robert	GITA
Schell	David	Open GIS Consortium
Soiland	Lisa	American Management Systems
Tomlin	Donald	Florida Power & Light Company
Wollack	Leslie	National States Geographic Information Council
		American Gas Association
		American Public Power Association
		American Public Works Association
		American Planning Association
		American Water Works Association
		Edison Electric Institute
		International City/County Management Association
		National Association of Counties

Appendix B
Workforce Sector

Last Name	First Name	Organization
Cashen	Kate	National Association of State Workforce Agencies
Cassidy	Patrick	National Association of Workforce Board
Collins	Walter	ATELS
Powers	Stephanie	National Association of Workforce Board

Appendix C

High Growth Job Training Initiative Matrix

Participants / Contributors:

Angela Lee, Marshall Faintich, Gene Stahl

Issue: Skills, Competencies & Training: Mapping				
Solution: Develop skill centers; community workshops and training programs for decision makers and managers				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Skills included: GIS; remote sensing; GPS- Stakeholder groups who help define what skills are delivered- Resource gap analysis- Decide where the training will take place; is it a physical site or is it virtual?- Customizable training for walk-in clients; assess skills and what additional skills are needed- Benchmark current use and replicate- Must stay connected to geospatial industry to stay up to date- Basic spatial train- National in organizational scope- Instructional capacity of centers should be WAN enabled	<ul style="list-style-type: none">- Department of Homeland Security- NASA- Public Sector Employees at all levels of government- Software providers- Software developers- Chamber of Commerce- Community- Workforce Investment Boards- Economic Development Authorities- Northeast Affiliates	<ul style="list-style-type: none">- Municipal representatives- Land asset management reps- Environmental trainers- User community – One ETA manager and a handful of outreach (5-10) people- NACo in kind political- NSGIC- Seed money to get from U.S. Department of Commerce- One stop access – hire trainers- Regional facilitator	<ul style="list-style-type: none">- Top down policies	<ul style="list-style-type: none">- Need to coordinate- Need better bottom-up decision making

Appendix D

Issue: Skills, Competencies & Training: Mapping				
Solution: Develop skill centers; community workshops and training programs for decision makers and managers				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- Able to support evolution of Geospatial tech. in your business - Qualified instruction				

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Angela Lee, Marshall Faintich, Gene Stahl

Issue: Skills, Competencies & Training: Mapping				
Solution: Host community forums for sharing existing geospatial information				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Know domain and how to do it as opposed to data- Awareness building- Training for existing jobs- Once meetings are in place, share best practices and knowledge- Distance learning	<ul style="list-style-type: none">- User community- Chamber- Economic development authorities- Local government	<ul style="list-style-type: none">- Web site – categorize web site- Database administrator – in kind	<ul style="list-style-type: none">- Copy writes on information	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Angela Lee, Marshall Faintich, Gene Stahl

Issue: Skills, Competencies & Training: Mapping				
Solution: Define business functions and look at where those functions are performed				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Identify business functions- Administrative information decision- product delivery and production- outreach to business community/user community- cross walk re geospatial competency model to identify- common tasks, how much is done in specific domain- outreach to content analysis, job parts- identify key sections see what skills practices	<ul style="list-style-type: none">- STIA/industry association- Specific industry associations- Chambers of Commerce- Economic development authorities	<ul style="list-style-type: none">- U.S. Department of Labor/Federal sponsored project- U.S. Department of Commerce		<ul style="list-style-type: none">- Defense/intelligence community policies- Department of Homeland Security critical infrastructure maintenance

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Issue: Skills, Competencies & Training: Mapping				
Solution: Create a reference guide to understand (where to find stuff)				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Easily maintained and updated- Easy access – web based XML or better- Linked other sources of information- Other language- Establish criteria for information and timeline- Should be a re geospatial one stop job posting resumes- Links to potential suppliers- Broader information than the One Stop- Standardized Data	<ul style="list-style-type: none">- Providers of information and services- Software providers- GIS – hardware suppliers- Users of hardware, software and data- Chamber- Government data providers- NGA, NASA, USGS- Training – GeoWDC	<ul style="list-style-type: none">- One manager- Have a server- Outreach staff with sponsorship goals- Borrow computer time	<ul style="list-style-type: none">- Information sharing- Finished product- Online tutorial	<ul style="list-style-type: none">- Regional approach

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Angela Lee, Marshall Faintich, Gene Stahl

Issue: Skills, Competencies & Training: Mapping				
Solution: Identify target industries for training				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- Develop criteria – do number 1 first and get feedback and patterns will emerge	- Same as business function			

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Angela Lee, Marshall Faintich, Gene Stahl

Issue: Skills, Competencies & Training: Mapping				
Solution: National strategy for geospatial non-profit				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
	<ul style="list-style-type: none">- Providers of information and services- Software providers- GIS – hardware suppliers- Users of hardware, software and data- Chamber- Government data providers- NGA, NASA, USGS- Training – GeoWDC			

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Issue: Skills, Competencies & Training: Competencies				
Solution: Develop geospatial curriculum in schools				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Work geo skills into existing standards- Qualified trainers	<ul style="list-style-type: none">- ALL stakeholders- Curriculum Developers- Super Association- DOL ETA- Teacher College Associations- School Boards			

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Issue: Skills, Competencies & Training: Competencies				
Solution: Develop...On-The-Job-Training				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Same as public sector training- Develop OJT curriculum- Develop apprenticeship- Cross disciplinary curriculum	<p>Additional Stakeholders</p> <ul style="list-style-type: none">- Business and Industry Stakeholders- Industry Assoc.- Apprenticeship System- Prof. Assoc.	<ul style="list-style-type: none">- OJT opportunities that already exist – businesses that offer- Industry assoc. professional assoc. to linking company to company and individual to training- Promote case studies and training opportunities		

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Issue: Skills, Competencies & Training: Competencies				
Solution: Develop programs specific to GIT competencies into public sector training				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Non-four year programs- Modular training- Appropriate customized application must be- Identify centers for excellence to deliver- Before being trained trainer must understand its applicability and learn it during training	<ul style="list-style-type: none">- Consortium- Trainers- Civil Service- Private Trainers- ESRI.; GITA- AAG- Elliott Masie, the Masie Center	<ul style="list-style-type: none">- University consortium for geographic information science www.vcgis.org- curriculum developed and levels of competency- NCGIA academic consortia.- Jr. college curriculum- One-stop career centers		

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Issue: Skills, Competencies & Training: Competencies				
Solution: #1				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Qualified/certified instruct- Identify existing models deemed successful- Identify the certifying body- Re-introduce SOL in geospatial into educational community- Accessible training- Certified curricula- Need to identify a champion- Institutionalize the process implementation	<ul style="list-style-type: none">- Industry- Academia- Federal, State, Local Government- Industry Association	<ul style="list-style-type: none">- Successful models- Federal government for data accessibility- Workforce Investment Act dollars- Foundations- Apprenticeship system- O*NET- Curriculum under- Policy to support collaboration across agencies and institutionalize these competitions- On-line training to deploy to industry- SOL to deploy to Educators	<ul style="list-style-type: none">- Education re-institute SOL- Cost for accessibility is an issue	<ul style="list-style-type: none">- Certifying battle who should spearhead the certifying process

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Issue: Skills, Competencies & Training: Deployment				
Solution: Develop competency standards used by GIT integration trainers within target groups				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Certification Standards- Multiple levels of trainers, users, business owners, trainers- Train the trainers				

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Issue: Skills, Competencies & Training: Deployment				
Solution: Conduct small business workshops to determine needs/requirements, training based on user needs, nurture potential users				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Qualified trainers- Qualified curriculum- Recognized by community (broad)- A follow up process (implementation/issues/usage)- Performance metrics- Reasonable or low cost	<ul style="list-style-type: none">- Chambers of Commerce- SBA- Workforce Investment Boards- Educational Community- Chief Elected Official- Geospatial Technologies Industry	<ul style="list-style-type: none">- New money- Knowledge base or users- Software- IT support- Connection or access to real time data from NASA or others- Marketing- Data appropriate for training- Suitable hardware at training site	<ul style="list-style-type: none">- WHO	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Issue: Skills, Competencies & Training: Deployment				
Solution: Deploy core training in K-12/community college. Deploy specialized training tracks such as business administration, IT, R&D, and/or geospatial solutions.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Qualified trainers- Qualified curriculum- Recognized by broader community- follow up process- implementation/issue/usage)- Performance Metrics- Teach transferable skills not jobs/occupations- Training should include hands-on field work- Geospatial tech incorporated into existing course work	<ul style="list-style-type: none">- States Board of Educations- Departments of Education (State)- National Center for Teacher Education- Geospatial Technology Industry- Chart Committees to focus on academic tracks- State GIS Clearing House	<ul style="list-style-type: none">- Professional development- New money- Knowledge base of users- Software- IT support- Data Appropriate- Suitable hardware at training site	<ul style="list-style-type: none">- State certification requirements- A new course is a barrier- State mandated credits- Creation of new curriculum and new degree- Gaining security clearance and long delays in process- Conflict of regulations immigration vs. security	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Issue: Skills, Competencies & Training: Deployment				
Solution: Create training program that includes classroom and field training (application).				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- People using application in the field- Agreements with existing user community- Classroom and field experience needs to be coordinated- Directed toward real vs. theoretical problems	<ul style="list-style-type: none">- State GIS Clearing House- Geospatial Technologies Industry- Workforce Investment Boards- Chamber of Commerce	<ul style="list-style-type: none">- Production or worker training others- State Clearing House GIS- New money- Knowledge base of users- Data appropriate for training- Suitable hardware	<ul style="list-style-type: none">- Local government to share data (State/Federal)- Privacy Issues- Equipment for field testing/data collection- WIB requirement (local level demand occupation)	<ul style="list-style-type: none">- Opportunity to provide community service (class projects)- Where does information go

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Issue: Skills, Competencies & Training: Deployment				
Solution: Portal for jobs and education and training programs available				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Widely available- Widely known- Easy to navigate/use- Tied into existing portal systems- Powerful and easy way to add new content- Self Maintaining- Standard format for content	<ul style="list-style-type: none">- Geospatial Technologies- Industry- Employers- Educators- ISP- DOL	<ul style="list-style-type: none">- New money- Evaluation/feedback monitoring and reporting	<ul style="list-style-type: none">- WIB requirements- WIA interpretation- Reaching consensus	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Issue: Skills, Competencies & Training: Deployment				
Solution: Establish geospatial coordinator at local one-stops.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Entire Breakout

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Develop a workgroup to develop and validate the conceptual industry model using a consensus approach to define the Geospatial Industry.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- Sponsoring organization with interested stakeholder	- Industry representatives	- Human Capital	- Maybe some organizational issues, U.S. Departments of Labor or Commerce resistance	- Sponsoring organization with interested stakeholder

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Entire Breakout

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Develop a task force/advisory group to “vet” programs and spending.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Clear mandate from the U.S. Department of Labor Secretary- Active group of participants- Input from the industry on the development of U.S. Department of Labor criteria	<ul style="list-style-type: none">- U.S. Department of Labor Secretary- Education- Workforce Investment Boards- Trade Associations	<ul style="list-style-type: none">- Leadership	<ul style="list-style-type: none">- Reauthorization of WIA Policy- Academic Higher Education Policies- No input from industry on criteria	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Andrew Barber, Fred Corel and John Moeller

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Develop a message that demonstrates Geospatial as an enabler of other location applications.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- What Geospatial does- Practical easy to understand by a large part of the population ... your average person can do this	<ul style="list-style-type: none">- Industry- Academia- Potential Geospatial Workforce Prospects	<ul style="list-style-type: none">- Funding for development- Funding for dissemination- Industry and academia develops message- Geospatial disseminate through contractors <u>- Resources:</u> <ul style="list-style-type: none">- Web- Marketing Skills- Career Counselors	<ul style="list-style-type: none">- Budget Constraints	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Andrew Barber, Fred Corel and John Moeller

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Develop an academic and industry communications strategy through the federal, state and local partners identifying what skills are required and map to industry standards				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Build upon competency model of NASA/USM – get broad consensus- Match against NAICS codes- Gap analysis- Current – update yearly- Broad communication from industry on competency model	<ul style="list-style-type: none">- University of Southern Mississippi- NASA- State Departments of Labor and Workforce Boards- Industry Associations (STIA, AIA, ASPRS, etc.)- NACO, ICMA- Tribal Associations	<ul style="list-style-type: none">- Funding- Communication experts- Industry, academia and non-profit support	<ul style="list-style-type: none">- Proprietary data- Lack of consensus on roles	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Andrew Barber, Fred Corel and John Moeller

Issue: Image and Outreach to the Public: Definition and Data, Image				
Solution: Create profiles of Geospatial professionals to make the industry more human.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Profile: Woman carjacked, in trunk, used cell phone, high speed police chase in Virginia (true story) ... similar stories out there- Cover heroes who took place the above using their geospatial knowledge- Interesting examples of professionals	<ul style="list-style-type: none">- Specific people referred to ...	<ul style="list-style-type: none">- Marketing (paid for by the Geospatial industry and academia- Funding- Career Voyages infrastructure		

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Andrew Barber, Fred Corel and John Moeller

Issue: Image and Outreach to the Public; Definition and Data; Image				
Solution: Link the resources of academia and industry and workforce boards to address the image challenge and integrate resources to make an impact.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- Getting the right organization involved, while maintaining a manageable size	- Academia - Industry - Workforce Development Organizations	- Committed organizations - Some technical support		

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Mary Gershwin, David Powe, Michael Flinton

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Link the resources of academia and industry and workforce boards to address the image challenge and integrate resources to make an impact.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Identify existing resources, i.e., MI Model, Spatial Information Technology Model, state, national local models- Identify needed resources- Identify partners- Replicate MI Model models	<ul style="list-style-type: none">- NASA- Workforce Boards- Trade Associations- Community Colleges- Departments of Labor/State Level- State Agencies- 4 Year University Systems	<ul style="list-style-type: none">- K – 12- Community Colleges- 4 Year Universities- Personnel/Human Resources from the above- Technical systems- Capacity of the workforce system	<ul style="list-style-type: none">- WIA Policy- (Legacy policies)- Higher Education policy at the state level	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Mary Gershwin, David Powe, Michael
Flinton

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Create profiles of Geospatial professionals to make the industry more human.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- ID by existing resources <ul style="list-style-type: none">o Sector, competency, SKAso “sex-up,” make appealingo push across different media	- Industry professionals <ul style="list-style-type: none">- Federal, state- Professional associations	- Existing studies <ul style="list-style-type: none">- Publications- Institutions		

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Mary Gershwin, David Powe, Michael Flinton

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Develop an academic and industry communications strategy through the federal, state and local partners identifying what skills are required and map to industry standards				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Understanding of industry requirements- Understanding of education national standards- Continuous process of mapping skills/educational standards	<ul style="list-style-type: none">- Education community, federal, state and local- Federal – national and regional- Industry	<ul style="list-style-type: none">- Federal- State- Local- Industry- Foundations		

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Mary Gershwin, David Powe, Michael Flinton

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Develop an academic and industry communications strategy through the federal, state and local partners identifying what skills are required and map to industry standards				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- Open communications - Common language - List of interested stakeholders	- Federal - State - Local – counties - Professionals	- Training Funds - Competent Educators - Translators between business and education	- Academic policies	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Tameiko Prentice, Sherry Giordano, David Filomeo, David Sonnen

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Develop an academic and industry communications strategy through the federal, state and local partners identifying what skills are required and map to industry standards				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Define industry- Define skill sets by sector	<ul style="list-style-type: none">- Industry- Academics- Government- Beneficiaries- End-users	<ul style="list-style-type: none">- Career Counselors- Government Employment Development Agencies		

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Tameiko Prentice, Sherry Giordano, David Filomeo, David Sonnen

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Link the resources of academia and industry and workforce boards to address the image challenge and integrate resources to make an impact.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<div><div>- Organization to bring stakeholders together (non-profit) = association (Geospatial Technologies & Application Associations) GTSS</div><div>- User scenarios/case studies</div><div>- Document, publish & communications programs<ul style="list-style-type: none">o Mailingso Forumso Seminars</div></div>	<div><div>- End Users</div><div>- Industry representation within sectors</div><div>- Academic representation</div><div>- Trade Associations</div><div>- Unaware beneficiaries</div></div>	<div><div>- Membership activities/SIG's</div><div>- Financial</div><div>- Marketing</div><div>- Career Counselors</div></div>	<div><div>- Privacy (expert control issues)</div></div>	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Tameiko Prentice, Sherry Giordano, David Filomeo, David Sonnen

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Create profiles of Geospatial professionals to make industry more human.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Target audience: non-engaged/non-traditional- Generate profiles that help solve a particular problem- Flexibility to address different motivators (\$'s, free world, etc.)	<ul style="list-style-type: none">- Academia- Industry (participant/purchase)- Counselors (school) – target young children- Government- Unaware beneficiary	<ul style="list-style-type: none">- Independent Association (nominations) – “who’s who” by category- Marketing- Trade Associations- Career Book<ul style="list-style-type: none">o Welfare to Worko K - 12		

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Tameiko Prentice, Sherry Giordano, David Filomeo, David Sonnen

Issue: Image and Outreach to the Public; Definition and Data; Image				
Solution: Develop a message that demonstrates Geospatial as an enabler of other location applications.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- ID functionality Geospatial capabilities adds to applications- Develop a method for determining business value of Geospatial Technology within business systems- Develop message: business value of Geospatial technology	<ul style="list-style-type: none">- Geospatial industry players- Business manager- Developers- Prospective workforce	<ul style="list-style-type: none">- Funding- Trade Groups (Geo T & A, A)- Counselors- Academia		

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Julie Slark, Kristi Peterson, Harry Voccola,
Pat Cassidy

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Develop a message that demonstrates Geospatial as an enabler of other location applications.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- An ad campaign that demonstrates the value of Geospatial applications in everyday life- Incorporate information about the industry and occupation in school curriculum- Message that appeals to other populations (groups), i.e., retirees, mid-career changers	<ul style="list-style-type: none">- Industry- School Network	<ul style="list-style-type: none">- Money for advertising and materials and demonstrations	<ul style="list-style-type: none">- Education programs are slow to keep up with technology demands	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Julie Stark, Kristi Peterson, Harry Voccola,
Pat Cassidy

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Develop an academic and industry communications strategy through the federal, state and local partners identifying what skills are required and map to industry standards				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Survey by industry segment the skills continuum needed over time (including existing information)- Define the audience- Create a matrix of messages for audience- Outreach materials targeted to define segments and audiences	<ul style="list-style-type: none">- Relevant trade associations- Federal, state, local partners- Academic community- Major industry players- Workforce Boards	<ul style="list-style-type: none">- Money, technical, human (committed professionals from each stakeholder)- Outreach material development- Professional marketing group	<ul style="list-style-type: none">- Budget/travel restraints at the state/local level- Confidentiality of competitive information	<ul style="list-style-type: none">- Security clearances- Nationwide marketing plans are very expensive

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Julie Slark, Kristi Peterson, Harry Voccola,
Pat Cassidy

Issue: Image and Outreach to the Public: Definition and Data; Image				
Solution: Create profiles of Geospatial professionals to make industry more human				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Identify key Geospatial occupations – and key attributes (salary, skills, education ...)- Identify generic skills for a Geospatial career and sources of training- Certification process	<ul style="list-style-type: none">- Industry- Academia	<ul style="list-style-type: none">- Funding- Knowledge transfer	<ul style="list-style-type: none">- Political priorities for funds	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Julie Slark, Kristi Peterson, Harry Voccola,
Pat Cassidy

Issue Image and Outreach to the Public: Definition and Data; Image				
Solution: Link the resources of academia and industry and workforce boards to address the image challenge and integrate resources to make an impact.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- See “Develop an academic and industry communications strategy”				

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Sharon Dold, Carolyn Teich, Lisa Velte,
Tony Zeiss

Issue: Pipeline: Development				
Solution: Industry focused educational institutions providing convenient on-site or on-line, affordable, customized training to G.S. employees to propose items for the next generation of skills.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Community Colleges & other deliverers need financial resources to develop and implement the training courses- Education deliverers must provide customized, on-site, on-line training-	<ul style="list-style-type: none">- Community Colleges & others (Federal, State, local government, geospatial employees)- Education lenders- Education Faculty- Industry Supervisors	<ul style="list-style-type: none">- Federal, State, Local Government- Geospatial Employers- Loaned Executives to Colleges from Geospatial Industry- Funds & Identification of Curriculum & Equipment- National Association Funds & Content Expertise	<ul style="list-style-type: none">- No national association to bless standardization- Lack of recognized certifications- Reluctance of community colleges & universities to be responsive to industry needs- No state funds for community colleges to develop new training programs- Reluctance of industry to give release time or training incentives- MOS Training must be compatible to these certifications	<ul style="list-style-type: none">- Encourage on-site “coaches”

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Sharon Dold, Carolyn Teich, Lisa Velte,
Tony Zeiss

Issue: Pipeline: Development				
Solution: “Incentives” grants and tax breaks for new/innovative applications of GIS/Geospatial technology. Partnerships linking mature Geospatial programs with new/start-up programs.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- National Association to lobby for these incentives	- Business - Military - Universities	- Business Research Groups - University Research - Military Technology - Federal/State/Local Government	- Need the National Association	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Sharon Dold, Carolyn Teich, Lisa Velte,
Tony Zeiss

Issue: Pipeline: Development				
Solution: Higher level training program for geospatial technicians to gain higher level skills in geography and spatial analysis, physics, remote sensing, math, etc. training discipline areas.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
Identify applicable competencies and mastery levels - Develop alliances between companies and institutes of higher learning (i.e., community colleges) - Convenient delivery and affordability	- Business Leader - Educational Institutions - Government Agencies involved in Geospatial	- Industry Funds - Personal Funds - Mentoring - Industry based on-site coaching	- Industry not aware this is available - Military (MOS) training needs to come into compliance	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Sharon Dold, Carolyn Teich, Lisa Velte,
Tony Zeiss

Issue: Pipeline: Development				
Solution: Higher level training program for geospatial technicians to gain higher level skills in geography and spatial analysis, physics, remote sensing, math, etc. training discipline areas.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Identify applicable competencies and mastery levels- Develop alliances between companies and institutes of higher learning (i.e., community colleges)- Convenient delivery and affordability	<ul style="list-style-type: none">- Business Leader- Educational Institutions- Government Agencies involved in Geospatial	<ul style="list-style-type: none">- Industry Funds- Personal Funds- Mentoring- Industry based on-site coaching	<ul style="list-style-type: none">- Industry not aware this is available- Military (MOS) training needs to come into compliance	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Sharon Dold, Carolyn Teich, Lisa Velte,
Tony Zeiss

Issue: Pipeline: Development				
Solution: Work with local colleges for appropriate degrees and certification programs in line with current needs/ develop tuition incentives (time off) for employees to obtain specialized degrees & certificates.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Identify competencies and mastery levels- Develop curriculum that is standardized and portable at fits competencies- Convenient delivery- Affordable- Identify grant/bonus programs for completing program for company and individuals	<ul style="list-style-type: none">- Government agencies providing grant money- Business Leaders- Education Institutions- Government Agencies involved in Geospatial- Geospatial Association*where they exist- Employees themselves <p>*Needs to exist</p>	<ul style="list-style-type: none">- Federal/State/Local Financing- Colleges to carve out Geospatial department- Technology loans/grants from industry- Business lends talent to teach technology	<ul style="list-style-type: none">- If coordinating groups can't agree on the curriculum- No Geospatial Assoc.- Reluctance of Universities to accommodate & adapt- Companies reluctant to carve out time for education- Military (MOS) training needs to come into compliance	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Randy Parker, Bill Cannon, Liz Arabadjis,
Tony Moraco

Issue: Pipeline: Retention				
Solution: Involve employees in decision making & project selection whenever possible/feasible.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- Clear Definition of Goals - Employee Empowerment - Management Support - Team Building - Sufficiently Diverse Products/Services within the Company	- Management - Employees	- Models from other industries are available	- Labor –Management Issues May Pose Problems	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Randy Parker, Bill Cannon, Liz Arabadjis,
Tony Moraco

Issue: Pipeline: Retention				
Solution: Transition training for “obsolete” skill sets/dislocated workers.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Local Access Training Center (i.e., Community Colleges)- Identify Geospatial needs and use Committed Employer (not to outsource)	<ul style="list-style-type: none">- Employees- Employers	<ul style="list-style-type: none">- U.S. Department of Labor Incumbent Worker Training- Local Funds	<ul style="list-style-type: none">- Worker’s Age- Union Issues- Company Commitment	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Randy Parker, Bill Cannon, Liz Arabadjis,
Tony Moraco

Issue: Pipeline: Retention				
Solution: Development agency/industry exchange programs to develop understanding between/among diverse groups.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Willing/amenable Agencies- Willing/amenable Academia- Willing/amenable Industry Site- Job Shadowing/Rotations- Development or adoption of other models- Flexibility in tailoring to individual needs & availability/expertise- Conflict of Interest/Nondisclosure	<ul style="list-style-type: none">- Employers/Faculty Employers	<ul style="list-style-type: none">- Programs- Models within other industry sectors- Industry/Agency Funds- Minimal Financial Resources required	<ul style="list-style-type: none">- Labor Laws- Clearance Issues Individual- Agency/Industry Policies- Non Disclosure	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Randy Parker, Bill Cannon, Liz Arabadjis,
Tony Moraco

Issue: Pipeline: Retention				
Solution: Develop industry specific (focused) survey tools to share salary benefits & best practices.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Standard Job Titles- Instrument sensitive to business sizes across industry, and regionally sensitive data- Captures Best Practices- Compensation- Comparisons with in and also to related technologies- Focus on Geospatial workers, not those who only use the tool on occasion	<ul style="list-style-type: none">- Employees- Employers- Potential Students- National Organizations/Professionals- Human Resources- Industry Analysts- Consultants- All/Everyone- Guidance Counselors	<ul style="list-style-type: none">- National Professional Organizations- Employers- Human Resources- Consultants- Industry Analysts- DOL	<ul style="list-style-type: none">- Privacy Disclosure	<ul style="list-style-type: none">- Who Compiles?- How Compiled?- How Validated?- How Distributed?- Must be Maintained & Updated Periodically

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Randy Parker, Bill Cannon, Liz Arabadjis,
Tony Moraco

Issue: Pipeline: Retention				
Solution: Develop a national system for certification. A stratification providing increased compensation, provide mobility across industries, and specific discipline/industries applications.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Universal recognition across political boundaries- Universal recognition across industries- Certification in a number of levels of expertise- Well defined competency level or testing- Accreditation process for certification programs	<ul style="list-style-type: none">- Students- Employers- Training Providers- Higher Education- Training Institutes- Professional Associations	<ul style="list-style-type: none">- Professional Associations- Community Based Training Grants- Industry Technical Expertise	<ul style="list-style-type: none">- Acceptance of Accreditation- Industry Adoption	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Randy Parker, Bill Cannon, Liz Arabadjis,
Tony Moraco

Issue: Pipeline: Retention				
Solution: Centralized, easy to understand certification/credentialing body and process that provides for universal recognition.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Local Access Training Center (i.e. Community Colleges)- Identify Geospatial needs and use- Committed Employer (not to outsource)	<ul style="list-style-type: none">- Employees- Employers	<ul style="list-style-type: none">- DOL Incumbent Worker Training- Local Funds	<ul style="list-style-type: none">- Worker's Age- Union Issues- Company Commitment	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Juan Deguara, Joe Perry, Chuck Roberts, Helen Soule’, Lorna Finch, Mike Huether, Harla Sherwood, Jim Brey

Issue: Pipeline: Recruitment				
Solution: Employers and job seekers could benefit from better definitions of the Geospatial industry for example better metrics on the industry sectors. Specific employment trends and needs.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- Develop industry survey of workforce needs, profiles, job opportunities with measures for awareness building - What part is public sector, private sector?	- DOL coordinated input from all sectors - (Counselors, career advisors, etc.)	- Human - Dissemination (\$)		

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Randy Parker, Bill Cannon, Liz Arabadjis,
Tony Moraco

Issue: Pipeline: Recruitment				
Solution: Start with middle and high school students experience how cool this stuff is by incorporating it in school science and social science work. Train teachers to use it and teach with it. Get software in labs so students can use it.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
<ul style="list-style-type: none">- Introduce educators (tweak interest) to Geospatial Technologies<ul style="list-style-type: none">-basic information-definitions-lab activities-career- Point teachers to stand alone programs- Develop new programs if needed	<ul style="list-style-type: none">- Educators- Curriculum Specialist- State Department of Education- Vendors	<ul style="list-style-type: none">- Development of comprehensive program that aligns with standards	<ul style="list-style-type: none">- Support from administration	<ul style="list-style-type: none">- Dual language component (English & Spanish)

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Randy Parker, Bill Cannon, Liz Arabadjis,
Tony Moraco

Issue: Pipeline: Recruitment				
Solution: Outreach to professional societies associated to Geospatial or related work civil engineer, geography, geology, urban planning, etc.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- Target Geospatial society/associations & partner in their outreach components	- Forum Members	- Releases - Brochures - Image - Video - Displays	- Coordination - Money for Development	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Randy Parker, Bill Cannon, Liz Arabadjis,
Tony Moraco

Issue: Pipeline: Recruitment				
Solution: Media campaign to recruit through (TV, Radio, Magazine, Ads) to provide more exposure to the technology so people are more aware.				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- Target Geospatial *Campaign national in scope - Target: broad spectrum, no limit to audience concise message TV, radio, web, magazine	- Industry - Government (Local – Federal)	- Industry ad & recruitment budgets - Society/Industry Organization to spearhead with input from Dept. of Labor	- Money - Fragmentation of societies	

Appendix D

High Growth Job Training Initiative Matrix

Participants / Contributors:

Randy Parker, Bill Cannon, Liz Arabadjis,
Tony Moraco

Issue: Pipeline: Recruitment				
Solution: Institute a job training/transition program for vets, retirees, government employees, etc. (example: troops to teachers. Identify military skills that translate to civilian skills. Also include materials to describe characteristics and companies that are involved.).				
Critical Attributes (What attributes are needed for success?)	Key Stakeholders (Who are needed for success?)	Resources (Financial, Human, and Technical)	Implementation Barriers	Anything Else???
- *Portal (web) with occupational profiles, jobs, additional education, credentials needed	- U.S. Department of Labor - Industry - Society - Educational Insight - Department of Defense - Congress - Office of Management and Budget (OMB)	- Government (DOL) provided website and support	- Money, support?	

Appendix D

All Solutions

Skills, Competencies and Training Break-out

Subcategory Competencies

1. Look at successful models in other areas for application and develop certifications for user community to demonstrate geo competency, i.e., pyramid taking geospatial business competency model into user community
2. Develop programs specific to GIT competencies into public sector training
3. Develop programs specific to OJT, employed worker training, and apprenticeship with business and industry
4. Develop geospatial curriculum in schools
5. Develop competency standards used by GIT integration trainers within target groups

Subcategory Mapping

6. Develop skills centers, community workshops, and training programs for decision-makers and mgrs.
7. Define business functions and look at where those functions are performed
8. Host community forums for sharing existing geospatial information
9. Create a reference guide to understand where needs, applications, and programs are
10. Identify target industries desiring targeted training

Subcategory Deployment

11. Conduct small business workshops to determine needs/requirements and offer training based on user needs. Nurture relationships with Chambers of Commerce/ED/Econ. Dev./WIBs sharing and leveraging resources
12. Deploy core geo-literacy training in K-12 and community colleges (students and teachers). Deploy career oriented specialized training tracks such as business admin, IT, R&D, Geospatial Solutions
13. Create training programs that include classroom and field training (application)
14. Portal for jobs linked to ED and Training programs available
15. Establish geospatial coordinated at local one-stops

Subcategory Competencies

16. Develop geospatial curriculum in schools
17. Develop programs specific to GIT competencies into public sector training
18. Look at successful models in other areas for application, i.e., pyramid taking geospatial business competency model into user community and develop certifications for user community to demonstrate geo competency
19. Develop programs specific to OJT and employed worker training and Apprenticeship with business and industry
20. Utilize 2+2+2 programs with opportunities to opt out to employment
21. Develop industry consensus on job definitions DACUM process (Assoc with the government agency partnership – consensus direction)

Appendix E

- 22. Geospatial hierarchy on Public Sector (between departments)
- 23. Develop competency standards used by GIT integration teams with target groups
- 24. Link with IT training programs
- 25. Develop portable credential

Subcategory Mapping

- 26. Leverage existing information sharing and analysis
- 27. Establish skills standards
- 28. Develop customer driven model
- 29. Host community forums for sharing existing geospatial information
- 30. Create geospatial certification programs as adjunct to other fields for professionals in other
- 31. ID target industries desiring targeted training
- 32. Define business functions and look at where those functions are performed
- 33. Develop workshop and training programs for decision-makers and mgrs; skills centers and community
- 34. Create a reference guide to understand where needs, applications, and programs are
- 35. Develop a geospatial not-for-profit

Subcategory Deployment

- 36. Deploy core training K-12 and CC students and teachers
- 37. Deploy training materials in appropriate area
- 38. Needs/Requirements
- 39. Align with existing K-16 initiatives (geospatial)
- 40. Establish geospatial coordinators. at one stops
- 41. Align non-credit courses with local WIB's
- 42. Sharing and Leveraging resources

Image and Outreach to the Public Break out

Subcategory Data and Definition

- 43. Create training programs that include classroom and application
- 44. Portal for ED programs as well as jobs (web based?)
- 45. Initial deployment to GIS specific through move to broader industry
- 46. Dare to Dream
- 47. Seed funding to stimulate user application
- 48. Use geospatial technology to identify workforce force gaps with one-stops, training providers, and job openings
- 49. Place for small business to go for networking expertise and advise about geospatial technology without having a fee attached. Geospatial enabled business
- 50. Have industry get rid of hype (Clancy movies)
- 51. Geospatial technology has a common definition commonly understood
- 52. A national strategy for geospatial technology

Appendix E

53. Develop a plan of action to blend industry segments, e.g., MIS & IT
54. Link the resources of academia and industry and workforce boards to address the image challenge and integrate resources to make an impact.
55. Get local academics in the room to view real industry projects to see cutting-edge of technology
56. Develop image strategies using local, state, commercial, federal and tribal governments
57. Develop an x/y chart demonstrating Geospatial services vs. needs
58. Outreach to youth early on
59. National event highlighting capabilities of Geospatial technology
60. Inventory work already done to define issues
61. Create academic industry forum to assess needed skills and requisite training
62. Identify and disseminate occupational codes and other LMI associated with Geospatial of current and projected employment
63. Survey industry for future spending
64. More focused meeting with specific industry sectors to identify market requirements
65. Highlight elite careers to young people using Geospatial thinking with practical applications
66. Inventory and coordinate the movement of, and add, GIS to business schools' curriculum
67. Define industry with collection of: disciplines, technology and thinking skills
68. Critical to identify definition of the industry then use standard marketing to raise awareness ... identifying audience and tailoring message.
69. Narrow the focus of the industry to the segments that use the technology
70. Educate potential industry entrants on classified aspect and requirements for security clearance
71. Develop a message that demonstrates Geospatial as an enabler of other location applications
72. Partner with SBA offices to identify existence of industry specialists and bring spatial thinking to the entrepreneurs business and marketing plan development
73. Promote the mission of Geospatial technology and information
74. Develop an academic and industry communications strategy through the federal, state and local partners identifying what skills are required and map to industry standards
75. Improve advertising of spatial thinking as a job requirement by key HR personnel (promote the value of ...)
76. Promote Geospatial education as a reachable science and engineering degree (CCs and retraining)
77. Define emerging industry in academic literature
78. Promote definition through PSAs, and develop a reference guide for HR
79. Create linkages beyond industry-specific professionals to others that think spatially
80. Create profiles of Geospatial professionals to make the industry more human
81. Promote exciting aspects of the industry – “make it sexy”
82. Develop a task/advisory force to “vet” programs and spending

Appendix E

Dare to Dream

83. Text message youth on their cell phones – “Get Spatial” – with phone number and website
84. Make a SIMS Geospatial cell phone game
85. Pop culture icon as spokesperson (Similar to milk commercial “Got Spatial)
86. Geospatial reality TV show
87. Game Boy-esque activity –“zoom up, find out where you are”
88. Bottle cap (soft drink challenge)
89. City-wide Easter egg hunt
90. Advertising during movie trailers, also on airplanes
91. E.T. “Find Home’
92. Show the progression of technology through the presidents, Thomas Jefferson to George Bush
93. Put GPS technology in the hands of explorers
94. “Trading Geospatial” as opposed to “Trading Spaces”
95. Bumper Sticker: “We know where you are, do you?”
96. Easy access to remote imagery to home via the web
97. Make technology common, e.g., location implants in humans

Pipeline Break out

Subcategory Recruitment

98. Provide industry resources to be retained at government transition offices.
99. Job seekers could benefit from having access to information about forecasts of growth trends and projections for specific sectors and skills within the geospatial industry (geospatial is a broad industry/job seekers must target).
100. Conduct GIS days for elementary and high school students – high growth career opportunities.
101. Involve K-14 teachers and guidance counselors in hands-on GIS courses.
102. Provide shadowing opportunities within a GIS application department or shop.
103. Internship programs: Colleges and small business to give students better understanding of field. Give student college credit instead of salary to offset cost to small business.
104. Offer internships and cooperative education opportunities.
105. Industry representatives form “awareness” groups at colleges/high schools to expose industry opportunities to next generation workforce.
106. Establish contact with student organizations (not limited those in the geospatial realm).
107. Publicity to teachers and educators so they may pass information to their students.
108. Presentations to college-bound high school students
109. ID career paths in industry – show model to high school (students, parents, counselors)
110. Industry scholarships for two year training
111. Get people excited – do media campaign

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Appendix A – A complete List of HGJTI Sectors

Appendix B – Geospatial Stakeholders

Appendix C – Model Solutions Matrices

Appendix D – All Solutions

Appendix E – Online Web Tool Solutions

Appendix F – The Geospatial Technology Environmental Scan

Appendix E

- Certificates
 - AA Degree
 - Bachelor
 - Etc.
142. “E” leaving for 24/7 instruction
143. Modularize curriculum to allow easier access
144. Enhance employee “value” with geospatial credentials defined by recognized
- a) Degree Programs
 - b) Geospatial Technology Certifications
145. Association with Recognized Geospatial Organizations (i.e., program management institute)
146. Work with community colleges to develop skills upgrade curriculum for workers.

Appendix E

Online Web Tool Solutions

1. Leveraging Workforce Investment Boards to build awareness;
2. Developing an understanding of the industry definition, size and scope;
3. Working with Federal partners to validate the Geospatial Technology Competency Model, including agency specific applications. Integrate geospatial competencies in the Geospatial Technology Competency Model with required competencies for other high growth job training;
4. Addressing the national need for geospatial literacy across the curriculum at K-14 level of public education, and continue with coverage of the need for those skills across America's workforce spectrum;
5. Utilizing the structure established by the Workforce Investment Act to establish training programs for incumbent workers, with incentives for employers to create a more GIS-literate workforce;
6. Building outreach and awareness starting at K with a strong emphasis on careers beginning in the middle school technology classroom. Distance learning programs can be used to highlight this new/emerging industry and workforce opportunity;
7. Developing educational alliance programs for next generation workers with top universities specializing in work (on-the-job training) projects with internship opportunities and technology grants from companies for software/hardware support for students;
8. Help build a 2 + 2 + 2 geospatial curriculum;
9. Develop an ROI evaluation frame work;
10. Consider translation for outreach awareness building to the Hispanic population;
11. Promote geospatial literacy and competency for incumbent workers;
12. Provide continuing education opportunities so that workers can continually improve their skill sets as technology changes so rapidly;
13. Building awareness of the scope of work to partnering industries, the wide utility and application of this workforce issue (marketable and transferable skills)
14. Build a centralized clearing house of geospatial workforce development efforts to link those in need of information to those that have been working on these projects. Much information exists;
15. Mapping core geospatial competencies to specific applications such as forestry;
16. Developing a survey/information gathering of recent hires to better understand what attracted them to the field to get more people in the pipeline;
17. Developing a two part test with a hands-on skills component and a more standard test with terms; and,
18. Developing state-level pilot program to address public workforce capacity and awareness using the e 3 model.

Appendix F –Geospatial Technology Industry Environmental Scan

This is a living document that will be updated as new information emerges.



A high growth industry is defined as an industry or sector predicted to encounter either high growth in new jobs or a high rate of change in its workforce. The Geospatial Technology industry was selected as a high growth industry because of its anticipated growth potential. The worldwide market for geospatial technologies is projected to have annual revenues of \$30 billion by 2005.¹ The Bureau of Labor Statistics does not have a separate industry categorization for geospatial technology, as this seems to be an emerging field. Documented employment and growth projections for this industry appear to be limited thus far.

What is Geospatial? According to a report prepared by the Geospatial Workforce Development Center at The University of Southern Mississippi in September 2001, the industry is defined as “an information technology field of practice that acquires, manages, interprets, integrates, displays, analyzes, or otherwise uses data focusing on the geographic, temporal, and spatial context. It also includes development and life-cycle management of information technology tools to support the above.” Such tools include aerial and satellite remote sensing imagery, the Global Positioning System (GPS), and computerized geographic information systems (GIS). Geospatial skill sets are embedded in applications and cross-cutting industries and organizations but have not yet been widely adopted in many occupations that could benefit from these technologies.

Industry Profile:

Geospatial Companies:

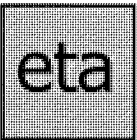
Information cannot yet be located on which companies have the largest sales in the Geospatial Technology industry. Information has been found on which companies are engaged in some aspect of this field, many of which are major defense and high tech firms. The Spatial Technologies Industry Association lists the following companies on their membership list:

- 3001, Atlantic Technologies, Autodesk, BAE SYSTEMS, Bentley Systems, Boeing Autometric, BTG, ComCARE Alliance, Dewberry, Digital Globe, EarthData, ESRI, Fourwinds Technology, Garmin, G.C.R. and Associates, Geographic Data Technology (GDT), General Dynamics, GeoSpatial Concepts, Harris, IBM, Intergraph, Intermap Technologies Corporation, IONIC Enterprise, Laser-Scan, Leica Geosystems, MapInfo, mPOWER3/EMERGE, Navigation Technologies, Northrop Grumman, Oracle, PCI Geomatics, PixSell, Questerra, Raytheon, Research Systems, SAIC, SDS, Space Imaging, Sun Microsystems, Techni Graphics Systems, Tele Atlas North America, Trimble, Vality Technology, ERIM International, VISTA Information Technologies, and Voxiva.

Economic and Employment Picture:

General Industry Overview

¹ : “Building the Geospatial Workforce” by Annulis, Carr, and Gaudet, 2002, in Urban and Regional Informational Systems Association Special Education Issue.

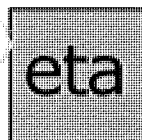


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- As of 2002, the current worldwide market for geospatial technologies was estimated at \$5 billion. The market is projected to have annual revenues of \$30 billion by 2005, consisting of: \$20 billion in the Remote Sensing market and \$10 billion in the GIS market, according to "Building the Geospatial Workforce," in *Urban and Regional Informational Systems Association Special Education Issue*.
- The market for the geospatial industry, particularly remote sensing, is growing by 5 to 14 percent per year, and this growth rate is expected to continue throughout this decade. (Source: www.asprs.org, ASPRS, The Imaging and Geospatial Information Society, 2004)
- Geospatial Technology information is used for a diverse set of tasks including: planning urban growth, managing forests, implementing precision farming, assessing insurance claims, siting ATM machines, routing 911 calls, designing a cellular phone network, guiding "intelligent" vehicles, operating a utility, mapping natural hazards and disasters, minimizing water pollution, assessing environmental impact, studying global climate change, and designing roads. (Source: www.asprs.org, ASPRS, The Imaging and Geospatial Information Society)
- Careers in imaging and geospatial technology disciplines are available in many segments of commercial, public, government and academic communities. Pam Frugoli with O*NET, the U.S. Department of Labor's Occupational Information Network, has identified a number of occupations that may require geospatial competencies, including: cartographers, photogrammetrists, surveyors, civil drafters, electrical drafters, mechanical drafters, aerospace engineering technicians, civil engineering technicians, electrical engineering technicians, environmental engineering technicians, industrial engineering technicians, mechanical engineer technicians, surveying technicians, mapping technicians, soil conservationists, range managers, foresters, geological data technicians, and geological sample test technicians.
- Other occupations listed by ASPRS include geographers, physical scientists, computer scientists, GIS analysts, database administrators, and remote sensing scientists.
- Industries that use GIS software include: retail, transportation/logistics, real estate, finance, environmental agencies, and all levels of government. (Source: DIRECTIONS MAG, 12 August 2003)
- The NASA Earth Science Applications Program has identified 12 national geospatial applications that are priorities of Congress and the Executive branch. These applications include: agricultural competitiveness, air quality management, aviation safety, carbon management, coastal management, community growth, community preparedness for disaster management, energy forecasting, homeland security, invasive species, public health, and water management.

Recent Employment Trends and Developments

- Geospatial products and specialists are expected to play a large role in homeland security activities. Information gathering needs to protect critical infrastructure have resulted in an enormous increase in the demand for such skills and jobs. Anecdotal data suggests that federal agencies, such as the National Imagery and Mapping Agency (NIMA), need more than 800 imagery analysts right now, and over 7,000 of their workers will need additional training in remote sensing technology within the next three years. (Source: Lorraine Castro, NIMA Human Resources Department)

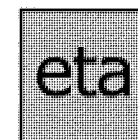


Appendix G

- To date, the Federal Government is the largest provider of geospatial data for the industry, while end users of the data are smaller businesses.
- Both state and federal governments are significant employers of individuals pursuing careers in geospatial technology. Federal agencies offering opportunities in this field are USGS, NOAA, USFS, EPA, NASA, NIMA, and BLM. At the state level, agencies that carry out activities in planning, environment, resources, transportation and geology offer employment opportunities. (Source: www.asprs.org, ASPRS)
- In a survey done by NASA's National Workforce Development Education and Training Initiative (NWDETI), it was determined that less than 30 percent of the needs for data are currently being met for all areas of the industry. Some sectors report that their needs are being met at less than a 10 percent level.
- In all sectors using remote sensing technology, research on government, academia, and the Geospatial Technology industry documented a significant gap between what is available to the industry and what is needed for their use. (Source: ASPRS)
- An estimated 175,000 people are employed in the U.S. remote sensing and geospatial information industry. It is a rapidly growing segment of the much larger information industry. (Source: ASPRS, "10-Year Industry Forecast," Executive Summary)
- The development of a capable workforce is of major concern for continued industry growth. Lack of retention of entry-level workers is hampering the long-term health of the industry, according to a study available through the ASPRS. (Source: ASPRS, "10-Year Industry Forecast," Executive Summary)
- In a 1998 survey of geospatial product and service providers, 87 percent of respondents expressed difficulty filling positions requiring geospatial technology skills. (Source: NWDETI Business Implementation Plan)
- Surveyors, cartographers, photogrammetrists, and surveying technicians held about 124,000 jobs in 2002. (Source: www.bls.gov/oco/ocos040.htm, Occupational Outlook Handbook, 2004-05 edition)
- Architectural, engineering, and related services firms – including companies that provided surveying and mapping services to other industries on a contract basis – provided about two-thirds of jobs for these workers. (Source: www.bls.gov/oco/ocos040.htm, Occupational Outlook Handbook, 2004-05 edition)
- Federal, state, and local governmental agencies provided almost one in six jobs of the 124,000 surveyor, cartographer, photogrammetrist, and surveying technician jobs. (Source: www.bls.gov/oco/ocos040.htm, Occupational Outlook Handbook, 2004-05 edition)
- Other professions using geospatial technologies include environmental scientists, geoscientists, and hydrologists, employing about 101,000 in 2002. Environmental scientists accounted for 65,000 of the total; geoscientists, 28,000; and hydrologists, 8,000. (Source: www.bls.gov/oco/ocos040.htm, Occupational Outlook Handbook, 2004-05 edition)

Occupational Statistics and Projections:

- Overall employment for these occupations is projected to grow about as fast as the average for all occupations through the year 2012. The widespread availability and use of advanced technologies, such as GPS, GIS, and remote sensing, will continue to increase both the accuracy and productivity of these workers, resulting in modest overall growth in employment. However, job openings will continue to result from the need to replace



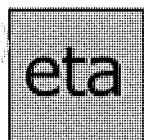
Appendix G

workers who transfer to other occupations or who leave the labor force altogether. (Source: www.bls.gov/oco/ocos040.htm, Occupational Outlook Handbook, 2004-05 edition)

- Employment of environmental scientists and hydrologists is expected to grow faster than the average for all occupations through 2012, while employment of geoscientists is expected to grow about as fast as the average. (Source: www.bls.gov/oco/ocos040.htm, Occupational Outlook Handbook, 2004-05 edition)
- Approximately 500,000 U.S. jobs require GIS skills. Estimates project that there will be approximately a 15% increase in GIS jobs per year, which could translate into as many as 75,000 new hires per year in GIS related jobs. Examples of GIS employment areas include environmental management, urban planning, emergency management, site selection, transportation and utilities planning. (Source: Osa Brand, Association of American Geographers presentation, Workforce Innovations 2003 National Conference, 7/03)

Education and Training

- Education and training requirements for occupations utilizing geospatial technologies generally require at least a two-year degree from a community college or technical institution. There is a substantial demand for technicians in geospatial information technology for individuals who do not wish to pursue an advanced degree. Certificate programs are the most likely course for training. (Source: www.asprs.org, ASPRS)
- College-preparatory courses that emphasize the sciences are suggested for individuals interested in pursuing careers in photogrammetry, remote sensing, and geographical information systems (GIS). (Source: www.asprs.org, ASPRS)
- Many two-year academic and technical institutions offer education and training in photogrammetry, remote sensing and GIS, and in related fields. Associate degree and certificate programs in GIS, surveying, photogrammetry, and similar curricula provide a sound foundation for work experience or for transfer to other academic institutions for further education. (Source: www.asprs.org, ASPRS)
- It is highly recommended that any individual wishing to pursue a career in photogrammetry, remote sensing, and GIS participate in an internship program to obtain "hands-on" experience as part of their preparation for employment. (Source: www.asprs.org, ASPRS)
- Like many rapidly advancing high-tech fields, continuing education in photogrammetry, remote sensing, and GIS is necessary to keep current as a professional. (Source: www.asprs.org, ASPRS)
- Beginners with postsecondary school training in surveying can usually start as technicians or assistants. With on-the-job experience and formal training in surveying – obtained either in an institutional program or from a correspondence school – workers may advance to senior survey technician, then to party chief, and in some cases, to licensed surveyor (depending on state licensing requirements). (Source: BLS, Occupational Outlook Handbook, 2002-03 edition)



Geospatial Technology Industry Environmental Scan

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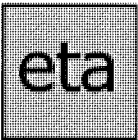


Occupational Statistics, Training and Earnings
for Select Geospatial-related Occupations²

Source: The Bureau of Labor Statistics

Occupation	Total Employment (000's)		2002-2012 change in total employment		2002 Percent Self-Employed	2002 Median Annual Earnings	Education/ Training Category
	2002	2012	Number (000's)	Percent			
Environmental engineers	47	65	18	38.2	0.4	\$61,410	Bachelor's degree
Environmental Engineering Technicians	19	24	5	28.4	0.4	\$36,850	Associate's degree
Surveying and Mapping Technicians	60	74	14	23.1	5.5	\$29,230	On the job training
Cartographers & photogrammetrists	9	10	1	15.1	3.3	\$42,870	Bachelor's degree
Geoscientists, except hydrologists and geographers	28	31	3	11.5	2.7	\$67,470	Master's degree
All other drafters, engineering, and mapping technicians	150	167	17	11.3	4.5	\$44,450	Associate's degree
Mechanical Engineering Technicians	55	61	6	11.0	0.4	\$41,280	Associate's degree
Electrical & Electronic Engineering Technicians	204	224	20	10.0	0.4	\$42,950	Associate's degree
Engineering managers	212	231	20	9.2	0.1	\$90,930	Bachelor's or higher degree plus work experience
Industrial Engineering Technicians	62	67	5	8.7	0.4	\$41,910	Associate's degree
Civil Engineering Technicians	92	99	7	7.6	0.4	\$37,720	Associate's degree
Surveyors	56	58	2	4.2	3.5	\$39,970	Bachelor's degree
Architectural and Civil Drafters	106	110	4	4.2	3.7	\$37,330	Postsecondary vocational award
Mechanical Drafters	72	74	1	1.9	3.7	\$40,730	Postsecondary vocational award
Aerospace Engineering & Operations Technicians	15	15	0	1.5	0.4	\$51,650	Associate's degree

² The list of occupations identified is not comprehensive in scope for the industry as a whole. For a comprehensive list of occupations go to www.bls.gov. Additionally, please note that these occupations are far broader in employment scope than just for the geospatial technology industry, i.e., geospatial related positions are subsets of these occupational categories.



Geospatial Technology Industry Environmental Scan

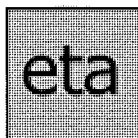
This is a living document that will be updated as new information emerges.

Policy and Legislative Issues:

- The Management Association for Private Photogrammetric Surveyors (MAPPS) primarily takes positions that further procurement opportunities for its members with the Federal government.
- In 2001 the White House Research Office polled each Federal Agency requesting information on the potential uses of remotely sensed data. One aspect of their query was to determine how the missions of the agencies could be furthered by use of the data.

Industry Interaction with Public Workforce System:

- The National Workforce Development Education and Training Initiative and their Federal Partners have established an Informal Program Review Panel made up of companies who are heavily involved in the Geospatial industry and representatives from several Federal and State Agencies involved with this effort.
- To date, the interaction with the Workforce System has been solely at the National level.
- Training capacity appears limited for specialized geospatial occupations, with some college course focus on Geographical Information Systems (GIS) related content.
- Challenges for publicly funded training programs in the Geospatial industry include:
 - New industry, where entry level workers are often not yet aware of the potential that the industry offers – more need to identify job openings and internships to build interest with the population.
 - Hiring a newly trained person is often very expensive for companies and sometimes it is easier to hire someone already trained – also, many jobs require more than short-term training (at least a Bachelor degree).
 - Employment opportunities in Geospatial appear to be somewhat regional in nature – people trained in one state/region may have to relocate to find jobs in another.
 - The technology keeps changing and getting updated – workers in this industry must keep up in their training.
 - Limited accessibility with expensive training, particularly given the expense of GIS training software.
 - Insufficient training capacity, including a lack of instructors who possess Geospatial knowledge and the skills to teach it.
 - Insufficient Geospatial related instruction at the secondary school level.

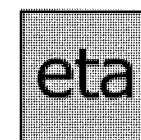


Geospatial Technology Industry Environmental Scan

This is a living document that will be updated as new information emerges.

Federal Funding for the Industry:

- The National Workforce Development Education and Training Initiative is an effort of the Office of Education and the Earth Science Enterprise, both located at the NASA John C. Stennis Space Center. The initiative is a customer-focused effort to meet workforce demands for the emerging multi-billion dollar geospatial industry. The Geospatial Workforce Development Center (Geo WDC) is housed at The University of Southern Mississippi and is designed to be a first source of information of geospatial workforce training and development.
- In the Department of Defense (DOD) budget for 2002, over \$1 million was listed for training and certifications for personnel in remote sensing.





Geospatial Management Competency Model

June 8, 2012

Background

The Geospatial Management Competency Model (GMCM) specifies 74 essential competencies and 18 competency areas that characterize the work of most successful managers in the geospatial industry. It is not intended to be an exhaustive inventory of all pertinent competencies, such as those specific to particular work settings. Instead, the GMCM seeks to distill a concise list that is widely applicable, and readily adaptable to evolving industry needs.

The GMCM is an element of the U.S. Department of Labor Employment and Training Administration's (DOLETA's) Competency Modeling Initiative (<http://www.careeronestop.org/competencymodel/>). For DOLETA, a "competency" is *the capability to apply or use a set of related knowledge, skills, and abilities required to successfully perform "critical work functions" or tasks*. A "competency model" is *a collection of competencies that together define successful performance* (Ennis 2008). The Competency Modeling Initiative promotes the development of industry-driven competency models in high-growth, high-demand industries. DOLETA identified "geospatial technology" as a high-growth industry in 2003.

In 2010, DOLETA issued a Geospatial Technology Competency Model (GTCM) that specifies the foundational (Tiers 1-3), industry-wide (Tier 4), and industry sector-specific (Tier 5) expertise characteristic of the various occupations that comprise the geospatial industry (<http://www.careeronestop.org/CompetencyModel/pyramid.aspx?GEO=Y>). Descriptions of individual geospatial occupations, including occupation-specific competencies and job requirements (Tiers 6-8), are published in DOLETA's O*NET occupation database (<http://www.onetonline.org/>). The GMCM corresponds to Tier 9 of the GTCM.

Intended Uses

Competency models are used to guide individual professional development, to help people move up or over in an organization or industry, to help educators and trainers develop curricula that address workforce needs, to inform development of interview protocols, as requirements for professional certification, and as criteria for academic program accreditation and articulation (PDRI and Aguirre International 2005).

Matrix Format

The GMCM is presented below in matrix form. The 74 matrix rows correspond to the Task Force's consensus minimum number of critical work functions that most geospatial managers need to be able to perform. Both general competencies and competencies particular to the geospatial industry are included.

Columns correspond to 18 competency areas are clusters of critical work functions that share a common focus or intended outcome. Although associations between competencies and competency areas are indicated, users should bear in mind that these associations vary from one job setting to the next.

Development Process

Practicing geospatial managers developed the GMCM with input from workforce development experts at DOLETA and in light of comparable models produced for kindred fields. A GMCM Task Force (listed below) produced the final version for DOLETA following its analysis of comments received during a public review period. The Urban and Regional Information Systems Association (URISA) orchestrated the effort in cooperation with DOLETA.

URISA's Board of Directors first proposed to organize a GMCM in a letter to DOLETA in December 2010. With DOLETA's consent, URISA Board member Greg Babinski organized a day-long work session at the Washington State GIS Conference in May 2011 to prepare a preliminary "strawman" draft GMCM. Participants (listed below) also suggested refinements to URISA's GIS Capability Maturity Model (Babinski 2010-11).

Then in November, 2011, during its annual GIS-Pro conference in Indianapolis, IN, URISA conducted a day-long workshop to refine and validate the strawman draft. Session organizers David DiBiase, Pat Kennelly, and Babinski identified a Task Force of twelve experienced geospatial managers and one facilitator (DiBiase) to produce a revised draft GMCM suitable for public review. All but two invitees volunteered to participate, and all at their own expense. (Participants are listed below.) DOLETA representatives greeted and encouraged the volunteers by telephone from Washington DC at the outset of the workshop.

Before, during, and after the workshop, Task Force members reviewed several comparable competency models. A preliminary list of fifteen management competency areas proposed by workforce analysts at DOLETA provided a starting point. The four competency clusters in HayGroup's Manager Competency Model (HayGroup 2001) – managing yourself, managing your team, managing the work, and managing collaboratively – guided the Task Force to consider the full spectrum of geospatial management issues. The U.S. Office of Personnel Management's IT Project Management competency model (OPM 2011) provides an extensive list of general and technical competencies that helped the Task Force validate the content of the GMCM. Task Force members were also acquainted with the Project Management Institute's *Project Management Body of Knowledge*.

The outcome of the Indianapolis Task Force workshop was a revised draft GMCM. The draft underwent seven further revisions through February 21, 2012 when Task Force members finally reached consensus on a draft suitable for public review. The draft GMCM was made available for public comment (via an online questionnaire) at the URISA web site from February 22 through March 31. URISA invited participation in the review through a press release and social media campaign.

DiBiase analyzed a total of 100 responses to the public review questionnaire. Ninety-four responses were found to be authentic. The geographic distribution of responses included 80 responses from 32 U.S. states, 10 responses from 5 Canadian provinces and 5 responses from 4 other countries (Egypt, India, Pakistan, Peru). Respondents' self-report job titles included "Manager" (24 responses, mostly "GIS Manager" or "Project Manager"), "Coordinator" (15, mostly "GIS Coordinator"), "Analyst" (10, mostly "GIS Analyst") and "Administrator" (6, mostly "GIS Administrator"). Sixty-two percent of respondents report more than five years of experience as geospatial managers. Nearly half (46%) reported over 10 years of experience.

Majorities of respondents expect the GMCM to be useful as a guideline for assessing individual professional development (76% of respondents) and as a resource for raising awareness about the geospatial field (57%). Over 90% of respondents judged the draft document to be acceptable as is or with minor revisions. Eighty-five percent considered URISA Task Force members as “qualified” or “Highly qualified” to create the document.

The Task Force revised the draft GMCM in response to public comments and suggestions, including a painstaking analysis by John Johnson of the National Geospatial Technology Center (GeoTech Center)—the group that led the development of the Geospatial Technology Competency Model (GTCM). The Task Force edited, added and deleted some competencies and competency areas. It also adopted the matrix format in response to feedback that the GMCM did not specify which competencies belonged to which competency areas. Reaching consensus about those associations was more difficult for the Task Force than identifying the competencies and competency areas. However, majorities of Task Force members supported each of the associations shown in the final matrix.

Contributors

GMCM Task Force (November 2011 - June 2012)

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- Thomas Conry, GIS Manager, Fairfax County VA
- Peter Crowell, PMP, GISP, President, Crowell-Schulte IT Consultants
- David DiBiase (facilitator), GISP, CMS, Director of Education, Esri
- Dianne Haley, DMH GIS Consulting
- Patrick Kennelly, Associate Professor of Geography, Long Island University and Penn State University
- Twyla McDermott, Corporate Strategic Technology Planning Manager, City of Charlotte NC
- Robert Ryan, CP, PLS, URS Corporation
- Rebecca Somers, President, Somers-St. Clair
- Bruce Stauffer, Vice President, geographIT
- Chin-hong Sun, Professor of Geography, National Taiwan University

GMCM Strawman Task Force (May 2011)

- Greg Babinski, GISP, King County (WA) GIS Center
- Steve Beimburn, City of Seattle (WA) GIS
- Don Burdick, GISP, City of Bellingham (WA) GIS
- Amy Esnard, GISP, Multnomah County (OR) GIS
- George Horning, King County (WA) GIS Center
- Tami Griffin, Thurston County (WA) GIS
- Ian Von Essen, Spokane County (WA) GIS

URISA

The Urban and Regional Information Systems Association's (URISA's) qualifications to organize the GMCM effort include its nearly 50-year history as one of the founding organizations of the GIS profession, its successful organization of the GIS Certification Institute and the URISA Leadership Academy, and its healthy working relationships with other professional and scientific associations in the geospatial field through the Coalition on Geospatial Organizations (COGO).

Additional Resources

Babinski, G. (2010-11). URISA Proposes GIS Capability Maturity Model. *ArcNews*, Winter 2010/11. <http://www.esri.com/news/arcnews/winter1011/articles/urisa-proposes.html>

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U.S. Office of Personnel Management (2011). Competency Model for IT Program Management. <http://www.chcoc.gov/transmittals/TransmittalDetails.aspx?TransmittalID=4058>

	Geospatial Technology Competencies	Self-Management	Human Resource Management	Performance Management	Legal Affairs and Policy Management	Communication	Team Management	Relationship Management	Business Development	Leadership	Professional Development	Strategic Planning and Action	Work Management	Geospatial Project Management	Political Skills	Contract Management	Financial Management	Asset Management
1. Keep up with technology trends and standards	•	•									•							
2. Keep abreast of developments that affect your organization		•										•			•			
3. Apply sound decision making practices		•					•					•		•			•	
4. Assess and improve your skills and performance regularly		•									•							
5. Develop a geospatial staffing plan to meet business needs			•										•					
6. Recruit and hire competent geospatial and support staff			•															
7. Define geospatial work functions and assign appropriate staff			•				•							•				

URISA Geospatial Management Competency Model

	Geospatial Technology Competencies	Self-Management	Human Resource Management	Performance Management	Legal Affairs and Policy Management	Communication	Team Management	Relationship Management	Business Development	Leadership	Professional Development	Strategic Planning and Action	Work Management	Geospatial Project Management	Political Skills	Contract Management	Financial Management	Asset Management
8. Establish clear performance expectations				•									•					
9. Maintain individual and organizational accountability				•									•					
10. Acknowledge and encourage exceptional achievement				•														
11. Remediate performance shortfalls effectively				•									•	•				
12. Avoid conflicts of interest—actual and apparent					•													
13. Comply with all relevant laws and regulations					•											•		
14. Follow relevant professional codes of ethics					•					•								
15. Communicate effectively in all forms, formats, and media						•	•			•								
16. Communicate effectively to all sizes and types of audiences						•		•		•								
17. Communicate the value of geospatial technology to decision makers and stakeholders	•					•			•	•								
18. Foster an environment conducive to teamwork							•							•				

URISA Geospatial Management Competency Model

	Geospatial Technology Competencies	Self-Management	Human Resource Management	Performance Management	Legal Affairs and Policy Management	Communication	Team Management	Relationship Management	Business Development	Leadership	Professional Development	Strategic Planning and Action	Work Management	Geospatial Project Management	Political Skills	Contract Management	Financial Management	Asset Management
19. Assemble, charge, and enable effective work teams				•			•							•				
20. Help resolve conflicts among team members							•											
21. Develop and maintain long-term client relationships								•	•						•			
22. Develop and maintain collaborative relationships within the organization								•							•			
23. Develop and maintain relationships with other organizations to promote mutually advantageous partnerships and best practices								•										
24. Identify business opportunities									•									
25. Evaluate risk of new ventures									•									
26. Assess competition									•									
27. Conduct client-focused needs evaluation									•									
28. Develop business case and plan for developing and marketing new ventures									•									
29. Develop and maintain strategic partnerships							•	•	•									

URISA Geospatial Management Competency Model

	Geospatial Technology Competencies	Self-Management	Human Resource Management	Performance Management	Legal Affairs and Policy Management	Communication	Team Management	Relationship Management	Business Development	Leadership	Professional Development	Strategic Planning and Action	Work Management	Geospatial Project Management	Political Skills	Contract Management	Financial Management	Asset Management
30. Develop, promote, and protect the organization's brand									•									
31. Lead creative thinking about geospatial technology opportunities										•		•						
32. Articulate a geospatial technology vision for the organization						•				•		•						
33. Communicate geospatial program goals to stakeholders						•		•		•								
34. Build consensus								•							•			
35. Foster a culture of employee-driven process improvement							•			•								
36. Mentor staff and colleagues							•				•							
37. Prepare and implement a geospatial staff competency plan			•								•							
38. Provide opportunities for continuing professional development											•							
39. Encourage contributions to the profession											•							

URISA Geospatial Management Competency Model

	Geospatial Technology Competencies	Self-Management	Human Resource Management	Performance Management	Legal Affairs and Policy Management	Communication	Team Management	Relationship Management	Business Development	Leadership	Professional Development	Strategic Planning and Action	Work Management	Geospatial Project Management	Political Skills	Contract Management	Financial Management	Asset Management
40. Develop a strategic plan with measureable goals and specific actions												•						
41. Implement a strategic planning cycle												•						
42. Align geospatial activities to support the organization's strategic plan												•						
43. Adjust the plan in response to changing environment												•						
44. Apply QA/QC best practices													•	•				
45. Ensure continuity of geospatial operations			•							•		•						
46. Monitor stakeholder satisfaction													•					
47. Improve efficiency													•					
48. Adopt a customer service orientation													•					
49. Apply project management knowledge and best practices														•				

URISA Geospatial Management Competency Model

	Geospatial Technology Competencies	Self-Management	Human Resource Management	Performance Management	Legal Affairs and Policy Management	Communication	Team Management	Relationship Management	Business Development	Leadership	Professional Development	Strategic Planning and Action	Work Management	Geospatial Project Management	Political Skills	Contract Management	Financial Management	Asset Management
50. Understand and apply the geospatial technology components of projects (as outlined in the Department of Labor's Geospatial Technology Competency Model) to accurately establish scope, resources, schedule and quality requirements for project success	•												•	•				
51. Identify collaborative opportunities to achieve project goals								•						•	•			
52. Manage a portfolio of projects effectively													•	•				
53. Cooperate within political and professional organizations								•							•			
54. Pursue goals tactfully in context of particular organizational cultures and governance structures								•							•			
55. Identify potential political champions and engage their support								•		•					•			
56. Respect jurisdictional responsibilities															•			

URISA Geospatial Management Competency Model

	Geospatial Technology Competencies	Self-Management	Human Resource Management	Performance Management	Legal Affairs and Policy Management	Communication	Team Management	Relationship Management	Business Development	Leadership	Professional Development	Strategic Planning and Action	Work Management	Geospatial Project Management	Political Skills	Contract Management	Financial Management	Asset Management
57. Champion policies that respect the purposes and roles of public, private, nonprofit, and academic organizations								•							•			
58. Prepare, negotiate, monitor, administer, and remediate contracts																•		
59. Prepare Statements of Work (SOW) defining project objectives and requirements																•		
60. Prepare competitive solicitations including project rationale and objectives, existing geospatial technology assets, desired services, and final deliverables	•															•		
61. Prepare proposals including understanding of need, technical approach and proposed technology, final deliverables, schedule, budget, and relevant qualifications	•															•		
62. Prepare objective selection criteria and scoring mechanism to fairly evaluate proposals																•		
63. Develop service level agreements																•		
64. Prepare and document budgets																	•	

URISA Geospatial Management Competency Model

	Geospatial Technology Competencies	Self-Management	Human Resource Management	Performance Management	Legal Affairs and Policy Management	Communication	Team Management	Relationship Management	Business Development	Leadership	Professional Development	Strategic Planning and Action	Work Management	Geospatial Project Management	Political Skills	Contract Management	Financial Management	Asset Management
65. Manage expenditures and income																	•	
66. Identify funding sources and obtain funding, including collaborative opportunities								•									•	
67. Develop and manage a long term financial plan												•					•	
68. Conduct regular financial analyses																	•	
69. Implement standard financial accounting procedures and controls					•												•	
70. Assure accountability by periodic independent audits																	•	
71. Understand enterprise geospatial architecture	•																	•
72. Ensure that geospatial technology infrastructure meets organization needs	•																	•
73. Recognize geospatial data as a capital asset	•																	•

74. Manage the asset lifecycle:
- a. Establish and maintain an up-to-date asset inventory
 - b. Procure and upgrade assets
 - c. Implement and periodically audit security procedures for assets such as work spaces, equipment, computer networks, data, and software
 - d. Implement computer system back-ups and periodically test reliability of backup procedures
 - e. Implement sound data management procedures

Geospatial Technology Competencies	Self-Management	Human Resource Management	Performance Management	Legal Affairs and Policy Management	Communication	Team Management	Relationship Management	Business Development	Leadership	Professional Development	Strategic Planning and Action	Work Management	Geospatial Project Management	Political Skills	Contract Management	Financial Management	Asset Management
																	<ul style="list-style-type: none">•

**SURVEY OF GEOGRAPHY DEPARTMENTS'
GRADUATE ENROLLMENTS AND STUDENT CHARACTERISTICS**

Conducted and compiled by:

Brad Cullen, Professor Emeritus
Department of Geography & Environmental Studies, UNM
Spring 2015

Population:

UNM Peer Institutions offering a PH.D. and/or M.A., M.S., etc. in geography
NMSU Peer Institutions offering a PH.D. and/or M.A., M.S., etc. in geography
SWAAG Institutions offering a PH.D. and/or M.A., M.S., etc. in geography
Total: 28
Returned surveys: 10
Sample Size: 36%

RESULTS:

QUESTIONS FOR DEPARTMENTS WITH A M.A.G., M.A. AND/OR M.S. PROGRAM (Sample Size-9)

1. Over the last five years, approximately how many students in your program have received a M.A., M.A.G., or M.S. degree? Total-221, Mean-25
 - a. What percentage of the above students subsequently enrolled in a Ph.D. program? 36%

QUESTIONS FOR DEPARTMENTS WITH A PH.D. PROGRAM (Sample Size-4)

1. Over the last five years, approximately how many students in your program have received a Ph.D. degree? Total-59, Mean-14.75
2. Approximately, how many of your PhD. graduates over the last five years received a lesser degree (i.e. B.A., M.A., etc.) from your institution? Converted to %- 29%
3. Approximately, how many of your PhD. graduates over the last five years were returning students (students who had taken off a year or more)? Converted to %-62%
4. Approximately, how many of your PhD. graduates over the last five years were initially employed in each to the following economic sectors? (Sample size-5)
 - a. Education-100% (all respondents has at least 1)
 - b. Government -100%
 - c. Manufacturing-0

- d. Retail Trade-0
- e. Wholesale Trade-0
- f. Transportation-0
- g. Agricultural, forestry, fishing, mining -40%
- h. Information-20%
- i. Real Estate-0
- j. Professional, Scientific, and Technical Services-40@
- k. Health Care and Social Assistance-0
- l. Other (please list)-60%

5. Approximately, how many of your PhD. graduates over the last five years initially were employed in the State where they received their degree? Converted to %- 20%
6. Approximately, what percent of applicants are accepted into your Ph.D. program? Med.-40%, range-20-50%

Potential Employment Categories and Employers in New Mexico for Graduates of Proposed New Mexico Joint Doctoral Program in Geography

Generated fall 2013 by the Advisory Board
for UNM’s Department of Geography & Environmental Studies

Employer Category	Agency/Example
Federal Government	Forest Service Bureau of Land Managements National Park Service NASA NOAA CIA USGS Census Bureau FEMA Department of Transportation Homeland Security
National Laboratories	Sandia Los Alamos
State and Local Governments	Planning Departments State Engineer’s Office Parks and Recreation Council of Governments Department of Transportation
Education	Public and Private Universities Public and Private Colleges Community Colleges Technical Colleges K — 12 Schools
Utilities	PNM Gas Company of New Mexico
Consulting	GIS Remote Sensing Mapping Environmental Analysis Market Analysis Location Analysis Research Polling Mining
Retail	Market Analysis Location Analysis
Other	Non-profit Organizations Film Industry

**Survey of Current MS students
At University of New Mexico**

Survey Details

Administered via: SurveyMonkey
Dates: open 10/26/2015 through 11/10/2015
Invitation: to GRADGEOG-L listserv 10/26 with reminder on 10/31
Survey population: 42 listserv members
Surveys returned: 20
Response rate: 47.6%

Note

Because the survey invitation was sent to the grad-student listserv, the population includes some students who are not formally MS-Geography students. Specifically, it includes several students who recently completed the MS program but have not yet been removed from the list, one student who recently decided to discontinue graduate study in favor of completing a second undergraduate degree, and two students who are enrolled in the LatinAmerican Studies PhD program but have GES as a concentration within that program. Of the 20 survey respondents, 16 are current MS students, and 4 are in one of these other categories. Rather than separating out non-MS or non-current students, we have included all responses here, as we believe they accurately reflect an aggregate view of student perspectives on post-program employment and locational preferences.

Results

See following pages for screenshots of SurveyMonkey-generated results for all questions included in the survey. For one question that had an open-ended answer box ("What was your undergraduate major?"), we have compiled the answers rather than including a screenshot of the SurveyMonkey-generated results, which listed each individual answer.

Please rank how likely you are to pursue the following options after completing your M.S. in Geography at UNM.

Answered: 19 Skipped: 1

	Very unlikely	Somewhat unlikely	Neither likely nor unlikely	Somewhat likely	Very likely	Total Respondents
enter a PhD program in Geography	21.05% 4	21.05% 4	10.53% 2	15.79% 3	31.58% 6	19
enter a PhD program in another field	31.58% 6	26.32% 5	10.53% 2	21.05% 4	10.53% 2	19
enter a Master's program in another field	47.37% 9	21.05% 4	10.53% 2	15.79% 3	5.26% 1	19
pursue a professional position with a government agency	10.53% 2	5.26% 1	10.53% 2	47.37% 9	26.32% 5	19
pursue a professional position with a private company	5.26% 1	10.53% 2	26.32% 5	31.58% 6	26.32% 5	19
establish your own business as an entrepreneur	31.58% 6	21.05% 4	31.58% 6	5.26% 1	10.53% 2	19

Please rank the desirability of the following locations is in terms of where you would consider living after you complete your M.S. in Geography at UNM.

Answered: 20 Skipped: 0

	Very undesirable	Somewhat undesirable	No opinion	Somewhat desirable	Very desirable	Total Respondents
Albuquerque, NM	5.26% 1	15.79% 3	10.53% 2	36.84% 7	31.58% 6	19
elsewhere in New Mexico	21.05% 4	15.79% 3	21.05% 4	42.11% 8	0.00% 0	19
elsewhere in the Southwest	5.26% 1	21.05% 4	36.84% 7	26.32% 5	15.79% 3	19
elsewhere in the United States	5.26% 1	15.79% 3	5.26% 1	42.11% 8	31.58% 6	19
elsewhere in North America	10.53% 2	10.53% 2	26.32% 5	36.84% 7	21.05% 4	19
outside North America	15.00% 3	15.00% 3	15.00% 3	25.00% 5	30.00% 6	20

If UNM's Department of Geography currently offered a PhD program, how likely would you be to apply for admission following completion of your M.S. in Geography?

Answered: 20 Skipped: 0

	Very unlikely	Somewhat unlikely	Neither likely nor unlikely	Somewhat likely	Very likely	Total	Weighted Average
(no label)	30.00% 6	10.00% 2	15.00% 3	20.00% 4	25.00% 5	20	3.00

What is your gender?

Answered: 20 Skipped: 0

Answer Choices	Responses
Female	50.00% 10
Male	50.00% 10
Total	20

Q5

Customize

Export

What is your age?

Answered: 20 Skipped: 0

Answer Choices	Responses
18 to 24	15.00% 3
25 to 34	65.00% 13
35 to 44	15.00% 3
45 to 54	0.00% 0
55 to 64	0.00% 0
65 to 74	5.00% 1
75 or older	0.00% 0
Total	20

Q6		Customize	Export ▾
What is your GPA?			
Answered: 20 Skipped: 0			
Answer Choices ▾		Responses ▾	
▾ 4.1 or above		20.00%	4
▾ 3.6 - 4.0		65.00%	13
▾ 3.1 - 3.5		15.00%	3
▾ 2.6 - 3.0		0.00%	0
▾ 2.1 - 2.5		0.00%	0
▾ 2.0 or below		0.00%	0
Total			20

What was your undergraduate major?

Answered: 20 Skipped: 0
Total majors listed (including double-majors): 23

Answers	Rates	
Geography	39.1%	9
Biology	4.3%	1
Religious Studies	4.3%	1
International Studies	4.3%	1
Architecture	4.3%	1
English or Creative Writing	13.0%	3
Chemistry	4.3%	1
Environmental Engineering	4.3%	1
Construction Engineering	4.3%	1
Anthropology	4.3%	1
Political Science	4.3%	1
Environmental Science	4.3%	1
History	4.3%	1

Current student status:

Answered: 20 Skipped: 0

Answer Choices ▼	Responses ▼	
▼ enrolled in M.S. Geography program at UNM	80.00%	16
▼ enrolled in other graduate program at UNM	10.00%	2
▼ enrolled in an undergraduate program at UNM	5.00%	1
▼ enrolled in a graduate program at an institution other than UNM	5.00%	1
▼ enrolled in an undergraduate program at an institution other than UNM	0.00%	0
▼ not enrolled as a student	0.00%	0
Total	20	

Institutions of Higher Education with
Doctoral Programs in Geography
in the Southwest Region

Data Source: AAG’s Guide to Geography Departments in the Americas, 2014-15

State	University	Program Specializations
Arizona	University of Arizona	Broad Geography
	Arizona State University	Broad Geography
Colorado	University of Colorado Boulder	Broad Geography
	University of Denver	Broad Geography
Idaho	University of Idaho	Physical Geog, Development, Remote Sensing, GIS
Nevada	University of Nevada, Reno	Remote Sensing, GIS Mountains, Deserts
Texas	Texas A&M University	Human-Environment Interaction, Geog Education
	Texas State University	GIS, Geography Education, Environmental Geography
	University of Texas, Austin	Broad Geography
Utah	University of Utah	Urban, Economic, GIS

PROJECTED CLASS SCHEDULE ROTATION (Note: see next sheet for table showing teaching loads by faculty member)

Course	Title	2017F	2018S	2018F	2019S	2019F	2020S	2020F	2021S	2021F	2022S	2022F	2023S
101	Home Planet: Land Water Life	CLL	CD	PTI	CD	PTI	PTI	CLL	CLL	PTI	PTI	CLL	CLL
101ONL	Home Planet (online)	CW	CW	CW	CW	CW	CW	CW	CW	CW	CW	CW	CW
102	People & Place	LS	PTI	LS	PTI	LS	JC	LS	JC	LS	JC	LS	JC
102ONL	People & Place (online)	CW	PTI	CW	PTI	CW	JC	CW	JC	CW	JC	CW	JC
105L	Phys Geog (Home Planet) Lab	TA	TA	TA	TA	TA	TA	CW	TA	CW	TA	CW	TA
140	Intro to World Regions	RB	PTI	RB	ML	RB	PTI	RB	ML	RB	ML	RB	ML
140ONL	World Regions (online)	CW	CW	RB	CW	RB	CW	RB	CW	RB	CW	RB	CW
180	World of Beer	ML		ML		CH		ML		ML		ML	
195	Introduction to Env Studies			TM		TM		TM		BW		BW	
195Field	Intro Env Studies (field version)				BW		BW		BW		BW		BW
217	Energy, Env't & Society	ME	CH	ME	CH	ME	CH	ME	CH	ME	CH	ME	CH
251	Meteorology		EPS		EPS		EPS		EPS		EPS		EPS
281	Intro to Maps & Geospatial Info	CLL	CLL	SF	CLL	SF	CLL	SF	NHGIS	SF	NHGIS	SF	NHGIS
350	Natural Environments		CLL		CLL		CLL		CLL		CLL		CLL
352	Global climate change		*		EPS		EPS		EPS				EPS
364	Law, Place and Space	JC		JC		JC		JC		JC		JC	
365	Nature & Society		TM		TM		TM		TM		TM		TM
380L	Basic Stats for Geographers	CH	YL	CH	YL	CH	YL	CH	YL	CH	YL	CH	YL
381L	Intro to Geog Information Systems	YL	XG	YL	CDL	YL	CDL	YL	CDL	YL	CDL	YL	CDL
427/527	Basic Programming for GISci	XG	XG	XG	XG	XG	XG	XG	XG	NHGIS	NHGIS	NHGIS	NHGIS
428/528	Advanced GISci Programming		XG		XG		XG		XG		NHGIS		NHGIS
450*	Environmental Hazards	*											
461/561	Environmental Mgmt	CH		CLL		CLL		CLL		CLL		CLL	
462/562	Water Management	PTI	BW	CH	BW	CH	BW	CH	BW	CH	BW	CH	BW
463/563	Public Lands Management	PTI											
464/564	Food & Natural Resources	CD	CD	CD	*		*		*		*		*
466/566	The City		JC		JC		JC		JC		JC		JC
467/567	Governing the Global Env't		CH		CH		CH		CH		CH		CH
468/568	Peoples/Env'ts in New Mexico			ML		PTI		ML		ML		ML	
469/569	Peoples/Env'ts in Latin America			BW		BW		BW		BW		BW	
471	Capstone	CD	*	CD	SF	SF	SF	SF	ML	SF	ML	SF	ML
481L*	Map design & geovisualization		PTI		SF		SF		SF	XG	SF	XG	SF
483L/583L	Remote Sensing Fundamentals	PTI		CLL	CLL	CLL	CLL	CDL	CDL	CDL	CDL	CDL	CDL
484L/584L	Applications of Remote Sensing		CDL		CDL		CDL		CDL		CDL		CDL
485L/585L	Internet Mapping (hybrid)	KB	KB	KB	KB		KB		KB		KB		KB
486L/586L	Applications of GIS (Advanced)	YL	YL	YL	XG	YL	SF	YL	SF	YL	SF	YL	SF
487L/587L	Spatial Analysis/Modeling	YL		SF		YL	XG	YL	XG	NHGIS	XG	YL	
488L/588L	GIS Concepts & Techniques (topics)	*		TM	LS	TM	LS	TM	LS	TM	LS	TM	LS
499Topics	Topics: Various		LS			CDL		RB		RB		RB	
499Topics	Topics: Various					CDL		BW		CDL		CDL	
499Topics	Topics: Various					CDL		CDL		CDL		CDL	
499Oaxaca	NEW: Oaxaca Field School		RB		RB		RB		RB		RB		RB
501	History & Phil of Geog	JC	ML	JC	ML	JC	CD	JC	CD	JC	CD	JC	TM
502	Geographic Research		ML		ML		CD		CD		CD		TM
514	Sem: Nat Resources			*		*	*	*	*	*	*	*	*
515	Sem: Cultural & Political Ecology		CD		CD		*		*		*		*
516	Sem: Globalization	BW		BW		BW		LS	LS		LS		LS
517	Sem: Legal Geography		*	BW	*		*		*		*		*
522	Spatial Data Management	KB		KB		KB		KB		KB			
524	Advanced RS Seminar	CDL		*		CDL		CDL		CDL		NHGIS	
525	Advanced GIScience Seminar		CDL		YL		YL	CDL	YL	CDL	YL		XG
551	Drylands								*				CD
570	Topics (includes XLUST)				TM		TM						
580L	Spatial Statistics												
581L	Fundamentals of GIS	XG		XG		XG		XG		XG		XG	
590	Qualitative Methods	LS		LS	LS		LS	LS		LS		LS	
601	Geog Theory and Application							JC	JC	JC		JC	
602	Integrative Research Design								LS		LS		LS
603	Professional Geog Practice								TM	TM		TM	

TEACHING LOAD BY FACULTY		2017F	2018S	2018F	2019S	2019F	2020S	2020F	2021S	2021F	2022S	2022F	2023S
FB	Mindy Benson												
FB	Ronda Brunkotte	140 LAS	499Oaxaca LAS	140 LAS	499Oaxaca LAS	140 Release	469/569 499Oaxaca	140 499Topics	469/569 499Oaxaca	140 499Topics	469/569 499Oaxaca	140 499Topics Sabbatical	469/569 499Oaxaca Sabbatical
JC	John Carr	364 501	466/566 Assoc Chair	364 501	466/566 Assoc Chair	364 501	102 466/566	364 501	102 466/566	364 501	102 466/566	364 501	102 466/566
CD	Chris Duvall	464/564 471	101 515	464/564 471	101 515	464/564 Admin	502 Admin	464/564 Admin	502 Admin	464/564 Admin	502 Admin	464/564 Admin	551 Admin
SF	Scott Freundschoh	Sabbatical	Sabbatical	281 488L/588L	471 481L*	281 471	481L* 486L/586L	281 471	481L* 486L/586L	281 471	481L* 486L/586L	281 471	481L* 486L/586L
XG	Xi Gong	427/527 581L	381L 428/528	427/527 581L	428/528 486L/586L	427/527 581L	428/528 488L/588L	427/527 581L	428/528 488L/588L	481L* 581L	488L/588L 499Topics	481L* 581L	380L 525
CH	Costa Hadjilambrinos	380L 461/561	217 467/567	380L 461/561	217 467/567	180 380L 461/561	217 467/567	380L 461/561 Sabbatical	217 467/567 Sabbatical	380L 461/561	217 467/567	380L 461/561	217 467/567
ML	Maria Lane	180	502	180 468/568 Admin	140 502 Admin	Release	Sabbatical	180 468/568	140 471	180 468/568	140 471	180 468/568	140 471
YL	Yan Lin	381L 487L/587L	486L/586L	381L 487L/587L Rsch Lv	380L 525 Rsch Lv	381L 487L/587L	380L 525	381L 487L/587L	380L 525	381L 487L/587L	380L 525	381L 487L/587L Sabbatical	Sabbatical
CLL	Caitlin Lippitt	101 281	281 350	450* 483L/583L	281 350	450* 483L/583L	281 350	101 450*	101 350	450* Sabbatical	350 Sabbatical	101 450*	101 350
CDL	Chris Lippitt	524 Buyout	484L/584L 525	Sabbatical	381L 484L/584L Sabbatical	499Topics 524	381L 484L/584L	483L/583L 524	381L 484L/584L	483L/583L 524	381L 484L/584L	483L/583L 499Topics	381L 484L/584L
TF	Tema Mistein		365	195 499Topics	365 570	195 499Topics	365 570	195 499Topics	365 499Topics	499Topics 603	365 499Topics	499Topics 603	365 502
LS	Lindsay Smith	102 590	499Topics	102 590	499Topics 590	102 Sabbatical	499Topics Sabbatical	102 590	499Topics 516	102 590	499Topics 516	102 590	499Topics 516
EW	Ben Warner	516	195Field 462/562	469/569 516	195Field 462/562	469/569 516 Rsch Lv	195Field 462/562 Rsch Lv	469/569 499Topics	195Field 462/562	195 469/569	195Field 462/562	195 469/569	195Field 462/562 499Topics
NHCHS	New HIRE, GIScience								281	427/527 488L/588L	281 428/528	427/527 524	281 428/528
EPG	taught by EPS (Gutzler)		251		251 352		251 352		251 352		251		251 352
ME	taught by Mech Engr	217		217		217		217		217		217	
KD	Karl Benedict (OILS)	522	485L/585L	522	485L/585L	522	485L/585L	522	485L/585L	522	485L/585L		485L/585L
SP	Shawn Porzman (PTI)												
CW	Cody Wiley (PTI)	101ONL 102ONL	101ONL 140ONL	101ONL 102ONL	101ONL 140ONL	101ONL 102ONL	101ONL 140ONL	101ONL 102ONL	101ONL 140ONL	101ONL 102ONL	101ONL 140ONL	101ONL 102ONL	101ONL 140ONL
PTI	Temp Part-Time Fac	462/562 463/563 483L/583L	102 140 481L*	101	102	101 468/568	101 140			101	101		
TA	Teaching Assistants in Instructor Role	105L	105L	105L	105L	105L	105L	105L	102ONL 105L	105L	102ONL 105L	105L	102ONL 105L

To: Mark Peceny, Dean, College of Arts and Science

From: Maria Lane, Chair, Geography & Environmental Studies

Re: GES FY19 Hiring Plan, with projections to FY21

Date: 8 June 2017

Summary Overview

The GES faculty hiring plan for the next three years is focused primarily on support for the development and implementation of a new PhD program and an online graduate certificate program in Geospatial Entrepreneurship. In total, we are proposing three hires (one replacement, one conversion, and one new hire) to increase our faculty size from 14 to 15 while also balancing the department's expertise in areas of student demand. All of these hires are in line with our most recent APR, and all of them contribute to the department's strategic focus on the scholarly nexus between Environmental Studies and Geographic Information Science & Technology (GIS&T).

Hires to Start in AY2018-19

- Conversion of existing Visiting Assistant Professor to Lecturer in Geographic Information Science. This full-time position would deliver a 3/3 teaching load in both basic and advanced GIScience courses, while also serving in an administrative role managing the proposed online Geospatial Entrepreneurship certificate program. This position could possibly be partially funded in the first year by incentive funds provided by the Provost.

Hires to Start in AY2019-20

- Expansion hire to support expanded research capacity and course offerings related to PhD program: Assistant Professor in Geographic Information Science & Technology to begin Fall 2018, with expertise in big-data analysis, modeling, and geovisualization. This hire could be deferred to start in Fall 2019, when we expect the PhD program to matriculate its first entering class.

Hire to Start in AY2020-21

- Replacement hire to support the PhD program and buttress undergraduate programs: Assistant Professor in Environmental Studies to begin Fall 2020, with expertise in conservation theory and praxis. Preference for scholars who conduct research related to water or other regionally-important resources.

Recent History and Trajectory of the Department

Since 2007, the Department of Geography & Environmental Studies has grown its faculty from the tenuous size of 4.0 FTE to a more robust 13 FTE, thanks to a combination of strategic commitments, opportunistic spousal hires, and transfer requests from other departments. This growth has allowed the department to dramatically improve both research and teaching, and GES is now poised to provide a significant contribution to the research and graduate teaching missions of the university by launching a PhD program, pending approval by the Regents and the state.

GES faculty have worked since the 2008 APR to strategically narrow the department's scholarly focus, to rejuvenate existing degree programs, and to develop sustainable new programs that contribute to the strategic missions of the College and University. This effort has been successful in improving undergraduate education, increasing enrollments, expanding externally funded research awards, and creating new programs designed to add value to existing UNM degrees and improve graduates' success in attaining employment in geospatial and environment-related fields.

Overhaul of existing programs:

Starting in 2010, we began overhauling our MS program to increase its research focus, improve curricular quality, attract more competitive applicants, and improve completion rates. This effort has been very successful, and we are now recruiting and graduating highly qualified students that engage in independent research at an advanced level. Three years ago, we revised both our BA and BS programs to streamline the path to graduation and provide better differentiation between the two degrees. The BA in Geography provides a strong background in Environmental Studies, preparing students for careers in environmental management and policy. The BS in Geography provides a combination of skills in Geographic Information Science and Technology (GIS&T) that prepares students for technical and policy-related positions in the fast-growing geospatial industry.

Strategic development of new programs:

In the past five years, GES faculty have developed a variety of new programs that add new enrollment capacity and take advantage of the department's existing curriculum, interdisciplinary connections with other units and programs on campus.

- Two New Minors: In fall 2012, we began offering undergraduate minors in (a) Geographic Information Science and (b) Law, Environment and Geography. Both of these minors are designed to add value to existing UNM degrees by guiding students to attain marketable skills that will help them succeed in the geospatial industry and environmentally-related fields.
- Shared-credit program with Economics: In spring 2014, we admitted the first student to our new shared-credit ("3/2") program with Economics, which allows qualified and motivated students to complete an undergraduate degree in Economics and a Master's in Geography in just five

years. This student successfully graduated in spring 2016, and we expect to see this program grow, as it provides a very attractive opportunity for students interested in natural resource economics.

- Graduate interdisciplinary certificate: In spring 2015, we began offering a graduate certificate in Law, Environment and Geography. This interdisciplinary certificate program provides training in legal and policy studies. Whether taken as a stand-alone program or as a complement to other graduate degrees, the certificate curriculum provides highly marketable skills that prepare students for work in environmental or geospatial jobs.

The following two programs are slated to launch during the next three years, and our hiring projection therefore takes these programs' needs into account.

- Joint PhD program with NMSU: In spring 2016, we submitted a proposal for the New Mexico Joint Doctoral Program in Geography, to be offered jointly between UNM and NMSU. Generated through three years of planning, collaboration, and innovative curricular design, this proposal is based in a substantial commitment from both sides to leverage existing strengths at both institutions and build a new model for PhD education in Geography. (See attached for 3-page executive summary.) At NMSU, the proposal has just been approved by the NMSU regents. At UNM, the proposal has moved through several approval levels before we caused a delay to update it with new information about changes to our faculty composition. As of summer 2017, it is again moving through the institutional approval process, and we expect it to be approved by the Regents by the end of 2017. If approved, it will go through state-level approval processes in 2018 and could gain legislative approval by early 2019, thus potentially allowing for a first cohort to enter in fall 2019 at the beginning of UNM's FY20.
- Planned: Online program in Geospatial Entrepreneurship: We are currently developing an innovative program in geospatial entrepreneurship, which would be delivered fully online. Although the programmatic details for this proposal have not been finalized, the draft proposal involves the productive leveraging of (1) existing faculty and courses in GES, (2) collaborative relationships with other departments and schools at UNM, (3) incentive funding from the Provost's office to launch the first year of the program, (4) establishment of an externally-funded MOOC to generate visibility and interest, and (5) use of a strategic partnership with a national geospatial organization that could direct students to this program as a preferred credential provider. The expectation is that this program would be a major generator of revenue and enrollment, and that it would quickly begin to pay for itself.

All of this work in program-building has come in direct response to the detailed recommendations of our 2008 APR, and all of it has been undertaken by a small faculty dominated numerically by its junior ranks.

Recent Hiring: Plans, Commitments, Opportunities

The expansion and development described in the previous section has been supported by a number of specific A&S hiring commitments in the last decade, with significant supplemental support in the form of opportunistic hiring. This section reviews the most recent commitments, plans, and hires, explaining how the proposed hiring plan has evolved.

FY16 hiring plan

Dean Peceny's FY16 hiring plan for A&S included an open-rank tenure-track position for GES with a focus in water policy (salary \$75,000 to \$90,000), as part of a request that the provost fund a water-related cluster hire spanning four departments. The Provost did not fund the cluster hire, but we continued to prioritize a water-related development scholar toward the top of our list for strategic new hires in the FY17 plan, mainly because we lost significant expertise in water resources management when Paul Matthew retired in 2013.

FY17 hiring plan

The FY17 hiring plan for GES prioritized an urgent replacement hire for Associate Professor Paul Zandbergen (who had been on unpaid leave for several years before resigning in 2014) as well as three strategic expansion hires needed to support the department's planned PhD program. We received approval to conduct a search for the immediate need, which was fulfilled by the hire of Dr. Yan Lin, who started in fall 2016. The expansion hires were updated in the FY18 hiring plan, and more recent opportunistic hires (spousal plus transfer-based) have fulfilled some needs from the FY17 plan while revealing other needs that had not been envisioned. The FY17 plan has thus been rendered essentially obsolete.

FY18 hiring plan

The FY18 hiring plan for GES updated the FY17 plan to account for the pending arrival of an unexpected spousal hire slated to join the faculty in Fall 2017: Dr. Ben Warner. If nothing else had changed, this year's FY19 hiring plan might have remained substantially unchanged from the FY18 plan, but we have gained several unexpected transfers from other departments, have recently lost a faculty member to another university, and have also seen a marked increase in student interest in Geographic Information Science. This necessitates a very substantial update to our list of priorities and positions. The bullet points below indicate how the hiring priorities submitted last year have evolved in this year's hiring plan for FY19 through FY21.

- **Our request for an FY19 Assistant Professor Hire in Global Development was a top priority in last year's hiring plan but is not included as a priority this year.** The FY18 hiring plan for GES detailed the need for a FY19 hire in global development, partially to fill the expertise gap created by the retirement of Brad Cullen, who had taught courses in economic geography. This need is less of a priority this year because of the unexpected addition of multiple faculty from other departments. Although none of these scholars has direct expertise in development, they add new dimensions to our faculty in cultural

geography, critical geography, and Latin Americanist geography that minimize the urgency of furthering developing this part of our scholarly portfolio.

- **Our request for an FY20-21 Assistant Professor in Environmental Studies was an important priority in last year's hiring plan, and this hire is now more urgent because of a faculty departure.** Our department continues to prioritize a focus on environmental studies, although we will spend time as a faculty in 2017-18 digesting the recommendations of our spring 2017 APR, which suggested that we consider "Environment and Society" as a broader and more appropriate focus than "Environmental Studies." As we consider this as a strategic option, we will also take into account the significant changes in our overall faculty expertise due to the transfer of faculty to GES from other departments (see below). Regardless of how the strategic discussion evolves, however, it is clear that the recent departure of Melinda Benson as our top Environmental Studies scholar (see also below) means it will be critical to maintain this position as a high priority in the hiring plan.
- **Our request for an FY20-21 Assistant Professor in Geographic Information Science was the third priority in last year's hiring plan, but this has now emerged as our very top priority.** Over the last few years, a great majority of our students at both the undergraduate and graduate levels have opted for the GIScience-focused options available in GES: BS vs BA degree for undergrads, and GIScience vs Environmental Studies track for Master's students. Although our recent spousal hire and our transfer faculty all fit solidly on the Environmental Studies side of the department, there has not been any substantial increase in our ability to support GIScience students. Students are filling our higher-level analysis courses and asking for more programming options than we can currently offer. The proposed top-priority GIScience hire will therefore be critical to meeting these emerging needs, and we additionally propose to convert the Visiting Assistant Professor position into a Lecturer position that would support the Geospatial Entrepreneurship program while simultaneously adding GIScience teaching capacity.

Visiting Assistant Professor Xi Gong, 2016-2018

As a spousal accommodation for Dr. Yan Lin, we offered a visiting position to her spouse, Dr. Xi Gong. His expertise in Geographic Information Science uses big-data analysis techniques to understand environmental health impacts. His presence has allowed us to adequately staff our basic GIS courses while also offering high-level classes in GIScience programming and analysis that are in high demand from GES students. He will stay for an additional year (2017-18) to cover classes during the full-year sabbatical of Professor Scott Freundsuh. The addition of Dr. Gong brought the GES faculty size to 10.5 FTE in the fall of 2016.

Retirement of Lecturer Kim Seidler, Fall 2016

GES had one lecturer, Kim Seidler, who retired at the end of the Fall 2016 semester. Seidler's expertise was in urban land use planning and management,

which allowed him to effectively teach a variety of undergraduate core courses while also supporting students with interests in Environmental Studies related to urban planning and development. His retirement, however, prompted the department to reconsider whether we should continue to maintain a specific urban expertise. It now seems more logical to re-focus attention on our Environmental Studies expertise, especially considering the transfers to GES of new faculty with expertise in a variety of non-urban subfields of critical geography. The retirement of Kim Seidler reduced the GES faculty size from 10.5 to 10 FTE.

Transfers of Lindsay Smith and Ronda Brulotte, January 2017

In fall 2016, GES was asked to evaluate the potential fit of Dr. Lindsay Smith and Dr. Ronda Brulotte, who were seeking transfers out of the Department of Anthropology. They each visited GES in November 2016 and participated in a formal interview process, meeting with faculty and students in GES. The GES faculty unanimously supported accepting them as faculty transfers, finding that their research expertise was based in critical geography and could provide an excellent complement for the department's Environmental Studies focus. In terms of faculty numbers, these additions raised the department's faculty size to 12 FTE.

Departure of Associate Professor Melinda Benson

In spring 2017, Dr. Benson was recruited in a search for the Dean position at the Haub School of the Environment, University of Wyoming. Despite our strenuous efforts to retain her as a critically important faculty member, she accepted the offer in June 2017. The pending arrival of Dr. Tema Milstein (see below) may offset research/teaching expertise lost with Dr. Benson, yet it remains critical that we replace this position in the next three years. This departure brings the faculty size down to 11 FTE, but two additions will bring it back up to 13 FTE.

Pending spousal hire of Ben Warner, August 2017

As a spousal accommodation for a recent hire in Emergency Medicine, GES was asked last year to evaluate the potential fit of Dr. Benjamin Warner as a member of the GES tenure-track faculty. He visited campus in March 2016 and participated in a two-day interview process, meeting with faculty in GES, Civil Engineering, Economics, and the Latin American and Iberian Institute. The GES faculty unanimously supported offering Dr. Warner a tenure-track position, finding that his research expertise – in mixed-methods analysis of climate change adaptation in both Latin America and North America – was an excellent fit for the department. We are especially excited about his potential for engaging in collaborative research across campus, supporting graduate students, and teaching new classes at the intersection of Environmental Studies and GIS&T. In terms of faculty numbers, Dr. Warner will raise the faculty size to 12 FTE.

Transfer of Tema Milstein, August 2017

In spring 2017, GES was asked to evaluate the potential fit of Dr. Tema Milstein, who was seeking a transfer out of the Department of Communication &

Journalism. She visited GES in April 2017 and participated in a formal interview process, meeting with faculty and students in GES. The GES faculty unanimously supported accepting her faculty transfer, finding that her research expertise was a direct fit for our Environmental Studies focus. Dr. Milstein will bring the faculty size to 13 FTE: 12 tenure-track, and one visiting assistant professor.

GES Three-Year Hiring Plan

To balance our faculty expertise and prepare for launch of the joint PhD program (potentially as early as fall 2019) and an online Geospatial Entrepreneurship program (potentially by summer 2018), we propose three strategic new hires over the next three years. We expect all three positions to contribute to (a) interdisciplinary collaborations and initiatives across campus, (b) the A&S mission to deliver a flagship university education for the emerging American majority, and (c) the department's existing scholarly strengths at the nexus of Environmental Studies and Geographic Information Science & Technology.

Two of these hires were included in the FY18 hiring plan for GES, while the third (which is listed first chronologically) has been identified as an area of need to support an important programmatic opportunity. Because of changes in our overall faculty composition, due to opportunistic hiring, the priority order of planned hires is not identical to those that were included in the FY18 hiring plan.

AY2018-19: Lecturer in Geographic Information Science

This proposed hire would play two important roles in GES: (1) the GIScience Lecturer would contribute to the teaching rotation for both basic and advanced GIScience courses on a 3/3 load; and (2) the GIScience Lecturer would have a quarter-time administrative appointment directing the Geospatial Entrepreneurship certificate program, which is currently in the proposal stage. We currently have a Visiting Assistant Professor supporting the GIScience teaching rotation, and his appointment will end after the 2017-18 academic year. Converting this position to a Lecturer position would allow us to offer more courses in areas of high student demand, particularly GIScience programming and analysis. Our efforts to launch an online geospatial entrepreneurship certificate program would also be greatly enhanced by assigning administrative responsibilities to a permanent faculty member. We are now finalizing a proposal to the Provost's office to provide financial support for this program in the first year, so it's possible that funding will provide some portion of the salary increase needed to bring the existing Visiting Assistant Professor position up to the level of a full-time Lecturer.

Salary: \$\$60,000 (increased from \$49,999)

Startup: none

Start date: Fall 2018

AY2019-20: Assistant Professor in Geographic Information Science

This proposed hire would complete the faculty expansion needed to support our new PhD program, bringing the faculty size up to 14. Expertise in Geographic Information Science has been an area of ongoing need in our department since 2008, when we revised and refocused the B.S. Geography curriculum to bring it in line with national standards in GIScience education. Although we now have a strong curriculum, we have struggled to offer all courses on a regular basis, given a shortage of GIScience-focused faculty. As the simplified chart below shows, faculty expertise in GES is heavily weighted toward Environmental Studies. The demand for our GIS&T courses, however, is at least as robust as for the Environmental Studies courses. We currently have higher enrollments in the BS degree than the BA, and we have an even split between MS concentrations in GIScience and Environmental Studies. For these reasons, we have already identified a strong need for balance with additional hires in GIS&T.

At the moment, we have one full professor (Freundschuh) who teaches courses in cartography and basic GIS topics; two veteran assistant professors (Lippitt and Lippitt) who specialize in remote sensing; a brand-new hire (Lin) who is capable of teaching across the spectrum of courses in GIS, spatial analysis and modeling, geostatistics, and programming; and a visiting assistant professor who specializes in big-data mining/analysis for environmental health issues. This is not quite enough personnel to consistently cover all of our high-demand GIScience courses, while also accounting for occasional leaves, sabbaticals, etc. We need to add at least one more GIS specialist who is capable of teaching courses across our spatial methods curriculum, who can contribute to program-building and curricular development, and who can play a significant role in supervising Master's theses. The burden of these responsibilities now falls heavily on our most junior professors (Lippitt, Lippitt, and Lin), thus compromising their research productivity.

We envision this expansion hire as having a specialization in big-data analysis, modeling, and geovisualization, which is a rapidly growing specialization within Geographic Information Science & Technology. Scholars in this field have substantial skills in programming, are capable of generating significant amounts of external funding, and can use their skills to collaborate both with colleagues in Geography and across related disciplines. To successfully hire a scholar in this field, we will need to provide a salary/startup package well above the average for Geography as a whole.

Salary: \$\$75,000-\$80,000

Startup: \$50,000

Start date: Fall 2019

AY2020-21: Assistant Professor in Environmental Studies

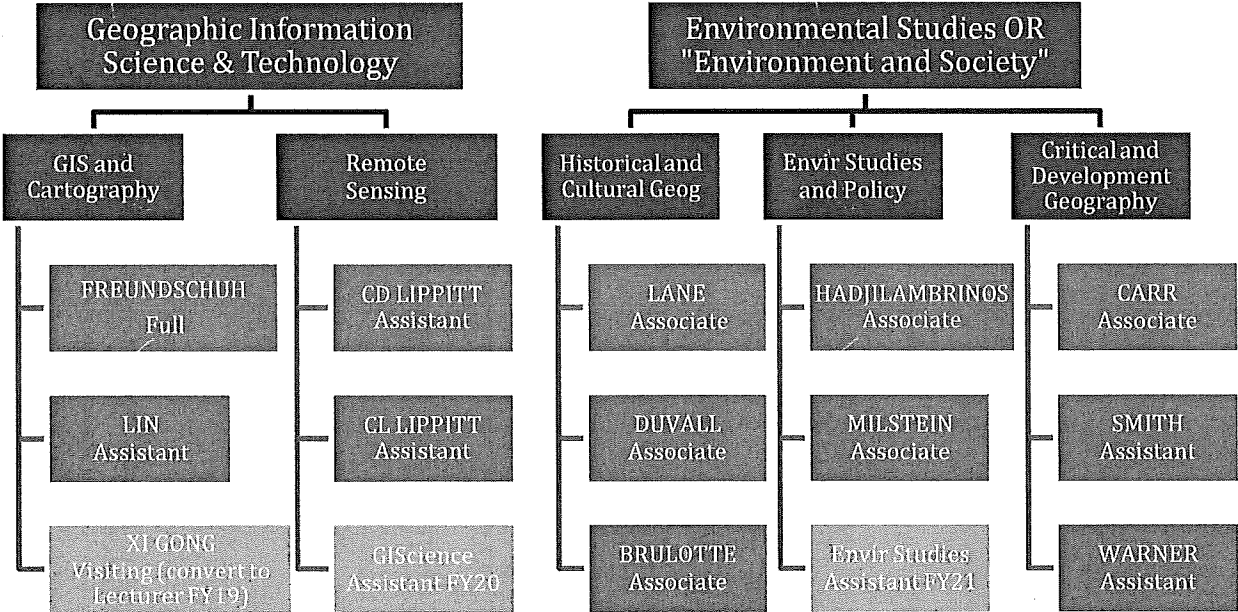
This replacement hire would expand the GES faculty size from 14 to 15 FTE, replacing the critical expertise lost by the departure of Melinda Benson, who is

leaving UNM to take a dean position at the University of Wyoming. Because Dr. Benson is technically going on leave and will have two years to accept her counteroffer (with a deadline of March 2019), we would like to plan to conduct a search for her replacement in 2019-2020, with an expected start date of Fall 2020. To most directly replace Dr. Benson and support the high-demand classes she taught, we will look for a scholar in Environmental Studies who has expertise in conservation theory and praxis. We would also like to recruit a scholar who has the ability to be successful in securing external funding in competitions like NSF's Coupled Human and Natural Systems. Although we do not anticipate limiting this position by region or by a specific resource type, we will likely include a preference for scholars with expertise in water or other regionally-important resources.

Salary: \$\$68,000-\$73,000
Startup: \$25,000
Start date: Fall 2020

Simplified Organizational Chart: GES Faculty Projection, FY21

Our projected organizational chart indicates the balance of expertise that will be created by the three-year hiring plan, providing adequate support for a robust launch of the planned PhD program without compromising existing programs and curricula.



Melinda Harm Benson
Department of Geography and Environmental Studies

Employment History

Associate Professor, 2014-present

Assistant Professor, 2008-2014

UNIVERSITY OF NEW MEXICO, GEOGRAPHY AND ENVIRONMENTAL
STUDIES DEPARTMENT; affiliated faculty with the College of Law, the Water
Resources Program, and Sustainability Studies

Lecturer and Research Scientist, 2004-08

UNIVERSITY OF WYOMING, HAUB SCHOOL AND RUCKELSHAUS
INSTITUTE OF ENVIRONMENT AND NATURAL RESOURCES

Staff Attorney, 2002-04

WESTERN RESOURCE ADVOCATES

Natural Resources Law Institute Fellow, 2001-02

LEWIS & CLARK LAW SCHOOL

Staff Attorney, 1999-2001

LAND AND WATER FUND OF THE ROCKIES (now known as Advocates for the
West)

Law Clerk, 1998-99

UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

State Affairs Director and Lobbyist, 1992-95

IDAHO CONSERVATION LEAGUE

Educational History:

J.D., UNIVERSITY OF IDAHO COLLEGE OF LAW, 1998

Summa Cum Laude

Law Review Comment: "Was the Lorax an Outfitter and Guide? A Shift in Idaho's
Standing Doctrine: Boundary Backpackers v. Boundary County and Selkirk-Priest Basin
Ass'n v. State." *Idaho Law Review* 32: 127-157.
Advisor: Dale Goble.

M.S., UNIVERSITY OF WYOMING, COLLEGE OF EDUCATION, 2011

Community Counseling

Plan II project topic and publication: "Are We Addicted to Oil? Lessons from Mental
Health." *Southwestern Geographer* 14: 121-136. Advisor: Michael Morgan

B.A., UNIVERSITY OF OREGON, 1991

Magna Cum Laude

Major: Political Science Minor: Philosophy
Honors thesis: *Consensus Decision-making in the Public Realm: a Practical and Theoretical Consideration of Plurality*. Advisor: Deborah Baumgold.

Professional Recognition Honors, etc.

Daniel B. Luten Award, Award for Best Paper, Association of American Geography
Energy and Environment Specialty Group, 2011
Selection, Editorial Board, Idaho Law Review, 1997-98
George Warren Scholar, University of Idaho, 1995-98
Harry S. Truman Scholar, Truman Scholarship Foundation, 1988
Century III Leadership Scholar, Shell Oil Company, 1987

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Caldera National Preserve (accepted for publication by *Virginia Environmental Law Journal*
in August 2015).

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Change.” *Sustainability* 6: 2338-2356.

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Benson, M.H. and A. B. Stone (2013). "Practitioner Perceptions of Adaptive Management Implementation in the United States." *Ecology and Society* 18 (3): 32. [online] URL: <http://www.ecologyandsociety.org/vol18/iss3/art32/>.

Benson, M.H., R. R. Morrison and M. C. Stone (2013). "A Classification Framework for Running Adaptive Management Rapids." *Ecology and Society* 18 (3): 30. [online] URL: <http://www.ecologyandsociety.org/vol18/iss3/art30/>.

Garmestani, A. S., C. R. Allen and **M.H. Benson** (2013). "Can Law Foster Social-Ecological Resilience?" *Ecology and Society* 18 (2): 37. [online] URL: <http://www.ecologyandsociety.org/vol18/iss2/art37/>.

Kavanaugh, J. and **M.H. Benson** (2013). "Reintroduction of Conservation Reliant Species: An Assessment of the Southwestern Grizzly Bear's Place on the Recovery Continuum." *Human Dimensions of Wildlife* 18:3, 194-207 [online] URL: <http://dx.doi.org/10.1080/10871209.2013.751638>.

Garmestani, A.S. and **M.H. Benson** (2013). "A Framework for Resilience-based Governance of Social-Ecological Systems." *Ecology and Society* 18 (1): 9. [online] URL: <http://www.ecologyandsociety.org/vol18/iss1/art9/>.

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Benson, M.H. Water Resources in the Middle Rio Grande: The Resource, How It’s Used, and Future Challenges. Designing for Resilience in New Mexico, anticipating the real and potential effects of cultural and climatic changes. American Institute of Architects New Mexico Chapter Annual Conference, Albuquerque New Mexico, 28 August 2015 (panel moderator).

Benson, M.H. Regime Change for New Mexico Forests. First Annual Sustainability Conference of American Legal Educators. Arizona State University College of Law, Tempe, Arizona, 7-9 May 2015.

Benson, M.H. A Framework of Resilience. 16th Water Assembly Conference Albuquerque, New Mexico, 21 March 2015.

Benson, M.H. Adaptive Governance in a Time of Uncertainty. Carpe Diem West’s Healthy Headwaters’ Ninth Convening, Albuquerque, NM 4 November 2014.

Benson, M.H. Water Resilience in a Time of Uncertainty: Using a Resilience Lens. Utton Transboundary Resources Center Workshop on Resilience in a time of Uncertainty, University of New Mexico College of Law 9 October 2014.

Benson, M.H. The End of Sustainability? An Environment Law Institute Research Webinar, 8 July 2014; <http://www.eli.org/events/end-sustainability>.

Benson, M.H. Reconceptualizing social-ecological relations – is resilience the new narrative? Journal of Environmental and Sustainability Law Symposium Environmental Law 4.0: Adaptive and Resilient. University of Missouri School of Law, Columbia MO, 14 February 2014.

Benson, M.H. and B. Cosens. Resilience in water governance: building adaptive capacity within social-ecological systems facing climate change. Transformational Solutions for Water in the West Workshop. Sandia National Laboratories. Albuquerque, New Mexico 5 September 2013.

Benson, M.H. Regulatory Takings—rights or relations? NSF Workshop on the Spatial Constitution. Washington, D.C., 13-14 June 2013.

Benson, M.H. The Spatiality of Judicial Review. University of New Mexico College of Law Spring Faculty Colloquium, 27 February 2013.

Craig, R.K. and **M.H. Benson.** Replacing Sustainability. The Next Generation of Environmental & Natural Resources Law, University of Akron School of Law, 29 September 2012.

Benson, M.H. Reconceptualizing social-ecological relations – is resilience the new narrative? University of Nebraska Lincoln, 4 October 2012.

Benson, M.H. Rules of engagement: the spatiality of judicial review. University of Nebraska Lincoln Department of Geography Seminar, Integrative Graduate Education and Research Traineeship program on Adaptive Governance in Stressed Watersheds, 5 October 2012.

Benson, M.H. Resilience thinking—is it changing environmental governance approaches in the United States? University of Nebraska Lincoln College of Law Environmental/Agricultural Law Society, 5 October 2012.

Benson, M.H. and R.K. Craig. Wicked problems: reconceptualizing environmental governance. New Directions in Environmental and Energy Law, Policy, and Geography University of Minnesota, 3-5 May 2012

Benson, M.H. Rules of engagement: the spatiality of judicial review. Where now? Moving Beyond Traditional Legal Geographies. University at Buffalo, 25-26 April 2012.

Benson, M.H. Geographies of Mt. Taylor: the Legal, Political and Cultural Implications of Proposed Uranium Mining Development in one of New Mexico's most Sacred Spaces. Ortiz Center Faculty Symposium, Albuquerque, NM, 16 March 2010.

Benson, M.H. Climate Change: Implications for Environmental and Land Use Planning and Management. Collaborative Adaptive Management Network Annual Rendezvous, Tucson, AZ, 9 March 2010.

Garmestani, A.S. and **M.H. Benson**. The “man” in management: adaptive management in law. 70th Midwest Fish and Wildlife Conference, Springfield, Illinois, 7 December 2009.

Benson, M.H. Adaptive Management as a Mandate: Implications for Energy Development in the Interior West.” Conference on Critical Intersections for Energy and Water Law: New Challenges and Opportunities, Calgary, Alberta, 15 May 2009.

Contributed (unrefereed) Abstracts and/or Oral Presentations at Professional Meetings

Benson, M.H. Legal Geographies of the Valles Caldera National Preserve, Annual Meeting of the Association of American Geographers, Chicago, IL 21-24 April 2015.

Benson, M.H. Regulatory Takings: Rights or Relations? 2014 Joint Meeting of the Southwest and Great Plains-Rocky Mountain Divisions of the Association of American Geographers, Albuquerque, New Mexico, 24 October 2014.

Benson, et al. Adaptive Governance and Social-Ecological System Resilience in New Mexico’s Rio Grande Valley, Association of Environmental Studies as Sciences Annual Meeting Pace University, New York, New York June 11-14, 2014.

Benson, M.H. Procedural rules and their spatial consequences. Law and Society Annual Meeting, Boston Massachusetts, May 31-June 2 2013.

Benson, M.H. Compelling government enforcement of environmental protections, Annual Meeting of the Association of American Geographers, Los Angeles, California, 9-12 April 2013.

Benson, M.H. The Rules of Engagement: the Spatiality of Judicial Review. Annual Meeting of the Southwest Division Association of American Geographers, Las Cruces, New Mexico, 25-27 October 2012.

Harris, S., M. Harvey, M. Stone, R., Morrison, T., Caplan, G. Gustina, G., and **M.H. Benson, M. H.** Flow optimization for geomorphic and ecological improvements in the wild and scenic reach of the Rio Chama, New Mexico. Environmental & Water Resources Institute, American Society of Civil Engineers. Albuquerque, New Mexico (2012).

Jones, J.A., I. Creed, K. Hatcher, R. Warren, **M.H. Benson**, E. Boose, W. Brown, J. Campbell, A. Covich, D. Clow, C. Dahm, K. Elder, C. Ford, N. Grimm, D. Henshaw, K. Larson, E. Miles, K. Moore, S. Sebestyen, A. Stone, J. Vose, M. Williams. Ecosystem Processes and Human Influences Regulate Streamflow Response to Climate Change at

Long-Term Ecological Research Sites. LTER 2012 All Scientists Meeting. Estes Park, Colorado, 10-13 September 2012.

Benson, M.H. The geographies of proof: a nomospheric investigation of the allocation of burdens embedded within the 'standing' requirement for environmental cases in the United States, Annual Meeting of the Association of American Geographers. Legal Geography and the Nomosphere, Power and Influence, session 3, New York, New York, 26 February 2012.

Benson, M.H. Burdens and Ontologies: the Geographies of Proof. Law and Society Association Annual Meeting, San Francisco, CA, 4 June 2011.

Benson, M.H. Geographies of Mt. Taylor: the Legal, Political and Cultural Implications of Proposed Uranium Mining Development in one of New Mexico's most Sacred Spaces. Association of American Geographers Annual Meeting, Session Geographies of Law and Environmental Regulation II, Seattle, Washington, 13 April 2011.

Benson, M.H. Intelligent Tinkering: the Endangered Species Act, Resilience Theory, and the Next Generation of Environment and Natural Resource Management. Resilience 2011: Resilience, Innovation and Sustainability: Navigating the Complexities of Global Change" Second International Science and Policy Conference, Arizona State University, 12 March 2011.

Garmestani, A.S. and **M.H. Benson.** Actualizing panarchy within environmental policy: mechanisms for tweaking institutional hierarchies to mimic the social-ecological systems they manage. Law for Social-Ecological Resilience Conference, Stockholm, Sweden, 18 November 2010.

Benson, M.H. and A.S. Garmestani. The Institutional Integration of Emerging Theories Regarding Social-Ecological Systems. Association for Environmental Studies and Sciences, 2010 Conference, Portland, Oregon, 19 June 2010.

Garmestani, A.S. and **M.H. Benson.** Embracing Panarchy and Building Resilience: Reworking Environmental Laws to Address Wicked Problems. Association for Environmental Studies and Sciences, 2010 Conference, Portland, Oregon, 19 June 2010.

Miller, S.N. and **M.H. Benson.** Assessment of Coalbed Natural Gas Active Well Migration in Wyoming's Powder River Basin: Implications for Adaptive Management, Energy Resources and Produced Water Conference, Laramie, Wyoming, 25 May 2010.

Benson, M.H. Governing for Resilience: Institutionalized Perceptions of Stationarity and their Implications for Ecosystem-based Adaptive Management. American Association of Geographers Annual Conference, Washington, D.C., 18 April 2010.

Benson, M.H. Law and Geography: Examining Intersections of Theory and Application within Legal Geography. Panel Discussion. American Association of Geographers Annual Conference Washington, D.C., 18 April 2010.

Benson, M.H. The National Environmental Policy Act: is it Time to Put Teeth Back in the Tiger? The 32nd Applied Geography Conference, Baton Rouge Convention Center Hotel, 29 October 2009.

Benson, M.H. Are We Addicted to Oil? Lessons from Mental Health. Western Social Science Association Annual Conference, Albuquerque, New Mexico, 18 April 2009.

Benson, M.H. Influences of Law and Policy on Coalbed Methane Development in Wyoming's Powder River Basin. Association of American Geographers Annual Meeting, Las Vegas, Nevada, 25 March 2009.

Benson, M.H. Environmental Management Trends. Panel Discussion. Association of American Geographers Annual Meeting, Las Vegas, Nevada, 25 March 2009.

Benson, M.H. Geologic Carbon Capture and Sequestration: Law and Policy Considerations. Research and Applications in Climate and Energy Workshop, University of Wyoming, January 2008.

Benson, M.H. Law on the Landscape: How Policy Choices and Legal Designations Shape the Meaning of Place. The Red Desert: Among Dead Volcanoes and Living Dunes: A Public Conversation about the Importance of Place, University of Wyoming September 2007.

Benson, M.H. Assessment of Current Regulations and Recommendations for Needed Changes. Moderator for Panel Discussion, Wyoming Law Review Symposium on Wyoming Energy Development: A Community and Regulatory Assessment, University of Wyoming College of Law, February 2007.

Benson, M.H. Wildlife & Energy Development. Public Interest Environment Law Conference, University of Oregon, March 2007.

Research Funding

“Law’s geographies: procedural rules and spatial consequences.” Melinda Harm Benson. University of New Mexico Resource Allocations Committee. (2/1/13-9/1/14) \$6,000.

“Building resilience in water governance: an interdisciplinary investigation into the social-ecological system dynamics of climate change.” Lead PI, NSF EPSCoR Western Tri-State Consortium IWG Proposal \$17,785.

“Rio Chama-El Vado to Abiquiu Reservoirs: Flow Reoperation to Optimize Ecosystem Function, Water Supply and River-Based Recreation.” Steve Harris, Rio Grande

Restoration. New Mexico Environment Department River Ecosystems Restoration Initiative. (M.H. Benson subcontract for adaptive management implementation and facilitation) (1/1/2011-6/30/2013) \$189,386.

“Geographies of Mt. Taylor: the Legal, Political and Cultural Implications of Proposed Uranium Mining Development in one of New Mexico’s Sacred Spaces.” Melinda Harm Benson. University of New Mexico’s Resource Allocations Committee. (1/1/2011-9/30/2011). \$ 3,837.

“Legal and Institutional Barriers to Adaptive Management of Natural Resources in the United States.” Melinda Harm Benson. University of New Mexico Resource Allocations Committee. (2/15/09-9/30/09). \$1,320.

“Integrated Management of Groundwater and Surface Water Resources: Investigation of Different Management Strategies and Testing in a Modeling Framework.” Fred Ogden and Melinda Harm Benson. University of Wyoming Water Research Program. (3/01/2007-02/28/2010). \$140,248.

“Integrating Coalbed Natural Gas Science and Management: Lessons Learned and Ways Forward.” Scott N. Miller, Fred Ogden, Roger Coupal and Melinda Harm Benson. U.S. Department of Energy (6/2/2006 -9/30/2008). \$183,915.

Pending Research Funding/In Progress

Unfunded Research Proposals

“Impacts of Drought and Wildfires on Water Quality and Availability in the Upper Rio Grande Watershed. Funding Opportunity: National Priorities: Systems-Based Strategies to Improve The Nation’s Ability to Plan And Respond to Water Scarcity and Drought Due to Climate Change, EPAG2014- ORD-L1 Principal Investigators: Mark Stone, PhD, PE, DWRE, stone@unm.edu, Janie Chermak, PhD, jchermak@unm.edu, Melinda Harm Benson, JD, mhbenson@unm.edu. Ryan Morrison, PhD, PE, rmorriso@unm.edu, Vanessa Valentin, PhD, vv@unm.edu, Dave Van Horn, PhD, vanhorn@unm.edu, Institution: University of New Mexico, Albuquerque, New Mexico Project Period and Location: 02/01/15 to 01/31/18; Albuquerque, NM, Project Cost: \$1,000,000 (\$250,000 non-federal cost share).

“Shifting the Environmental Governance Paradigm: Adaptive Management Methodologies in the United States.” Melinda Harm Benson. National Science Foundation Law and Social Science Program (5/1/2011-6/30/2013) (submitted 8/15/10) (\$162,589).

“Sustainability of a System: Building Resilience in Governance and Water Regimes in the Rio Grande.” Julie Coonrod, Melinda Harm Benson, Janie Chermak, Cliff Dahm, Grant Meyer, National Science Foundation Water Climate and Sustainability Program Category I. (submitted October 2011)(\$ 149,871).

“Capacity of a Social-Ecological System to Enhance Environmental and Economic Conditions in New Mexico’s Rio Chama Watershed.” Mark Stone, Melinda Harm Benson, Cliff Dahm and Janie Chermak, National Science Foundation Coupled Human Natural Systems Exploratory Project (submitted November 2011) (\$249,302).

“Geographies of Judicial Review: procedural rules and their spatial consequences.” Melinda Harm Benson. Lead PI. NSF Law and Social Sciences Program (1/15/2014) \$150,000.

“Resilience in water governance: building adaptive capacity within social-ecological systems facing climate change.” Co-PI with Derek Kauneckis, Barbara Cosens. NSF Science Technology and Society Program (2/15/14) \$ 489,000).

Teaching

Doctoral Advisement

- Noelle Chaine, (PhD Candidate, Natural Resources), University of Nebraska Lincoln, School of Environment and Natural Resources: adaptive management, committee co-chair (Fall 2012-2015)
- Ryan Morrison (PhD Candidate, UNM Civil Engineering), "Assessing the impacts of system uncertainty in environmental flow analyses, committee member (Spring 2013-Spring 2014)

Masters Advisement

- Jordon Stone (M.S. Geography expected 2017): Environmental Education, committee chair (Fall 2015-present).
- Kristin Long (M.S. Geography expected 2017): Urban Planning, committee chair (Fall 2015-present).
- Kaisa Lappalainen (M.S. American Studies expected 2015): Wolf Reintroduction and Rural America, committee member (Spring 2013 to present)
- Jordy Hicks (M.S. Geography expected 2015): Bosque Place Identity, committee chair (Fall 2013-present)
- Kathryn (Cyd) Schulte (M.S. Water Resources expected 2014): Water and the Media, committee chair (Fall 2013-present)

Matt Piccarello (M.S. Water Resources and Community and Regional Planning expected spring 2013): A Resilience Based Approach to Natural Resource Management for Santa Clara Pueblo, (Spring 2013-present)

Crystiana M Baca-Bosiljevac (M.S. Geography expected 2014): Social-ecological resilience of local food systems, committee chair (Fall 2012 to present)

Steven Sutton (M.S. Geography 2013): (non thesis), committee member

Martin Martinez, (M.S. Geography 2013): (non thesis), committee member

Mark Lawler (M.S. Geography 2013): Collaborative processes for adaptive management of New Mexico's Rio Chama, committee chair

Erin Marchand (M.S. Geography 2013): survey community perceptions of wolf reintroduction in southern New Mexico, committee chair

Imogen Ainsworth (M.S. Geography 2013): (non thesis), committee chair

Patricia Dominguez (M.S. Water Resources expected 2014): Impact of National Environmental Policy Act analyses on proposed uranium mining on the Cibola National Forest, New Mexico, committee member

Ralph Monfort (M.S. Water Resources 2012): Adaptive Management Methodologies and the Middle Rio Grande Endangered Species Act Collaborative Program, committee chair

Sarrah Kubinec (M.S. Geography 2012): (non thesis), committee chair

John Kavanaugh (M.S. Biology 2011): Brown Bear (*Ursus arctos*) Reintroduction to the American Southwest: A Feasibility Study, committee member

Matt Gagnon (M.S. Geography 2011): Management of the Valles Caldera National Preserve: the Recreationist Perspective, committee chair

Peggy Allison (M.S. Geography 2010) (non thesis), committee member

Drew Ignizio (M.S. Geography 2010): Suitability Modeling and the Location of Utility Scale Solar Power Plants in the United States, committee member

Rick Carpenter (M.S. Geography 2009): Toward Development of a Regional Water Authority: the Buckman Direct Diversion Project Case Study, committee member

Sara Henchey Brosnan (M.S. Water Resources 2009): A Case Study of Shortage Sharing in the San Juan Basin, committee member

B.S./B.A. Honors Thesis Advisement

Brendon Isaiah Nixon (B.S. Geography): Comparison of Albuquerque School Districts’ curriculum with national standards.

Andy Loerch (B.S. Geography 2014): Differences in solar insolation caused by shade/objects creating shade Locations where the mixing of artificial and natural snow melt occurs, committee member

David Jacobs (B.S. Geography 2010): The Glass Graveyard, committee member

Chris Sylvan (B.S. Geography 2010: Geography of Confined Feeding Operations in New Mexico, committee member

Classroom Teaching

2008-9

- Fall, Geog 461/561, Environmental Management (19)
- Spring, Geog 499.05, Nature and Society (13)
- Spring, Geog 499.011/Law 593.011: Sem. in Natural Resource Management (8)

2009-10

- Fall, Geog 463/563, Public Lands (17)
- Fall, Geog 461/561, Environmental Management (20)
- Spring, Geog 599 (Thesis) (1)
- Spring, Geog 365, Nature and Society (30)
- Spring, Geog 514, Seminar in Natural Resource Management (16)
- Spring, Geog 599 (Thesis) (1)

2010-11

- Fall, Geog 463/563, Public Lands (16)
- Fall, Geog 461/561, Environmental Management (21)
- Spring—research semester

2011-12

- Fall, Geog 461/561, Environmental Management (19)
- Fall, Geog 365, Nature and Society (26)
- Spring, Geog 462/562, Water Resources Management (28)
- Spring, Geog 514, Seminar in Natural Resource Management (13)
- Spring WRP 598 (Professional Project) (1)

2012-13

- Fall, Geog 461/561, Environmental Management (19)
- Fall, Geog 365, Nature and Society (26)
- Fall, Internship (1)

Fall, Geog 599 (Thesis) (2)
Spring, Geog 463/563, Public Land Management (19)
Spring, Geog 514, Law and Geography Seminar (5)
Spring, Internship, (1)
Spring, Problems, (1)
Spring, Geog 599 (Thesis) (2)

2013-2014

Fall, Geog 462/562, Water Resources Management (30)
Fall, Geog 514/LAW 593, Seminar in Natural Resource Management (15)
Fall, Geog 491 (Problems) (1)
Fall Geog 599 (Thesis)(1)
Spring, Geog 365 (28)
Spring, Geog 463/563 (19)
Spring, Geog 491 (Problems)
Spring, Fall Geog 599 (Thesis)(1)

2014-2015

Fall, Geog 462/562, Water Resources Management (30)
Fall, Geog 514/LAW 593, Seminar in Natural Resource Management (9)
Fall, Geog 491 (Problems) (1)
Fall WRP 598 (Professional Project (1)
Spring--sabbatical

2015-2016

Fall, Geog 462/562, Water Resources Management (27)
Fall, Geog 514, Seminar in Natural Resource Management (10)
Fall WRP 598 (Professional Project (1)

Curriculum Development or Teaching Administrative Positions

Environmental Management, Fall 2008
Nature and Society, Spring 2009
Natural Resource Management Seminar, Spring, 2009
Public Land Management, Fall, 2009
Water Resources Management, Spring 2012
Law and Geography Seminar, Spring 2013

Service

Sesync

Editorships

Co-editor with Craig Allen and Ahjond Garmestani of the *Ecology and Society* Special Feature on "Law and Social-Ecological Resilience, Part I" (2013)
<http://www.ecologyandsociety.org/issues/view.php/feature/78>.

Reviewing books, journals reports

Book chapter for Prentice-Hall. (2009)

Ecology and Society (2011, 2012, 2013, 2014)

Journal of Environmental Management (2010)

Water Resources Research (2009, 2010)

Journal of Natural Resources Policy Research (2011)

Society and Natural Resources (2013)

Geoforum (2013)

Antipode (2013)

Environment and Planning A (2013) (2015)

Environmental Science & Policy (2014)

Annals of the Association of American Geographers (2014) (2015)

Ecological Applications (2015, 2015)

Review of Nie & Schultz, Decision-making Triggers, Decision-making Triggers in Adaptive Resource Management [DRAFT REPORT], at request of USDA Pacific Northwest Research Station, 2012

Reviewer of Luten and Cook Award paper competition, Association of American Geographer's Energy and Environment Specialty Group, 2013

Administrative work in Department College, University Committees

Associate Chair, University of New Mexico, Department of Geography and Environmental Studies, 2015-present

Personnel Committee Chair, University of New Mexico, Department of Geography and Environmental Studies, 2015-present

Member, Curriculum Committee, University of New Mexico, Department of Geography and Environmental Studies, 2015-present

Acting Co-chair, Curriculum Committee, University of New Mexico, Department of Geography and Environmental Studies, Spring 2015

Chair, Search Committee, Assistant Professor in GIScience, University of New Mexico,
Department of Geography and Environmental Studies, October 2015-present

Director, Undergraduate Studies, University of New Mexico, Department of Geography
and Environmental Studies, 2012-2014

Masters Assessment Team Member, Department of Geography, University of New
Mexico, September 2008-present

B.A. Assessment Team Member, Department of Geography, University of New Mexico,
September 2008-present

Member, Faculty Steering Committee, Water Resources Program, University of New
Mexico, 2009-present

Member, University of New Mexico Truman Scholarship Selection Committee, 2014-
present

Member, Search Committee, Water Resource Program Director, Water Resources
program, December 2012-Spring 2013

Member, Search Committee, University of New Mexico, Department of Geography,
Part-time Instructor, September 2012-Spring 2013

Member, Search Committee, University of New Mexico, Department of Geography,
Department Chair, 2008-10

External Communications Coordinator, Department of Geography, University of New
Mexico, September 2008-2012

Affiliated Faculty: UNM College of Law

Affiliated Faculty: UNM Water Resources Program

Affiliated Faculty: UNM Sustainability Studies

Community Service, Memberships, Affiliations, Bar Admission

Member, National Council of the Association of American Geographers Constitution
and Bylaws Committee, July 2010-2013

Member, Association of American Geographers, 2008-present

Member, Association of American Geographers Water Specialty Group, 2008-present

Member, Association of American Geographers Energy and Environment Specialty Group, 2008-present

Member, Law and Society Association, 2009-present

Member, Association for Environmental Studies and Sciences, 2009-present

Founding Member, Transdisciplinary Research Group, University of New Mexico, 2008-2010.

Admitted to Practice in Idaho and Wyoming, U.S. District Court of Idaho, U.S. District Court of Wyoming; U.S. Court of Appeals for the Ninth Circuit

Professional Development

Office of Support for Effective Teaching Workshop. Getting Students to Really Discuss. February 12, 2013

Community and Regional Planning 513. Qualitative Research Methods. University of New Mexico School of Architecture and Planning. Spring 2011

National Science Foundation. EPSCoR NSF Day in New Mexico. 17 March 2011

Office of Support for Effective Teaching Workshop. Designing Courses for Effective Student Learning, 20-21 May 2010

Workshop on Participatory Research sponsored by the Ortiz Center with guest lecturer Carl Wilmsen Ph.D. 20 November 2009

Office of Support for Effective Teaching New Faculty Discussion Group: “What the Best College Teachers Do.” Six-week discussion group hosted by the University of New Mexico Office of Support for Effective Teaching, Fall 2009

Faculty Institute. Geography Faculty Alliance Early Career Workshop, One-week residential workshop hosted by the Geography Faculty Development Alliance July 2008, Boulder Colorado

Guest Lectures

Lecture on Resilience and the End of Sustainability. Environmental Ethics, University of Calgary College of Law, September 2015.

Lecture on Legal Geography, Anthropology 240/550. Power and Culture in the Americas. April 2013

Lecture on Environmental Governance, Geography 364, April 2011, 2012, 2013

Lecture on Environmental Governance in CRP 580 Community Growth and Land Use Planning, April 2009, 2010, 2011

Lecture on Standing as an Environmental Requirement. Art and Ecology. February 2010

Service at Academic Conferences

Session chair and co-organizer. Law and Geography. Association of American Geographers Annual Meeting, San Francisco, California, 9 April 2015.

Session chair and organizer. Law's geographies. 2014 Joint Meeting of the Southwest and Great Plains-Rocky Mountain Divisions of the Association of American Geographers, Albuquerque, New Mexico, 24 October 2014.

Session chair and organizer. Academic Publishing Discussion Panel 2014 Joint Meeting of the Southwest and Great Plains-Rocky Mountain Divisions of the Association of American Geographers, Albuquerque, New Mexico, 24 October 2014.

Session chair and co-organizer. Bridging Practice and Theory with Legal Geography Sessions I, II and III. Association of American Geographers Annual Meeting, 9 April 2013, Los Angeles, California

Session chair, Law and Geography Roundtables I, II The Future of Law and Geography. Association of American Geographers Annual Meeting, 9 April 2013, Los Angeles, California

Session Co-organizer. Law's Geographies Annual Meeting of the Southwest Division Association of American Geographers. 25-27 October 2012, Las Cruces, New Mexico

Session Co-Organizer. Legal Geography and the Nomosphere, Power and Influence, sessions 1, 2 and 3. Annual Meeting of the Association of American Geographers, New York, New York. 24-28 February 2012

Session Co-Organizer. Governance, polycentricity, markets, and multilevel challenges. Resilience 2011: Resilience, Innovation and Sustainability: Navigating the Complexities of Global Change. Second International Science and Policy Conference, Arizona State University Tempe Arizona. 11-16 March 2011

Session Co-Organizer. "Law and Geography: Examining Intersections of Theory and Application within Legal Geography, Sessions 1, 2, and 3. American Association of Geographers Annual Conference Washington, D.C. 18 April 2010

Session Organizer. "Environmental Management Trends. Association of American Geographers Annual Meeting. Las Vegas, Nevada. 25 March 2009.

Ronda L. Brulotte
Curriculum Vitae
October 2016

Current Address:

Latin American & Iberian Institute MSC02-1690	Phone: (505) 277-7042
1 University of New Mexico	Fax: (505) 277-5989
Albuquerque, NM 87131-0001	Email: brulotte@unm.edu

Educational History:

2006	Ph.D. University of Texas at Austin, Austin, TX, Anthropology Dissertation supervisor: Richard R. Flores
1999	M.A. University of Texas at Austin, Austin, TX, Latin American Studies
1996	B.A. <i>magna cum laude</i> , University of Washington, Seattle, WA, Spanish and Latin American Studies

Employment History:

2016-	Associate Director for Academic Programs, Latin American and Iberian Institute, University of New Mexico, Albuquerque, NM
2015-	Associate Professor, Department of Anthropology, University of New Mexico, Albuquerque, NM
2009-2015	Assistant Professor, Department of Anthropology, University of New Mexico, Albuquerque, NM
2009-	Faculty Affiliate, Latin American and Iberian Institute, University of New Mexico, Albuquerque, NM
2007-2008	Lecturer III, Department of Anthropology, Anthropology, University of New Mexico, Albuquerque, NM
2007	Assistant Professor, Department of Anthropology, University of Oklahoma, Norman, OK

Temporary and Visiting Positions:

2015	Visiting Research Faculty, Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS), Oaxaca, Mexico
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2008	Co-Director of <i>Conexiones</i> Program in Michoacán, Mexico, Department of Spanish and Portuguese and University Honors Program, University of New Mexico, Albuquerque, NM
2005-2006	Program Specialist and Co-Editor of <i>la Tertulia</i> , Hulbert Center for Southwest Studies, Colorado College, Colorado Springs, CO
2005	Assistant Director, Summer Ethnographic Field School in Oaxaca, Mexico, Department of Anthropology, California State University, Long Beach, CA
2003-2004 & 1991-2001	Teaching Assistant, Department of Anthropology, University of Texas at Austin, Austin, TX

Professional Recognition, Honors, and Achievements:

2015-2020	Fulbright Specialist Roster Candidate, eligible for short-term international collaborations funded by the U.S. Department of State Bureau of Education and Cultural Affairs
2014	Outstanding Faculty Member Recognition, Accessibility Resource Center, University of New Mexico
2011	Dean’s Research Semester Award, University of New Mexico
2010	American Indian Student Services Outstanding Faculty Recognition, University of New Mexico
2010	Nominated for New Faculty Teacher of the Year, University of New Mexico
1998-1999	Friends of Latin American Studies Fellowship, Institute of Latin American Studies, University of Texas at Austin
1997-1998	Foreign Language and Area Studies (FLAS) Fellowship, Institute of Latin American Studies, University of Texas at Austin

Description of Research, Teaching, and Service Interests:

My research and teaching interests focus on tourism, critical heritage studies, materialism, and food systems. I frame my broader theoretical interests in commodities and consumption within the context of the historical development of Mexico as a site of global tourism. My first book, *Between Art and Artifact: Archaeological Replicas and Cultural Production in Oaxaca, Mexico* (University of Texas Press 2012), is an ethnographic account of the historically contentious relationship between local artisans and state-sponsored archaeology at the Monte Alban zone, a UNESCO World Heritage site and one of Oaxaca's most popular tourist attractions. Additionally, I have begun to research and write about heritage from the perspective of food studies. In 2014 I published *Edible Identities: Food as Cultural Heritage* (Ashgate Publishing), a co-edited volume that brings the lens of critical heritage studies to bear on a discussion of food and food-related practices. This book explores the ways in which the cultivation, preparation, and consumption of food is used to create identity claims of "cultural heritage" on local, regional, national, and international scales.

My latest research examines the sociologically complex field of production, marketing, and connoisseurship surrounding Oaxacan mezcal as it circulates in the global market. Mezcal is a distilled spirit made from agave, the same plant used to produce tequila. However, while tequila has enjoyed vast commercial success at home and abroad since the 1970s, until the late 1990s mezcal remained a regional drink, produced on a relatively small scale for local consumption and was virtually unknown outside of Mexico. Oaxacan mezcal is currently undergoing a dramatic transformation into an economically valuable prestige commodity destined for export to other regions of Mexico and around the world. I recently completed a Fulbright Scholar research fellowship in Mexico and am currently working on a book manuscript, under contract with the University of Texas Press.

I have taught a 100-level introduction to cultural anthropology (Cultures of the World), 300-level courses on material culture and indigenous Mexico, and a 200-level honors course on contemporary Mexican society. I advocate interdisciplinary approaches to teaching and developed the course "The Ethnography of Archaeology and Community" and later The Anthropology of Heritage, both of which I have co-taught with archaeology colleagues. At the graduate level, I have taught seminars on cultural theory and popular culture, post-WWII anthropological theory, and food and culture. I am currently developing a field school for undergraduate and graduate students in Oaxaca, Mexico.

In 2016 I was appointed as Associate Director for Academic Programs at Latin American and Iberian Institute; in this role I oversee the undergraduate and graduate programs in Latin American Studies at UNM in addition to chairing the Interdisciplinary Committee on Latin American Studies (ICLAS), the faculty governance body of the LAS program. I am on the editorial board for the *Journal of Anthropological Research* and am currently serving on the University of New Mexico Press faculty review committee. I am the President-elect for the Society for Latin American and Caribbean Anthropology and am the Communications Chair of the Anthropology of Tourism Interest Group, both organizations of the American Anthropological Association. In Mexico, I am a member of the executive board of the Welte Institute for Oaxacan Studies, a research center and library dedicated to scholarship on southern Mexico.

Scholarly Achievements:

Books Authored

Between Art and Artifact: Archaeological Replicas and Cultural Production in Oaxaca, Mexico. Austin: University of Texas Press, 2012.

Books Edited

Edible Identities: Food as Cultural Heritage, Ronda L. Brulotte and Michael Di Giovine, eds. Surrey, UK: Ashgate Publishing, 2014 (New York: Routledge, 2016).

Articles in Refereed Journals

“‘Yo soy nativo de aquí’: The Ambiguities of Race and Indigeneity in Oaxacan Craft Tourism,” *Journal of Latin American and Caribbean Anthropology* 14(2): 457-482, 2009.

“Oaxacan Woodcarving in Cyberspace: Virtual Tourism and the Crafting of Zapotec Tradition,” *Text, Practice, Performance* 2: 63-82, 2000.

Articles Appearing as Chapters in Edited Volumes

“Archaeological Replica Vendors and an Alternative History of a Mexican Heritage Site: The Case of Monte Albán.” In *World Heritage Sites and Tourism: Global and Local Relations*, Maria Gravari-Barbas, Laurent Bourdeau, and Mike Robinson, eds. New York: Routledge, 2017.

with Michael A. Di Giovine, “Introduction: Food and Foodways as Cultural Heritage.” In *Edible Identities: Exploring Food as Cultural Heritage*, Ronda L. Brulotte and Michael A. Di Giovine, eds., pp. 1-27. Surrey, UK: Ashgate Publishing, 2014.

with Alvin Starkman, “Caldo de Piedra and Claiming Pre-Hispanic Cuisine as Cultural Heritage.” In *Edible Identities: Exploring Food as Cultural Heritage*, Ronda L. Brulotte and Michael A. Di Giovine, eds., pp. 109-123. Surrey, UK: Ashgate Publishing, 2014.

Review Essays

“Collecting the Sacred, ‘Huichol Art and Culture: Balancing the World’ at the Museum of Indian Arts and Culture in Santa Fe, New Mexico,” *Anthropology Now* 2(3): 95-104, 2010.

Published Conference Proceedings

“Monte Albán as World Heritage: Archaeological Replicas and the Struggle over Mexico’s Ancient Past,” *World Heritage and Tourism: Managing for the Global and the Local*, pp. 264-273. Quebec City: University of Laval Press, 2011.

Book Reviews

Review of *Crafting Identity: Transnational Indian Arts and the Politics of Race in Central Mexico*, by Pavel Shlossberg, *Museum Anthropology Review* 10(1): 42-42, 2016.

Review of *¡Tequila! Distilling the Spirit of Mexico*, by Marie Sarita Gaytán, *Journal of Anthropological Research* 71 (2): 262-63, 2015.

Review of *Land, Livelihood, and Civility in Southern Mexico: Oaxaca Valley Communities in History*, by Scott Cook, *Journal of Anthropological Research* 71(1): 142-43, 2015.

Review of *We Are the Face of Oaxaca: Testimony and Social Movements*, by Lynn Stephen. *American Anthropologist* 117(1): 34-35, 2015.

Review of *A Return to Servitude: Maya Migration and the Tourist Trade in Cancún*, by M. Bianet Castellanos. *American Ethnologist* 39(1): 216-217, 2012.

Review [with Kristen Adler] of *Travelers to the Other World: A Maya View of North America*, by Romin Teratol and Antzelmo Péres. *Journal of Anthropological Research* 67(3): 461-462, 2011.

Review of *The World of Lucha Libre: Secrets, Revelations, and Mexican National Identity*, by Heather Levi, *Journal of Anthropological Research* 66(1): 133-134, 2009.

Review of *Made in Mexico: Zapotec Weavers and the Global Ethnic Art Market*, by W. Warner Wood, *Museum Anthropology* 32(2): 159-160, 2009.

Review of *Shane, the Long Ethnographer: A Beginner's Guide to Ethnography*, by Sally Campbell, *Journal of Anthropological Research* 64(4): 570-572, 2008.

Review of *Mayan People Within and Beyond Boundaries: Social Categories and Lived Identity in Yucatán*, by Peter Hervik, *Cultural Analysis* 6: R1-R3, 2007.

Review of *The Devil's Book of Culture: History, Mushrooms, and Caves in Southern Mexico*, by Benjamin Feinberg, *The Americas* 62(4): 662-663, 2006.

Works in Progress:

Books

Oaxacan Mezcal and the Making of an Indigenous Global Commodity, under contract with the University of Texas Press.

Articles

“Can Mezcal Save a Village? Rethinking Migration in Southern Mexico,” article in preparation for submission to *Human Organization*.

“Mezcal, Gastronomy and the New Face of Oaxacan Tourism,” article in preparation for submission to *Journal of Gastronomy and Tourism*.

Invited or Refereed Abstracts and Presentations at Professional Meetings:

“Tourists, ‘Maestros Mezcaleros,’ and Discovering the Authentic Palenque,” paper accepted for presentation at the Annual Meeting of the American Anthropological Association, Minneapolis, MN, November 2016.

“Turning Mezcal into Mexican Heritage through Transnational Circulation,” paper presented at the Meeting of the Latin American Studies Association, New York, NY, May 2016.

“Caldo de Piedra and the Marketing of Indigenous Cuisine as Cultural Heritage,” invited presentation at the Congreso Internacional Patrimonios alimentarios: Consensos y tensiones, Universidad Nacional Autónoma de México (UNAM), Mexico City, Mexico, November 2015.

“Technological Taxonomies and the Evolving Aesthetics of Oaxacan Mezcal,” paper presented at the Annual Meeting of the American Anthropological Association, Denver, CO, 2015.

“*La Ruta de Mezcal*: Developing a Rural Oaxacan Commodity for Tourism,” paper presented at the Society for Latin American and Caribbean Anthropology Fifth Meeting, Oaxaca, Mexico, March 2015.

“Technological Differentiation and Value Creation in Oaxacan Mezcal Production,” paper presented at the Annual Meeting of the American Anthropological Association, Washington, D.C, December 2014.

“New Directions in the Museum and the Marketplace,” invited roundtable session for the Annual Meeting of the American Folklore Association, Santa Fe, NM, November 2014.

“Caldo de Piedra and the Paradoxes of Claiming Pre-Hispanic Cuisine as Cultural Heritage,” paper presented at the Annual Meeting of the American Anthropological Association, Chicago, IL, November 2013.

“Oaxacan Mezcal and the Making of a Transnational Prestige Comestible,” paper presented at the Annual Meeting of the Rocky Mountain Council for Latin American Studies, Santa Fe, NM, April 2013.

"Oaxacan Mezcal and the Making of a Transnational Prestige Comestible," paper presented at the Annual Meeting of the American Anthropological Association, San Francisco, CA, November 2012.

"Affective Border Crossing: Mexican Migration as Tourist Spectacle," paper presented at the Annual Meeting of the Rocky Mountain Council for Latin American Studies, Santa Fe, NM, April 2011.

"Vicarious Border Crossings: Staging Undocumented Mexican Migration for Tourism," paper presented at the Annual Meeting of the American Anthropological Association, New Orleans, LA, November 2010.

"Monte Alban as World Heritage: Power and the Production of Mexico's Ancient Past," paper presented at the International World Heritage and Tourism Conference, Quebec City, Canada, May 2010.

"Chapulines, Gusanitos, and Cuitlacoche: The Politics of Extreme Eating in Mexico," paper presented at the Annual Meeting of the Society for Applied Anthropology and Society for Latin American and Caribbean Anthropology, Santa Fe, NM, March 2009.

"Visual Regimes of Exclusion and Oaxacan Archeological Heritage," poster presented at the Annual Meeting of the American Anthropological Association, Washington, D.C., November 2007.

"From Mexico's Heart: Oaxacan Cookbooks and the Representation of a Regional Ethnic Cuisine," paper presented at the Annual Meeting of the Southwest/Texas Popular Culture Association, Albuquerque, NM, February 2007.

"Why Fakes Matter: Rethinking Material Culture at Monte Alban," paper presented at the Annual Meeting of the American Anthropological Association, Washington, D.C., November 2005.

"Consuming the Land of Seven *Moles*: Discursive Authority and Authenticity in Oaxacan Cookbook Writing," paper presented at the Annual Meeting of the American Folklore Society, Atlanta, GA, October 2005.

"Competing Visions for the Utilization of an Oaxacan Archeological Site: The Case of Replica Vendors at Monte Alban," paper presented at the Annual Meeting of the Society for Applied Anthropology, Santa Fe, NM, April 2005.

"Replicating Authenticity, Authenticating Replicas: A Case Study of Pre-Hispanic Replica Vending at Monte Albán," paper presented at the Meeting of the Latin American Studies Association, Las Vegas, NV, 2004.

“Of Alebrijes and *Idolos*: Ambivalent Discourses of an Oaxacan Artisan Community,” paper presented at the Annual Meeting of the American Anthropological Association, Chicago, IL, November 2003.

“Selling Oaxaca’s Past: Pre-Hispanic Replica Vendors at Monte Albán,” paper presented at the Annual Meeting of the American Folklore Society, Albuquerque, NM, October 2003.

“Online Encounters with the ‘Authentic’ and the ‘Traditional’: Marketing Oaxacan Folk Crafts in Cyberspace,” paper presented at the Annual Meeting of the Society for Applied Anthropology, Merida, Yucatan, Mexico, March 2001.

“Virtual Tourism and the Creation of the Oaxacan Cyber-‘folk’,” paper presented at the Annual Meeting of the American Folklore Society, Columbus, OH, October 2000.

“www.alebrijes.com: The Commodification of Oaxacan Woodcarving in Cyberspace,” paper presented at the XX Annual Student Conference on Latin America, University of Texas at Austin, Austin, TX, February 2000.

Sessions Organized or Chaired at Professional Meetings:

“The Transnational Politics of Food Heritage in Bolivia and Mexico,” session organizer and chair, Meeting of the Latin American Studies Association, New York, NY, May 2016.

“Social Transformations and Technological Change: Contemporary Experiences in Oaxaca and Yucatan, Mexico,” organized session, Annual Meeting of the American Anthropological Association, Washington, D.C., December 2014.

“Edible Identities: Exploring Food and Foodways as Cultural Heritage,” organized and chaired invited session, Annual Meeting of the American Anthropological Association, Chicago, IL, November 2013.

“High Tidemarks in Asia-Pacific: The Politics and Voices of Constructing Heritage,” discussant for invited session, Annual Meeting of the American Anthropological Association, Montreal, Canada, November 2011.

“Cosmopolitan Imaginaries: (De)Constructing Zones of Encounter,” session chair, Annual Meeting of the American Anthropological Association, New Orleans, LA, November 2010.

“Dollars Make Sense: Tourism in Response to Economic Crisis in Rural Mexico,” session organizer, Meeting of the Latin American Studies Association, Toronto, Canada, October 2010.

“Cultural Representations of Oaxaca: Discourses of Identity, Discourses of Containment,” session organizer, Annual Meeting of the American Anthropological Association, Chicago, IL, November 2003.

Invited Lectures and Other Presentations:

"Oaxacan Cuisine and Oaxacan Mezcal in the Global Market," invited lecture, Albuquerque International Association, Albuquerque, NM May 2016.

"Oaxacan Mezcal in the Global Market," invited lecture, Central New Mexico Community College, Albuquerque, NM, September 2015.

"Oaxacan Mezcal and the Making of an Global Indigenous Commodity," invited lecture, Department of Anthropology, Miami University, Oxford, OH, October 2014.

"Small-Scale Economies and Mezcal Production in Southern Mexico," invited class lecture for "Mexican Economy and Markets," Anderson School of Management, University of New Mexico, Albuquerque, NM, May 2014.

"Oaxacan Mezcal and the Making of a Transnational Prestige Commodity," invited lecture, Center for Latin American Studies, San Diego State University, San Diego, CA, November 2013.

"Oaxacan Mezcal and the Making of a Transnational Prestige Commodity," invited lecture, Department of Engineering, University of New Mexico, Albuquerque, NM, November 2013.

"Oaxacan Mezcal and the Making of a Transnational Prestige Commodity," invited lecture, Latin American and Iberian Institute, University of New Mexico, Albuquerque, NM, October 2013.

"Between and Artifact: Archaeological Replicas and Cultural Production in Oaxaca, Mexico," colloquium presentation, School for Advanced Research, Santa Fe, NM, February 2013.

"Between and Artifact: Archaeological Replicas and Cultural Production in Oaxaca, Mexico," invited lecture and book signing, University of New Mexico Bookstore, Albuquerque, NM, October 2012.

"Archaeological Replica Vendors and an Alternative History of a Mexican Heritage Site: The Case of Monte Albán," invited lecture, University of Arizona Oaxaca Summer Institute, Oaxaca, Mexico, June 2011.

"Replicating Authenticity, Authenticating Replicas: Archaeological Crafts, Woodcarvings, and the Contradictions of Oaxacan Cultural Tourism," invited lecture, Department of Anthropology, SUNY Albany, Albany, NY, April 2010.

"Art, Artifact and Authenticity: Woodcarving and Archeological Replicas in Oaxaca, Mexico," colloquium presentation, School for Advanced Research, Santa Fe, NM, November 2008.

"Art, Artifact and Authenticity: Woodcarving and Archeological Replicas in Oaxaca, Mexico," invited lecture, Hulbert Center for Southwest Studies Aficionados Luncheon, Colorado

College, Colorado Springs, CO, November 2007.

“Narratives of Idols and Alebrijes in Oaxaca, Mexico,” invited lecture, Department of Anthropology, Colorado College, Colorado Springs, CO, April 2006.

“Memoryscapes: An Exhibition of Memory, Trauma and Tourism,” participant in a multi-media exhibit and presentation, Department of Anthropology, University of Texas at Austin, Austin, TX, May 2001.

“Reconceptualizing Mexican Folk Art,” invited lecture, Austin International Festival, Austin, TX, March 2000.

“Public Archeology at Varner-Hogg Plantation Park,” site development plan presented to the Texas Parks and Wildlife Department, Austin, TX, May 2000.

Research Funding:

“Documenting the Changing Culture of Sotol in Chihuahua, Mexico,” Faculty Research Grant, 2015, Latin American and Iberian Institute, University of New Mexico, \$840

“Oaxacan Mezcal and the Making of a Transnational Prestige Commodity,” Fulbright Scholar Program Faculty Research Award, 2014-15, U.S. Department of State Bureau of Educational and Cultural Affairs and COMEXUS (Mexico), \$22,000

“Oaxacan Mezcal and the Making of a Transnational Prestige Commodity,” Research Allocations Committee, Small Grant, 2013, University of New Mexico, \$4,564

“An Ethnographic Study of Oaxacan Mezcal Production, Marketing, and Distribution,” Faculty Research Grant, 2012, Latin American and Iberian Institute, University of New Mexico, \$1,300

“Staging Undocumented Mexican Migration for Tourism: A Pilot Study of the Parque EcoAlberto in Hidalgo, Mexico,” Faculty Research Grant, 2009, Latin American and Iberian Institute, University of New Mexico, \$2,018

Faculty Enrichment Grant, 2007, University of Oklahoma, \$2,000

Presidential Travel Fellowship, 2007, University of Oklahoma, \$500 towards airfare to Mexico

Professional Development Award, 2006, University of Texas at Austin, \$200

David J. Bruton Fellowship, 2004, University of Texas at Austin, \$2,000

Professional Development Award, 2004, University of Texas at Austin, \$100

“Crafting Oaxaca: Woodcarvers, Tourists, and the Aesthetics of Zapotec Identity,” Fulbright-Hays Doctoral Dissertation Research Fellowship, 2002-2003, U.S. Department of State Bureau of Educational and Cultural Affairs and COMEXUS (Mexico), \$26,500

David J. Bruton Fellowship, 2002, University of Texas at Austin, \$2,000

International Education Fee Scholarship, 2002, University of Texas at Austin, \$500

Tinker Foundation Research Grant, 2000, Institute of Latin American Studies, University of Texas at Austin, \$2,000

Liberal Arts Graduate Research Fellowship, 2000, University of Texas at Austin, \$1,500

Summer Research Fellowship, 2000, Américo Paredes Center for Cultural Studies, University of Texas at Austin, \$1,000

International Education Fee Scholarship, 2000, University of Texas at Austin, \$500

Professional Development Award, 2000, University of Texas at Austin, \$100

Other Funding:

Funds to develop field school in Oaxaca, Mexico, 2016, Latin American and Iberian Institute, University of New Mexico, \$2500

Funds to develop field school in Oaxaca, Mexico, 2015, Study Abroad Allocations Committee, University of New Mexico, \$3000

New Course Development Award, 2012, Latin American and Iberian Institute, University of New Mexico. New course: ANTH 340/540 “Indigenous Mexico”

Conference travel, 2011 Latin American and Iberian Institute, University of New Mexico, \$80

Conference travel, 2010, Latin American and Iberian Institute, University of New Mexico, \$158

Travel and honorarium for Dr. John Hartigan for presentation co-sponsored by Latin American and Iberian Institute, Anthropology, and American Studies
Latin American and Iberian Institute, 2010, University of New Mexico, \$500

Travel from Mexico for artisan Catarino Carrillo to participate in the Maxwell Museum of Anthropology “Artisans of the World” series, 2008, Latin American and Iberian Institute, University of New Mexico, \$300

Teaching:

**Doctoral Advisement:
Chair of Committee**

Jennifer Cardinal (Ethnology), degree expected 2017
Topic: Expatriate communities and tourism development on Mexico's Pacific coast

Katie Hoepfner (Ethnology), degree expected 2019
Topic: Tourism, surveillance and governmentality in Mexico

Ruth Jolie (Ethnology), Ph.D. 2010, co-chair of committee with Dr. Louise Lamphere
Dissertation: "We're Parents Too!" Changes in Father Involvement in Domestic Labor
Among Urban Middle Class Dual-worker Couples"

Kelley Sawyer (Ethnology), degree expected 2017, co-chair of committee with Louise
Lamphere and Amy Brandzel
Topic: LGBTQ tourism and urban development in Philadelphia, PA

Daniel Shattuck (Ethnology), degree expected 2018, co-chair of committee with Lindsay
Smith
Topic: Heritage food production in Italy

Committee Member

Jara Carrington (Ethnology), Ph.D. 2016
Dissertation: "Ambivalent Subjects in Neoliberal Times: Non-Governmental Organizations
and Binational Same Sex Couples in the United States"

Caitlin Davis (Ethnology), degree expected 2018
Topic: The politics of conservation practices and heritage in Palestine

Siegrid Guillaumon (School of Administration, Universidade Federal de Bahia, Brazil), Ph.D.
2011, faculty supervisor for inter-institutional doctoral program at UNM
Dissertation: "Gestão do turismo em territórios de grande densidade religiosa: o caso do
Novo México"

Erin Hegberg (Archaeology), degree expected 2017
Topic: Historicizing ethnic boundary formation in the Southwest through ceramic analysis

Shirley Heying (Ethnology), Ph.D. 2012
Dissertation: "Finding Hope: Guatemalan War Orphans' Responses to the Long-term
Consequences of Genocide"

Erin Hudson (Archaeology), degree expected 2016

Topic: NAGPRA implementation

Rosemary Sallee (American Studies), Ph.D. 2016

Dissertation: "Femmage and the DIY Movement: Feminism, Crafty Women, and the Politics of Gender Performance"

**Masters Advisement:
Chair of Committee**

Amie Belmont (Latin American Studies), M.A. 2016

M.A. Exam Chair

Vanessa Cornwall (Latin American Studies), M.A. 2015

M.A. Exam Chair

Mare Svare (Ethnology), M.A. 2015

Thesis: "Speaking in Circles: Interpretation and Visitor Experience at Chaco Culture National Historic Park"

Ashley Valenzuela-Ruesgen (Latin American Studies), M.A. 2014

M.A. Exam Chair

Committee Member

Ilse Biel (Ethnology), M.A. 2012

Thesis: "Zapatista Materiality Disseminated: A Co-Construction Reconsidered"

Kevin Brown (Public Archaeology), M.A. 2011

M.A. Program Portfolio

Katherine Councilor (American Studies), M.A. 2009

Topic: Historic cookbooks and the making of New Mexican culture

Ileana Gómez (Theater and Dance), M.F.A 2010

M.F.A. Thesis: "La Nueva Escuela De La Danza Flamenca: Postmodern Shifts in Flamenco Dance"

Lillian Greenawald (Public Archaeology), M.A. 2011

M.A. Program Portfolio

Stacie Hecht (Ethnology), M.A. 2014

Thesis: "Afro-Colombians and the Encroachment of Paramilitaries on the African Palm Oil Sector"

Meghan O'Leary (Ethnology), M.A. 2012

M.A. Report: Senior centers and Latino immigrant participation

Geneva Smith (Ethnology), M.A. 2013

Thesis: "'Soy Gaucho': Nationalism and Modernity in Argentina"

Deborah Sposito (Latin American Studies), M.A. 2014

M.A. Exam Committee Member

Ivan Weber (American Studies), M.A. 2011

Thesis: "Miniature Nation Building: Model Railroading and the Dialectics of Scale in Post-WWII America"

Bachelor's Honors Advisement:

Raoul Paisner (Ethnology), honors paper

Topic: Socioeconomic impacts of the Gulf oil spill in Louisiana

Other Advisement:

Giselle Chang Vargas (Department of Anthropology, Universidad de Costa Rica), 2011, faculty supervisor while student was at UNM doing doctoral dissertation research

Amanda McEwen (Ethnology), McNair Faculty Mentor, 2009-2011

Dr. Jessica Metcalfe, UNM Postdoctoral Diversity Fellow, faculty mentor, 2010-2011

Daniel Shattuck (Ethnology), faculty mentor, 2009-2011

Meghan O'Leary (Ethnology), faculty mentor, 2010-2012

Ashley Sherry (Ethnology), faculty mentor, 2009-2011

Maren Svare (Ethnology), faculty mentor, 2012-2014

Katie Hoepfner (Ethnology), faculty mentor, 2013-2014

Cassandra Smith (Ethnology), faculty mentor, 2014-2016

Classroom Teaching:

University of New Mexico

Fall 2016

Graduate Proseminar in Latin American Studies, LTAM 510, 8 students

Fall 2015-Spring 2016

Sabbatical leave

Spring 2015

Research leave, Fulbright Fellowship, Mexico

Fall 2014

Culture of the World, ANTH 130 (Freshman Learning Community course taught in conjunction with Peace Studies 102), 22 students

Anthropology of Heritage, ANTH 381/570, 19 students

Spring 2014

Cultures of the World, ANTH 130, 100 students

Food, Culture, and Society, ANTH 530, 11 students

Fall 2013

Cultures of the World, ANTH 130, 75 students

Material Culture, ANTH 340, 27 students

Spring 2013

Indigenous Mexico, ANTH 340, 40 students

Theory in Ethnology II, ANTH 547, 10 students

Fall 2012

Cultures of the World, ANTH 130, 76 students

Anthropology of Heritage, ANTH 381/581, 420/561, 27 students

Spring 2012

Theory in Ethnology II, 5 students

Cultures of the World, ANTH 130, 99 students

Fall 2011

Junior research leave

Spring 2011

Cultures of the World, ANTH 130, 100 students

Theory Ethnology II, ANTH 547, 5 students

Fall 2010

Cultures of the World, ANTH 130, 100 students

Anthropology of Heritage, ANTH 340/420/540, 14 undergraduate students, 8 graduate students

Spring 2010

Cultural Theory and Popular Culture, ANTH 530/AMST 540, 16 students

One course teaching release

Fall 2009
Cultures of the World, ANTH 130, 100 students
Material Culture, ANTH 340, 30 students

Spring 2009
Cultures of the World, ANTH 130, 80 students
Ethnography of Archaeology and Community, ANTH 340/420, 25 students

Fall 2008
Cultures of the World (ANTH 130), two sections, 110 students total

Spring 2008
Mexico: Culture and Society, UHON 222, 16 students
Material Culture, ANTH 340, 30 students

Fall 2007
Cultures of the World, ANTH 130, 2 sections, 110 students total

University of Oklahoma

Spring 2007
Peoples of the World, ANTH 2203, 80 students
Material Culture, ANTH 4163, 25 students

University of Texas at Austin

Spring 2004
American Public Culture, ANTH 325, 2 sections, 50 students total

Fall 2001
Language, Culture and Communication, ANTH 320, 80 students

Spring 2001
Cultural Anthropology, ANTH 302, 2 sections, 60 students total

Fall 2000
Cultural Anthropology, ANTH 302, 2 sections, 60 students total

Spring 1999
Language, Culture and Society in Latin America, ANTH 320, 30 students

Other Teaching and Curriculum Development:

2015-16
Program and curriculum development for “Art, Culture and Indigenous Language in Oaxaca,” a field school in Oaxaca, Mexico (to be offered Spring 2018)

2008
Revised and developed new program curriculum for *Conexiones* Language and Culture Study Program in Michoacán, Mexico

2003
Developed and implemented an English as a Second Language after school program for grades 4-6, Arrazola, Oaxaca (Mexico)

2002
Substitute teacher, K-12, Española Valley Public Schools, Española, New Mexico

Service:

Reviewing for Journals and Presses

- | | |
|------|--|
| 2015 | 1 Article for <i>Agriculture and Human Values</i> , 2 Articles for <i>Journal of Latin American and Caribbean Anthropology</i> |
| 2014 | 1 Article for <i>Ethnos: Journal of Anthropology</i> , 1 article for <i>American Anthropologist</i> , 1 article for <i>Journal of Latin American and Caribbean Anthropology</i> , 1 book manuscript proposal for Bloomsbury Publishing |
| 2013 | 1 article for <i>Collaborative Anthropologies</i> , 1 article for <i>Journal of Latin American and Caribbean Anthropology</i> , 1 article for <i>Ethnos: Journal of Anthropology</i> , 1 article for <i>American Anthropologist</i> , 1 article for <i>Digest: A Journal of Foodways & Culture</i> |
| 2012 | 1 article for <i>Journal of Anthropological Research</i> , 1 article for <i>Journal of Latin American and Caribbean Anthropology</i> |
| 2011 | 1 article for <i>Research in Economic Anthropology</i> , 1 article for <i>Journal of Anthropological Research</i> |
| 2010 | 1 article for <i>Journal of Anthropological Research</i> , 1 article for <i>Journal of Latin American and Caribbean Anthropology</i> |
| 2009 | 1 textbook review for W.W. Norton, 1 article for <i>Museum Anthropology</i> , 1 article for <i>Journal of Latin American and Caribbean Anthropology</i> , 1 article for <i>Journal of Anthropological Research</i> |
| 2008 | 1 article for <i>Urban Anthropology</i> , 1 article for <i>Journal of Anthropological Research</i> |

Grant and Paper Prize Committees

2015	Christine Wilson Award and the Thomas Marchione Award, judge for the Society for the Anthropology of Food and Nutrition
2014 & 2015	Roseberry-Nash Student Graduate Paper Contest, judge for the Society for Latin American and Caribbean Anthropology
2014	American Fellows Program Reviewer, Hans Arhnold Center, The American Academy in Berlin, Germany
2014	Mellon International Dissertation Research Fellowship Reviewer, Social Science Research Council
2010	Resident Scholar Review Panel, School for Advanced Research, Santa Fe, NM

Individual Grants Reviewed

2016	Reviewed graduate student grant for Polish-U.S. Fulbright Commission
2010	Reviewed faculty grant for National Science Foundation
2009	Reviewed graduate student grant for National Science Foundation
2008	Reviewed faculty grant for National Science Foundation

Editorships and Editorial Boards

2015-	Member, Editorial Board, <i>Journal of Anthropological Research</i>
2011-2014	Contributing Editor, Society for Latin American and Caribbean Anthropology, <i>Anthropology News</i>
2009-2014	Book review editor, <i>Journal of Anthropological Research</i>
1999-2001	Member, Editorial Board, Text, Practice, Performance, University of Texas at Austin

Advisory Boards

2016-	President-Elect, Society for Latin American and Caribbean Anthropology, American Anthropological Association
2016-	Chair, Interdisciplinary Committee on Latin American Studies, Latin American and Iberian Institute, University of New Mexico
2016-	Member, Executive Committee, Latin American and Iberian Institute, University of New Mexico

- 2016- Member, Grants and Awards Committee, Latin American and Iberian Institute, University of New Mexico
- 2016 Member, Study Abroad Allocations Committee, University of New Mexico
- 2016- Member, Health and Safety Advisory Committee, University of New Mexico
- 2015- Assistant Treasurer and Board Member, Instituto Welte para Estudios Oaxaqueños/Welte Institute for Oaxacan Studies, Oaxaca, Mexico
- 2015-2017 Communications Chair, Anthropology of Tourism Interest Group, American Anthropological Association
- 2011-2017 University of New Mexico Press Review Committee
- 2011-2014 Councilor, Society for Latin American and Caribbean Anthropology, American Anthropological Association

University Service

- 2014 Search Committee Member, Director of Peace Studies Program
- 2014 Search Committee Member, Curator of Ethnology Position, Maxwell Museum of Anthropology
- 2012 Search Committee Member, Curator of Exhibits Position, Maxwell Museum of Anthropology
- 2011-2016 Maxwell Museum of Anthropology Exhibit Selection and Review Committee
- 2009-2011 Faculty Mentor, Ronald E. McNair Scholars Program
- 2009-2011 National Endowment for the Humanities, Humanities Institute Initiative Planning Committee
- 2008 Program Co-Organizer, Oaxaca Life and Art (Artisans of the World Series), Maxwell Museum of Anthropology
- 2008 Peace Fair Organizing Committee

Departmental Service

- 2009-2014 Co-Chair, Ethnology Graduate Admissions Committee

2010-2011	Instructional Resources and Space Committee
2010	Presentation Reviewer, 14 th Annual Graduate Research Symposium (AGSU)
2009-2010	Chair, Ethnology Graduate Comprehensive Exams
2009-2011	Faculty Adviser, Undergraduate Anthropology Society
2009	Chair, Instructional Resources Committee
2007-2011	Co-Chair, Anthropology Colloquia Series Committee
Other Professional Service	
2004-2005	Volunteer Collections Assistant, Taylor Museum, Colorado Springs, CO
2002	Volunteer Curator Assistant, Museum of International Folk Art, Santa Fe, NM
2000-2001	Cultural Exhibits Coordinator, Austin International Children's Festival, Austin, TX
1998	Intern, Sociedad Mexicana Pro-Derechos de la Mujer, evaluator for women's microfinance programs, Mexico, D.F.

John Newman Carr
Department of Geography and Environmental Studies
University of New Mexico

Educational History

Ph.D. 2007, University of Washington, Seattle, Washington
Geography Department
Dissertation: The Political Grind – The Role of Youthful Identities in the Municipal
Politics of Public Space
Advisor: Steve Herbert

J.D. 1993, University of Texas School of Law, Austin, Texas

B.A., 1990 Trinity University, San Antonio, Texas
Cum Laude
Major: Philosophy, Minors in History, Art, and Art History

Employment History – Principal Positions

Associate Professor, July 2015 to Present
University of New Mexico – Department of Geography and Environmental Studies

Assistant Professor, August 2009 to June 2015
University of New Mexico – Department of Geography and Environmental Studies

Visiting Professor, January 2008 to May 2009
University of New Mexico – Department of Communication and Journalism

Predoctoral Lecturer, March 2005 to June 2007
*University of Washington – Department of Geography / Law Society & Justice
Program*

Lead Teaching Assistant, March 2006- June 2006
University of Washington Department of Geography

Teaching Assistant, September 2003-March 2005
University of Washington

Litigation Associate, January 2003 – September 2003
Oles Morrison Rinker & Baker, Seattle, Washington

Legal Partner, October 1996 – December 2002
Law Office of John Newman Carr, Albuquerque, New Mexico

Litigation Associate, February 1994 – October 1996
Browning & Peifer, P.A., Albuquerque, New Mexico

Full-Time Contract Attorney, May 1993 – February 1994
Freedman, Boyd, Daniels, Peifer, Hollander, Guttman & Goldberg, Albuquerque, New Mexico

Law Clerk, Winter 1991-1992, Sumer 1992
Freedman, Boyd, Daniels, Peifer, Hollander, Guttman & Goldberg, Albuquerque, New Mexico

Law Clerk, Sumer 1991
I.R.S. District Counsel, Phoenix, Arizona

Research Assistant, Summer 1991
University of Texas School of Law, Austin, Texas

Employment History – Concurrent Positions

Instructor, July 2015-August 2015
John Cabot University, Rome, Italy

Instructor, November 2001-February 2002
University of Colorado Denver/International College of Beijing, Beijing, China

Professional Recognition, Honors, etc.

2016 Visiting Erskine Fellowship, University of Canterbury, Christchurch New Zealand. Visiting teaching and scholar position. February – April 2016.

2013 New Teacher of the Year, University of New Mexico OSET, one of two University-wide teaching awards for pre-tenure Faculty

Fellow of the CMM Institute for Personal and Social Evolution, \$2500 research support award, 2012, Fielding Graduate University and Villanova University

Nominee, Outstanding New Teacher of the Year, 2010-2011, 2011-2012 University of New Mexico

Best Teacher Award. 2008-2009, Communication Graduate Students, University of New Mexico

Arch C. Gerlach Dissertation Completion Grant, 2007-2008, University of Washington

Geography Department Nominee for Dissertation Fellowship Competition in the Humanities, Social Sciences & Social Professions, 2007, University of Washington

Outstanding Geography Teaching Assistant Award, 2005-2006, University of Washington

Law, Societies, and Justice Department Nominee for university-wide 2006 Excellence in Teaching Award. University of Washington

Geography Department Nominee for University of Washington Graduate School Medal recognizing students combining scholarship and social awareness, 2006

Board of Advocates, University of Texas Law School honorary society. 1991-1993

Short Narrative Description of Research, Teaching and Service

Research and Scholarship: While my research has involved topics as diverse as urban planning, the workings of online microcredit philanthropy, and locational data privacy, my scholarship is united by a fundamental curiosity about the spaces for, and barriers to transforming society to be more fair and just. This line of inquiry has led me to look at a variety of urban geographies, legal geographies, online geographies, and the intersections of the three. In the process, I have endeavored to bridge the divide between critical theoretical perspectives, and more pragmatic, applied approaches in hopes of opening up directions for practice that are informed by critical insights. My professional goals for the future center on exploring ways that critical geographic approaches to the law may be practically used to create spaces for community empowerment and engagement.

I currently have ten articles published or accepted for publication in peer reviewed academic journals, including top tier journals such as *Environment and Planning: A* and *Urban Geography*, with an additional article to be revised pursuant to a revise and resubmit, and several others in various stages of development. I have three book chapters in publication, and one published academic encyclopedia entry. I have also organized a “Symposium” special edition of *The Journal of Geography in Higher Education* around the theme of geolocational privacy and ethics. I have actively presented my research in professional forums, with nineteen presentations since becoming affiliated with UNM in 2008.

I am also bringing my work as an urban geographer to a broader audience as a public scholar. This is most apparent with my work with The Living Cities initiative, an interdisciplinary planning think-tank funded and supported by 22 of the world’s largest philanthropic foundations. After an invited presentation of my work on the future of cities in the U.S. southwest, the Living Cities project invited me to join its “roundtable” on entrepreneurship and development.

Teaching: As reflected by my 2013 New Teacher of the Year award, I have consistently received very strong student and peer evaluations, all while developing four new courses during my time as Assistant Professor. My summary IDEA scores range from 4.4 to 4.9 (out of 5), with an average of about 4.7. Moreover, my IDEA B scores (overall teaching) range from 4.8 to 5.0 (out of 5). My teaching includes my department’s “Introduction to Human Geography,” a 120 student, 100 level class that I teach without the aid of a teaching assistant, to the department’s introductory graduate seminar on “Geographic Theory and Method.” I also regularly teach graduate and undergraduate courses on Urban Geography and Legal Geography.

Service: My service reflects a personal commitment to advance my department by creating stronger connections between Geography, the student body, other departments and programs, and the discipline as a whole. I am spearheading the

development of an interdisciplinary concentration in “Law, Environment and Geography,” and have created a new, one-year graduate certificate program in Law, Environment, and Geography, as well as a new undergraduate minor program in Law, Environment and Geography. I have served as the program development coordinator for an Economics/Geography undergrad/graduate “shared credit” degree program. I am currently serving as the Director of the Graduate Program for Geography

Scholarly Achievements

Scholarly Monographs

None

Articles in Refereed Journals

Carr, J., Dickinson, E. A., McKinnon, S., & Chávez, K. (In Press – April 2016). Kiva's Flat, Flat World: The Placelessness of Microcredit in Cyberspace . *Globalizations* 13(2), _____(available online at <http://www.tandfonline.com/doi/full/10.1080/14747731.2015.1062603>).

Carr, J. (2014 - November), Introduction: Towards a Methodology for Teaching the Ethics of Geocoded Data Privacy, *Journal of Geography in Higher Education*. 38(4), 441-443.

Carr, J., Vallor S., Freundsuh S., Gannon, W., Zandbergen, P. (2014 - November), Hitting the moving target: the challenges of creating a dynamic curriculum addressing the ethical dimensions of geospatial data, *Journal of Geography in Higher Education*. 38(4), 444-454.

McKinnon, S., Dickinson, E. A., Carr, J., & Chávez, K. (2013- October). Kiva.org, Person-to Person Lending, and the Conditions of Intercultural Contact. *Howard Journal of Communication*. 24(4), 327-347 (Top Article).

Carr, J. (2012- March). Public Input/Elite Privilege: The use of participatory planning to reinforce urban geographies of power in Seattle. *Urban Geography*, 33(3). 420-441.

Carr, J. (2012 - February). Activist Research and City Politics: Ethical lessons from youth-based public scholarship. *Action Research Journal*. 10(1), 61-78.

Carr, J. (2012 - July). No Laughing Matter: Using the Internet to challenge gatekeepers' role in maintaining media hegemony. *International Journal of Communication*. 6, 2825–2845

Carr, J. (2010 - October). Skating Around The Edges Of The Law: Urban Skateboarding And The Role Of Law In Determining Young Peoples' Place In The City. *Urban Geography*. 31 (7), 988-1003 (Legal Geographies series).

Carr, J., Herbert, S.K., & Brown, E. (2009 - June). Inclusion under the law, exclusion from the city: The regulation of bodies and places in Seattle. *Environment & Planning: A*. 41(8), 1962 -1978.

Howard, P.N., Carr, J., & Milstein, T. (2005 - March). Digital technology and the market for political surveillance. *Surveillance and Society*, 3(1), 59-73.

Peer Reviewed Chapters in Edited Volumes

Carr, J. (2014 - January) Invited, Peer-Reviewed Book Chapter: “Making Urban Politics Go Away: The role of legally mandated planning processes in occluding city-level power.” In M. Davidson and D. Martin (Eds.) *Urban Politics: Critical Approaches*. Sage (London)[Article].

Carr, J. (2011- April). Invited, Peer-Reviewed Book Chapter: “Whose Public Space? The Political Geography Of Skateboarding.” In M. Brown (Ed.) *Seattle Geographies*. Seattle: University of Washington Press [Article].

Herbert, S.K., Carr, J. & Erickson, K. (2006 - October). “The scales of justice: Federal-local tensions in the War on Terror.” In S. K. McGoldrick & A. McArdle (Eds.) *Uniform Behavior: Police Localism and National Politics*. New York: Palgrave Macmillan [Article].

Carr, J. (2009 - November). Foucault’s Archeology and Geneology. In Littlejohn, S. & K. Foss (Eds.) *Encyclopedia of Communication Theory*. Thousand Oaks: Sage [Encyclopedia entry]

Book Reviews

Carr, J. (In Press – Accepted May 12, 2015). Review of the book *The Expanding Spaces Of Law: A Timely Legal Geography*. The Geographical Review. [Book Review]

Carr, J. (2005 - April). Review of the book *Digital Nation: Toward an Inclusive Information Society*. Resource Center for Cyberculture Studies, June 2005. [Book Review]

Works in Progress

Articles in Refereed Journals – Accepted for Publication

Carr, J. (2015). Review of the book *The Expanding Spaces of Law: a timely legal geography*. The Geographical Review (In Press).

Articles in Refereed Journals – Submitted for Publication

Carr, J. (Revise and Resubmit received January 23, 2014) Reworking the Law:
Exploring the Utopic Potential of Civil Law, *Environment and Planning: A*

Articles in Refereed Journals – In Preparation

Carr, J. (Manuscript due July, 2015) "Skateparks as gender-normative and subverting
nomospheres." *Sociology of Sport Journal*.

Research Presentations

Invited and Refereed Presentations (* denotes presenting author)

Carr, J.* Planning for the placeless city of tomorrow? Conflicting paradigms within
the history of Albuquerque's urban development. Professor Ric Richardson's
"Community Growth and Land Use Planning" graduate course. School of
Community and Regional Planning, University of New Mexico, September 21,
2015. Albuquerque, New Mexico

Carr, J.* The First Post-Modern City?: Pioneering Mythic Urbanism in Santa Fe,
New Mexico. Lecture Series: Subjective Mapping/Postmodern Geographies.
Department of Communication. John Cabot University, July 7, 2015. Rome,
Italy.

Carr, J.* Invited Panelest: Legal geographies 11: Power, (post)disciplinarity, and
practice -- B -- Nature, society, economy. Association of American Geographers,
April 23, 2015. Chicago, NM.

Carr, J.* Where Did the Santolina Development Come From?: A selective history of
Albuquerque's built environment. Professor Levi Romero's "Human
Settlements" course. School of Community and Regional Planning, University of
New Mexico, March 3, 2015. Albuquerque, New Mexico

Carr, J.* Getting There or Getting Left Behind?: Infrastructure And Geographies of
Inequality in Albuquerque, New Mexico. Department of Civil Engineering
Graduate Seminar. University of New Mexico, February 18, 2015. Albuquerque,
New Mexico

Carr, J.* Breaking Better; Reexamining Albuquerque's past to chart a successful
future. Hosted by The Living Cities Initiative November 14, 2014. Albuquerque,
NM. (Attendees included representatives from: Albuquerque Mayor's Office,
McCune Foundation, Association of General Contractors, National Hispanic
Cultural Center, Partnership for Community Action, ABC Trade Alliance, Indian
Pueblo Marketing Industries, CNM STEMulus Initiative, etsy.com, Rio Grande
Community Development Corp., and the Railyard Market)

Carr, J.* Developing ethical and privacy sensitivity towards geocoded data. Teaching GeoEthics Across the Geoscience Curriculum: Workshop 2014, June 10, 2014. Pray, Montana.

Carr, J.* Hotwiring The Law To Create The Sustainable Cities Of Tomorrow. "The Future of the City: an interdisciplinary symposium" Hosted by ABQ/UNM CityLab, April 12, 2013. Albuquerque, NM.

Carr, J.* Public Input/Elite Privilege: The use of participatory planning to reinforce urban geographies of power in Seattle, School of Environment, University of Auckland. May 31, 2012. Auckland, New Zealand.

Carr, J.* Opportunities and Obstacles to Transforming Planning Communication Through the Creation of Digital Visualization Tools. CMM Institute Fellows Presentation. April 13, 2012. Philadelphia, PA.

Carr, J.* Technology, Information, and their Impact on our Future, The Nelson Club. March 26, 2012. Nelson, New Zealand.

McKinnon, S.*, Dickinson, E. A., Carr, J., & Chávez, K. Kiva.org, Person-to Person Lending, and the Conditions of Intercultural Contact. International Communication Association Conference, May 24-28, 2012. Phoenix, AZ. **Top Paper, Intercultural Communication Division**

Carr, J.* Liberal Exclusion or Neoliberal Inclusion? : The regulation of skateboarders in Seattle as an example of contemporary "spatial sorting" of bodies. The Law and Society Association, June 2-5, 2011. San Francisco, CA.

Carr, J.* Public Input Based Planning as Political Shell Game: Political barriers to making urban planning more democratic through communicative approaches. Urban Communication Foundation Seminar, November 11, 2009. Chicago, IL.

Carr, J.* Bringing a Legal Emphasis on Written and Oral Argument to Graduate and Undergraduate Teaching. National Communication Association, November 14, 2009. Chicago, IL.

Carr, J.* & Erickson, K. Virtual activism: Openings for political struggle between cyberspace and physical space. National Communication Association. November 21-24, 2008. San Diego, CA.

Carr, J.* Activist research and the stories we tell: Lessons from youth-based public scholarship. American Studies Association. October 16-19, 2008. Albuquerque, NM.

Carr, J.* The Politics of Youthful Space: Contesting young people's identities in Seattle's struggles over public skateparks, School of Environment, University of Auckland. September 6, 2007. Auckland, New Zealand.

Carr, J.* The colonization of cyberspace by rights: From *BIOS* to ROM BIOS. Language and Global Communication Conference, July 7, 2005. Cardiff, Wales, United Kingdom.

Carr, J.* A preliminary exploration of the ramifications of the individual RIAA file-swapping lawsuits for the Internet as a space for free speech. Western States Communication Association Conference, February 12, 2005. San Francisco, California.

Carr, J.* The halls of law, the spaces of domination: Reexamining the progressive potential of private property rights discourses in a post-colonial world. International Critical Geography Group, January 12, 2005. Mexico City, Mexico.

Non-refereed Presentations (* denotes presenting author)

Carr, J.* & Milstein, T. Of Manatees and Power Plants: The naturalization of ecological destruction through environmental law and its discursive sites of protection. Association of American Geographers, April 23, 2015. Chicago, NM.

Carr, J.* & Milstein, T.* Man vs. Manatee: The legal framing of neoliberal environmental discourses. Southwest Association of American Geographers, October 24, 2014. Albuquerque, NM.

Carr, J.* Private Law as a Vessel for Traditional Community Values in New Mexico. Association of American Geographers, April 10, 2014. Tampa, FL.

Carr, J.* Utopic legal geography: Using legal mechanisms to bridge critical theory and urban practice. Association of American Geographers, April 9, 2013. Los Angeles, CA.

Carr, J.* Legal Geography and Directions forward for Praxis. Southwest Association of American Geographers, October 26, 2012. Las Cruces, NM.

Carr, J.* Making Urban Politics Go Away: The role of legally mandated planning processes in occluding city-level power. Association of American Geographers, April 6, 2011. Seattle, WA.

Carr, J.*, Dickinson, E., McKinnon, S., Chavez, K. Microfinance/Microliberalism: The role of Internet enabled microfinance in scaling down neoliberal citizenship. Association of American Geographers, April 14, 2010. Washington, DC.

Carr, J.* Law and Geography: Examining Intersections of Theory and Application within Legal Geography (Round Table). Association of American Geographers, April 15, 2010. Washington, DC.

Carr, J.* Participatory planning as the victory of good politics over democratic politics: Planning for youthful spaces in Seattle. Association of American Geographers, March 24, 2009. Las Vegas, NV.

Carr, J.* The political grind: Public space and the domestication of skateboarding. Association of American Geographers, March 20, 2007. San Francisco, CA.

Carr, J.* Expulsion from skateopia: Urban skateboarding and the role of law in determining children's place in the city." Place Matters Conference, October 28, 2006. Seattle, WA.

Carr, J.* Digital spaces of exception: The War on Terror and the role of emergent technologies of biopolitics. Association of American Geographers, March 11, 2006. Chicago, Ill.

Carr, J.* "Poached:" Skateboarders' performativity and activism as constructing and claiming space in urban Seattle. Association of American Geographers, April 6, 2005. Denver, CO.

Carr, J.* Must we transgress to progress?: The role of spatial categories in maintaining state ideology. Symposium on Production/Reproduction: An inquiry into Post-National Imaginaries, April 2004. University of Washington. Seattle, Washington.

Home Campus Academic Presentations
None

Planning and Organizing Professional Presentations

- Organizer. "Legal Geographies": Twelve paper-session mini-conference. Association of American Geographers, April 21-23, 2015. Chicago, IL.
- Panel Organizer and Chair. "Human and More-Than-Human Environments": Double paper session. Association of American Geographers, April 22-23, 2015. Chicago, IL.
- Panel Organizer and Chair. "Law, Culture, and Place": Double paper session. Association of American Geographers, April 10, 2014. Tampa, FL.
- Panel Organizer (with Harm Benson, M.) and Chair. "Bridging Practice and Theory with Legal Geography": Triple paper session. Association of American Geographers, April 9, 2013. Los Angeles, CA.
- Panel Organizer (with Harm Benson, M.) and Chair. "Law, State, Space": Triple paper session. Association of American Geographers, April 6, 2011. Seattle, WA.

- Panel Organizer (with Erickson, K). “New performances of urban space and the construction of unconventional urbanisms” Association of American Geographers, April 2005. Denver, Colorado.

Research And Service Funding

Research and Travel Grants

2016 Visiting Erskine Fellowship, University of Canterbury, Christchurch New Zealand. Visiting teaching and scholar position. February – April 2016.

Curriculum Development Grants

None

Funded Research Proposals

“Geospatial Privacy: Legal, Social and Ethical Implications for Users of Geocoded Data.”

PI: John Carr, co-PI's Paul Zandbergen, Shannon Vallor, William Gannon

NSF proposal # SES-1135304

1 year, \$30,000, National Science Foundation, Division of Social and Economic Sciences, Ethics Education in Science and Engineering (EESSE) competition.

September 1, 2012 - June 31, 2014.

Non-Funded Research Proposals

“Collaborative Research: Geospatial Privacy - Legal, Social and Ethical Implications for Users of Geocoded Data.”

PI: John Carr, co-PI's Elizabeth Buchanan, Francis Harvey, Patrick Kelley, Shannon Vallor

NSF proposal # SES- 1456344

3 year, \$488,281, National Science Foundation, Division of Science, Technology and Society competition.

February 15, 2015 – February 14, 2018.

Research and Professional Awards and Honors

Fellow of the CMM Institute for Personal and Social Evolution, \$2500 research support award, 2012, Fielding Graduate University and Villanova University

Funded Service Grants

2015 Graduate Student Recruitment Fund Grant from the Office of Graduate Studies, University of New Mexico - \$2600.

Teaching Experience

Classroom Teaching

Spring quarter 2015

Geography 364: Law and Geography. (21-day enrollment from LoboWeb: 17 students; EvaluationKIT median effectiveness score: 4.67 out of 5)

Geography 566/466: The City as Human Environment. (21-day enrollment from LoboWeb: 14 students; EvaluationKIT median effectiveness score: 5 out of 5)

Fall quarter 2014

Geography 501: Geographic History and Method. (21-day enrollment from LoboWeb: 11 students; IDEA summary evaluation, adjusted: 4.2)

Geography 517: Law and Geography. (21-day enrollment from LoboWeb: 6 students; IDEA summary evaluation, adjusted: 4.7)

Spring quarter 2014

Geography 364: Law and Geography. (21-day enrollment from LoboWeb: 15students; IDEA summary evaluation, adjusted: 5.0)

Geography 566/466: The City as Human Environment. (21-day enrollment from LoboWeb: 12 students; IDEA summary evaluation, adjusted: 4.5)

Fall quarter 2013

Geography 102: Introduction to Human Geography. (21-day enrollment from LoboWeb: 99 students; IDEA summary evaluation, adjusted: 4.6)

Geography 102: Introduction to Human Geography – Freshman Learning Community. (21-day enrollment from LoboWeb: 22 students; IDEA summary evaluation, adjusted: 4.6)

Geography 501: Geographic History and Method. (21-day enrollment from LoboWeb: 9 students; IDEA summary evaluation, adjusted: 4.5)

Spring quarter 2013

Geography 364: Law and Geography. (21-day enrollment from LoboWeb: 18 students; IDEA summary evaluation, adjusted: 4.7)

Geography 566/466: The City as Human Environment. (21-day enrollment from LoboWeb: 13 students; IDEA summary evaluation, adjusted: 4.4)

Fall quarter 2012

Geography 102: Introduction to Human Geography. (21-day enrollment from LoboWeb: 124 students; IDEA summary evaluation, adjusted: 4.7)

Geography 516: Globalization: Neoliberal and Postcolonial Theory. (21-day enrollment from LoboWeb: 10 students; IDEA summary evaluation, adjusted: 5.0)

Summer 2012

Geography 102: Introduction to Human Geography. (21-day enrollment from LoboWeb: 16 students; IDEA summary evaluation, adjusted: 5.0)

Fall quarter 2011

Geography 102: Introduction to Human Geography. (21-day enrollment from LoboWeb: 122 students; IDEA summary evaluation, adjusted: 4.6)

Geography 516: Globalization: Neoliberal and Postcolonial Theory. (21-day enrollment from LoboWeb: 11 students; IDEA summary evaluation, adjusted: 4.9)

Summer 2011

Geography 102: Introduction to Human Geography. (21-day enrollment from LoboWeb: 20 students; IDEA summary evaluation, adjusted: 5.0)

Spring quarter 2011

Geography 364: Law and Geography. (21-day enrollment from LoboWeb: 32 students; IDEA summary evaluation, adjusted: 4.7)

Geography 566/466: The City as Human Environment. (21-day enrollment from LoboWeb: 18 students; IDEA summary evaluation, adjusted: 4.8)

Fall quarter 2010

Geography 102: Introduction to Human Geography. (21-day enrollment from LoboWeb: 119 students; IDEA summary evaluation, adjusted: 4.6)

Geography 516: Globalization: Neoliberal and Postcolonial Theory. (21-day enrollment from LoboWeb: 13 students; IDEA summary evaluation, adjusted: 4.6)

Spring quarter 2010

Geography 499: Law, Control, Human Environment. (21-day enrollment from LoboWeb: 12 students; IDEA summary evaluation, adjusted: 4.8)

Geography 499: Transborder Cities. (21-day enrollment from LoboWeb: 6 students; IDEA summary evaluation, adjusted: 4.6)

Fall quarter 2009

Geography 102: Introduction to Human Geography. (21-day enrollment from LoboWeb: 92 students; IDEA summary evaluation, adjusted: 4.4)

Spring quarter 2009

Communication & Journalism 512: Places & Spaces - Co-Instructor for Danish Graduate Exchange Seminar. Enrollment: 22

Communication & Journalism 468: Mass Media Law. (21-day enrollment from LoboWeb: 40 students; IDEA summary evaluation, adjusted: 4.5)

Communication & Journalism 130: Presentational Speaking. (21-day enrollment from LoboWeb: 22 students; IDEA summary evaluation, adjusted: 4.9)

Fall quarter 2008

- Communication & Journalism 562: Mediascapes of Post-Colonialism. . (21-day enrollment from LoboWeb: 9 students; IDEA summary evaluation, adjusted: 4.2)
- Communication & Journalism 468: Mass Media Law. . (21-day enrollment from LoboWeb: 16 students; IDEA summary evaluation, adjusted: 4.4)

Spring quarter 2008

- Geography 499/American Studies 360: Southwestern Trans-Border Urbanism. Enrollment: 11
- Communication & Journalism 468: Mass Media Law. Enrollment: 24

Mentoring

Graduate Advisor

Jeremy Work, Department of Geography, University of New Mexico. (Anticipated graduation 2017).

Jacob Wolf, Department of Geography, University of New Mexico. (Anticipated graduation 2017)

Linda Tatro, Department of Geography, University of New Mexico. (Anticipated graduation 2017)

Graduate Committee Service

Neil Michael Ayala Ayala, PhD program in Latin American and Iberian Studies, with a concentration in Geography, University of New Mexico. (Anticipated graduation 2016)

Ursula Freire, PhD program in Latin American and Iberian Studies, with a concentration in Geography, University of New Mexico. (Anticipated graduation 2016)

Stephen Griego, Department of Communication & Journalism, University of New Mexico. (Ph.D. candidate, anticipated graduation 2017). Stephen is examining the traditional New Mexico matanza as a space of resistance situated in the Neo-liberal world order

Maryam Aihinai, Department of Communication & Journalism, University of New Mexico. (Ph.D. candidate, anticipated graduation 2017). Maryam is examining the ways that participant action research techniques can be used to foster cultures of environmental entrepreneurship in Oman.

Christina Faris, Department of Geography, University of New Mexico. (Anticipated graduation 2016)

Bryce Lockett, Department of Geography, University of New Mexico. (Anticipated graduation 2016)

Jordy Hicks, Department of Geography, University of New Mexico. (Anticipated graduation 2015). Jordy is investigating conflicting approaches to environmental/public space management in the Bosque area of Albuquerque's Rio Grande Valley.

Samuel Thompson, Department of Geography, University of New Mexico. (Anticipated graduation 2015). Sam is investigating the impact of crime statistics on property values in Albuquerque NM.

Veronica Chavez, Department of Geography, University of New Mexico. (Anticipated graduation 2015)

Saundra Daras, MA 2014, Department of Geography, University of New Mexico. "Crime And Immigration In Albuquerque, NM: Real Or Misperception?"

George Luna-Pena, MA, 2014, American Studies, University of New Mexico. "Intimate Gestures: Race, Photography, and Time in Tijuana's Irregular Settlements."

Brynn Shaw, MA 2013, Comparative Literature and Cultural Studies, University of New Mexico. "Zombie Economics: Violence and Economics in three First-person shooter zombie-themed video games."

Mark Lawler, MS, 2013, Geography, University of New Mexico. "Non-Federal/Federal Collaborators In Endangered Species Driven River Restoration: How Risk And Incentive Mobilize Institutional Supply In The Middle Rio Grand Endangered Species Collaborative Program."

Stephen Griego, MS, 2013, Geography, University of New Mexico. "Restaurant Regions: An Ecological Community Based Model Of Restaurant Chain Distribution In The United States"

Kate Lenzer, MS, 2011, Geography, University of New Mexico. "Characterizing the local food environment in Albuquerque, New Mexico: a dual perspective of retailer and consumer"

Molly Padget, Department of Geography, University of New Mexico. Plan II.

Travis Lee Estep, Department of Geography, University of New Mexico. “The Effect of Temperature, Humidity, Wind Speed, Wind Direction, and Elevation on the Success of Major League Knuckleball Pitchers”

Graduate Mentoring

Independent Research Supervisor, Christina Faris 2014-2015, Department of Geography and environmental Studies. Christina is conducting a supervised research project that seeks to overview the currently available data and research in the social sciences on New Mexico’s acequia irrigation systems.

Independent Research Adviser, Jason Kikel 2015 Community and Regional Planning. Jason is conducting preliminary research on the legal geographies of planning for the de-criminalization of cannabis in several US states.

Independent Research Adviser, Desi Brown 2011, Peace Studies Program. Desi’s project was to research innovative pedagogy methods for mixed graduate and undergraduate courses.

Undergraduate Mentoring

Mentor, George Luna-Pena. 2013 Latina/o Graduate and Professional Student Fellowship, University of New Mexico, El Centro de la Raza & Title V Graduate Resource Center

Independent Research Adviser. Laura Arguelles, Department of Geography, University of New Mexico. 2010. Laura’s Project involved the creation of an internet portal for the interpretation, discussion, and collection of resources addressing the City of Albuquerque’s “Humane and Ethical Animal Rules and Treatment” Ordinance of 2006.

Independent Research and Thesis Adviser. Patricia Lopez, Comparative History of Ideas major, University of Washington. 2007. Patricia’s senior project explored the intersections between law, culture, and cyberspace, focusing on disruptions to cultural and legal concepts of privacy.

Curriculum Development

PhD Program Proposal, with Maria D. Lane and New Mexico State University (In Process)

Combined Masters Degree Program, Geography and Community and Regional Planning (In Process)

Graduate Certificate in Law, Environment and Geography (Approved Fall 2014)

Freshman Learning Community Curriculum Development & Teaching, Fall 2013 –
Curriculum Combining Globalization, Human Environment, and Disaster
Management

3/2 Combined Geography Masters/Economics Undergraduate Major/ Geography
Undergraduate Minor Program (submitted Fall 2010 – Approved Spring 2014)

M.S. Concentration in Environmental Management (Approved Spring 2012)

Undergraduate Minor in Law, Environment and Geography (Approved Spring 2012)

New Course - Geography 517: Law and Geography (Approved Spring 2012)

New Course – Geography 566/466: The City as Human Environment (Approved
Spring 2010)

New Course – Geography 516: Globalization (Approved Spring 2010)

New Course – Geography 364: Law and Geography (Approved Spring 2010)

Service

Editorial and Review

- Editor-in-Chief. *Texas Environmental Law Journal*, 1992-1993.
- Staff Member. *Texas Environmental Law Journal*, 1991-1992.
- Editorial Board. *Western Journal of Communication*, 2012.
- Reviewer, *Geographical Research*, 2015
- Reviewer, *Annals of the American Association of Geographers*, 2015
- Reviewer, *Journal of Broadcasting & Electronic Media*, 2015, 2014, 2009
- Reviewer, Routledge Books, Criminology Titles, 2014
- Reviewer, *Historical Geography*, 2014
- Reviewer, Israel Science Foundation, 2013
- Reviewer, National Science Foundation, BCS: Geography and Spatial Sciences 2012
- Reviewer. *Environment & Planning:A*. 2012.
- Reviewer. *Action Research* 2010, 2012.
- Reviewer. *Professional Geographer*. 2011-2012.
- Reviewer. *Geoforum*. 2011, 2012.
- Reviewer. *Urban Geography*. 2011.
- Reviewer. *Western Journal of Communication*. 2011.
- Reviewer. *Geographical Journal*. 2010, 2011.
- Reviewer. *Geography Compass*. 2010.
- Reviewer. *Social and Cultural Geography*. 2008.
- Reviewer. *Urban Studies*. 2007.
- Reviewer. *New Media & Society*. 2006.

Administrative Service

Department of Geography, University of New Mexico:

- Director of Graduate Program, Department of Geography, 2014-Present
- Chair - Curriculum Committee, Department of Geography, 2015-Present
- Chair – Graduate Program Plan II Design Committee, 2015-Present
- Curriculum Committee, Department of Geography, 2014-Present
- Budget Committee, Department of Geography, 2014-Present
- Departmental Executive Committee, 2013-Present
- Lecturer II Hiring Committee, 2013
- Departmental outreach coordinator, 2009- Present
- Public Relations committee, 2012-Present
- Course Scheduling, 2012
- 3/2 Economics/Geography program coordinator, 2010- Present
- Law, Environment & Geography program coordinator, 2010- Present
- Undergraduate recruitment coordinator, 2009- Present
- Graduate Admissions Committee, 2009- Present

- Geography Department Chair Search Committee 2009-2010

University of New Mexico

- OSET – New Teacher of the Year Award Review Committee, 2014-Present

- Latin American Studies & Iberian Institute, Grants and Awards Committee, 2012-2014

Other Service, Leadership, & Mentoring

- Organizer and Facilitator, Professor Levi Romero's "Human Settlements" course. School of Community and Regional Planning, University of New Mexico. Designed primary student community based research project – 2015.
- Discussion Leader, UNM Peace Center's "People Before Profit Film Series" showing of the film *Dirty Pretty Things*. March 7, 2011.
- Invited Reviewer, Professor Moises Gonzales' "Human Settlements" course. School of Community and Regional Planning, University of New Mexico. Reviewed and provided feedback to final student projects – 2009-2010.
- Speaker and Panelist, Academic Publishing Workshop for Department of Communication and Journalism, University of New Mexico. March 11, 2008.
- Panelist, Faculty Panel for Communication and Journalism 101, University of New Mexico. March 6 2008.
- Research Director. Flora Diaz, Andrea Tindall, Brandon Rain, Victor Ku, Chris Moore, and Vy Tran (Winter 2007); Mattan Barnea and Nancy Nowlin (Spring 2006), University of Washington Law, Societies, and Justice majors. Trained assistants in library and database research, qualitative coding, and recording transcription to assist in ethnographic research on the political negotiation of urban spatial governmentality.
- Panel Organizer (with Harm Benson, M.) and Chair. "Law, State, Space": Triple paper session. Association of American Geographers, April 2010. Seattle Washington.
- Founding Member, *Transdisciplinary Research Group*, University of New Mexico. 2008-2011
- Chairperson. Panel on "Terrorism, surveillance, and the media." Association of American Geographers, March 11, 2006. Chicago, Illinois.
- Chairperson. Refereed presentation panel on "E-mails on the darker side of globalization: A sociolinguistic perspective." Language and Global Communication Conference, July 2005. Cardiff University, Wales, United Kingdom.
- Graduate Fellow. Center for Internet Studies, University of Washington, 2003-2007.
- City Government Liaison. Puget Sound Skatepark Association, 2004-2007.
- Chairperson & Member. Seattle City Parks Department Skatepark Advisory Committee, 2005-2007.
- Member. Seattle City Parks Department Skatepark Task Force, 2006-2007.

- “Foreign Expert” guest. China Central Television (all-English channel, CCTV 9) talk show on cultural customs. More than 100 million viewers. December 2001. Beijing, China.
- University of Texas National Environmental Moot Court Team. 1991-1993.

Public Scholarship/Community-Based Scholarship:

- Consultant, Valle Encantada – Community based economic and cultural development organization in Albuquerque, New Mexico’s Hispanic South Valley neighborhood.
- Connecting Community Voices. Research member of Hispanic-community focused study in collaboration with nonprofit community organizations, including Conservation Voters of New Mexico, The Wilderness Society, and Arts of Aztlan, as well as the UNM Resource Center for Raza Planning in the School of Architecture and Planning. Analyzing data aimed at identifying New Mexico Hispanic communities’ place related meaning systems in an effort to highlight connections to land, resources, and community and to help communities empower themselves to shape sustainable urban and environmental policy and politics. Groundbreaking, highly applied participatory action project. Frontpage media coverage of project in bilingual newspaper *Mas New Mexico* in January 2009.
- Interview: Seattle’s public space politics and the impacts of youth, discourse, race, and class. www.seattleskateparks.org, January 2008, Seattle, Washington.
- Featured scholar radio interview. Regulation of youth in public space. Fresh FM (95.4 FM). September 19, 2007. Nelson, New Zealand.
- Member, Seattle City Parks Department Skatepark Task Force, a “blue ribbon” panel supervising and facilitating the creation of a city-wide master plan for a system of youth oriented public spaces. March 2006- August 2007.
- Volunteer on-water monitor, Soundwatch marine mammal protection program operating in the transborder Puget Sound region. June 2007- August 2007.
- Guest Speaker (with Seattle Mayor Greg Nickels, Parks Superintendent Ken Bounds, and City Council Member David Della), Opening Ceremonies for Ballard Commons Park. March 4, 2006.

- Coordinator, “Hittin’ Reality,” Langston Hughes Performing Arts Center’s spoken word/hip-hop performance and summer employment program for at-risk urban youth. Summer 2005. Seattle, Washington.
- Member, Seattle City Parks Department Skatepark Advisory Committee, a citizen advisory group addressing planning considerations for youth-oriented urban public spaces. August 2005- January 2006.
- Adviser to and Member of Puget Sound Skatepark Association, a regional public interest non-profit corporation. Involved in public space activism and representation of organization before a public bodies and officials. 2005-2007. Seattle, Washington.
- Community Mural assistant creator and co-facilitator for September Project, an international project spearheaded by University of Washington Professor David Silver. Engaged public in public mural project later displayed in several urban public spaces. Multiple media interviews. Sept. 11, 2004. Central Library. Seattle, Washington.
- Active founding member, University of Washington student chapter of The September Project, an international event founded by Communication Professor David Silver organizing public libraries to involve the public in free collective discussions of matters of community import. 2004 - 2007. Seattle, Washington.
- Member of Total Projection Action, a small group of interdisciplinary graduate students and artists organizing and creating a communication event in the heart of University of Washington campus the evening before 2004 presidential election. Projected slides, digital text, video, transparencies, and other images onto the walls of campus buildings and public-created “virtual graffiti.” Nov. 1, 2004. Seattle, Washington

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Education and Professional Experience

Education

- 8/2001-12/2006 University of Wisconsin, Madison, WI
Doctor of Philosophy, Geography, 2006
Advisor: Dr. Matthew D. Turner
Dissertation: Villages, vegetation, bedrock, and chimpanzees: Human and non-human sources of ecosystem structure in southwestern Mali
Minor: African Languages and Literature
- 8/1998-5/2000 San José State University, San José, CA
Master of Science, Environmental Studies, 2000
Advisor: Dr. Gary A. Klee
Thesis: Conservation of the tree *Gilletiodendron glandulosum* in southwestern Mali
- 8/1990-12/1994 University of California, Santa Cruz, CA
Bachelor of Arts, History (concentration: Africa), 1994
College, Department, and Thesis Honors

Professional Experience

- 8/2013-present Department of Geography, University of New Mexico, Albuquerque, NM
Associate Professor
- 8/2008-8/2013 Department of Geography, University of New Mexico, Albuquerque, NM
Assistant Professor
- 1/2007-8/2008 Department of Geography, Michigan State University, East Lansing, MI
Assistant Professor
- 8/2006-12/2006 Department of Geography, University of Wisconsin, Madison, WI
University Research Fellow
- 1/2006-5/2006 Department of Geography, University of Wisconsin, Madison, WI
Senior Teaching Assistant, Geography 339: Environmental Conservation
- 8/2005-1/2006 Department of Geography, University of Wisconsin, Madison, WI
Lecturer (Instructor), Geography 339: Environmental Conservation
- 1/2004-12/2004 Department of Geography, University of Wisconsin, Madison, WI
Independent Geography Research in Mali
- 8/2003-12/2003 Department of Geography, University of Wisconsin, Madison, WI
Teaching Assistant, Geography 127: Introduction to Physical Geography
- 2/2002-8/2002 Wild Chimpanzee Foundation, Geneva, Switzerland
Consultant on Environmental Education in Mali

4/2002-10/2002	World Wildlife Foundation, Washington, DC Consultant on Biogeography and Conservation in West Africa
8/2001-6/2003	Department of Geography, University of Wisconsin, Madison, WI University Research Fellow
1/2000-8/2001	San Francisco Conservation Corps, San Francisco, CA Associate Director of Field Programs
8/1999-12/1999	San José State University, San José, CA Independent Environmental Studies Research in Mali
10/1998-8/1998	African Immigrant and Refugee Resource Center, San Francisco, CA Refugee Resettlement Services Program Manager
1/1995-4/1997	United States Peace Corps, Bamako, Mali Agriculture Extension Agent

Unpaid Professional Appointments

1/2011-present	Robert Wood Johnson Foundation, Center for Health Policy Research, University of New Mexico, Albuquerque, NM Senior Research Fellow
9/2010-8/2012	Institute of Evolution, University of Haifa, Haifa, Israel Adjunct Professor

Publications and Presentations

Forthcoming Publications

Sluyter, A. and **C.S. Duvall**. In press [expected November 2016]. African rangeland burning and colonial ranching landscapes in the neo-tropics. *The Geographical Review*. Accepted September 2015.

Duvall, C.S. In press [expected March 2016]. Science, society, and knowledge of the Columbian Exchange: The case of *Cannabis*. In *World Environmental History: State of the Art* (C. Joanez de Melo, A Rui Azevedo Sousa Melo, & E. Vaz, eds.). Springer Publishing: New York.

Scholarly Monograph

Duvall, C.S. 2015. *Cannabis*. Botanical Series, Reaktion Books: London.

Peer-reviewed Journal Articles

Lave, R., M. Wilson, E. Barron, C. Biermann, M. Carey, **C.S. Duvall**, L. Johnson, K. Lane, N. McClintock, D. Munroe, R. Pain, J. Proctor, B. Rhoads, M. Robertson, J. Rossi, N. Sayre, G. Simon, M. Tadaki, C. Van Dyke. 2014. Intervention: critical physical geography. *Canadian Geographer* 58(1): 1-10.

Junker, J., R. Bergl, S. Blake, C. Boesch, G. Campbell, A. Dunn, L. du Toit, **C.S. Duvall**, A. Ekobo, G. Etoga, A. Galat-Luong, J. Gamys, J. Ganas-Swaray, S. Gatti, A. Ghiurghi, N. Granier, E. Greengrass, J. Hart, J. Head, I. Herbinger, T.C. Hicks, B. Huijbregts, I.S. Imong, N. Kuempel, S. Lahm, J. Lindsell, F. Maisels, M. McLennan, L. Martinez, B.

- Morgan, D. Morgan, F. Mulindahabi, R. Mundry, K.P. N'Goran, E. Normand, A. Ntongho, D.T. Okon, C.-A. Petre, A. Plumptre, H. Rainey, S. Regnaut, C. Sanz, E. Stokes, A. Tondossama, S. Tranquilli, J. Sunderland-Groves, P. Walsh, Y. Warren, E.A. Williamson, H.S. Kuehl. 2013. Recent decline in suitable environmental conditions for African great apes. *Diversity and Distributions* 18(11): 1077-1091.
- Gruley, J. and C.S. Duvall. 2012. The evolving narrative of the Darfur conflict as represented in *The New York Times* and *The Washington Post*, 2003-2009. *GeoJournal* 77(1): 29-46. [Joel Gruley is a former Master's student.]
- Duvall, C.S. 2011. Biocomplexity from the ground up: Vegetation patterns in a West African savanna landscape. *Annals of the Association of American Geographers* 101(3): 497-522.
- Duvall, C.S., P. Howard, and K. Goldsberry. 2010. Apples and oranges? Classifying food retailers based on fresh produce availability in a Midwestern U.S. city. *Journal of Hunger and Environmental Nutrition* 5(4): 526-541.
- Goldsberry, K., C.S. Duvall, P. Howard, and J. Stevens. 2010. Visualizing nutritional terrain: A geospatial analysis of pedestrian produce access in Lansing, Michigan, USA. *Geocarto International* 25(6): 485-499.
- Duvall, C.S. 2009. A Maroon legacy? Sketching African contributions to live fencing practices in early Spanish America. *Singapore Journal of Tropical Geography* 30(2): 232-247. [revised version published as: Duvall, C.S. 2010. Trans-Atlantic violence: The landscape legacy of African warfare in the Americas. In *War and Peace in Africa* (T. Falola & R.C. Njoku, eds.): 73-100. Carolina Academic Press: Durham, USA.]
- Duvall, C.S. 2008. Classifying physical geographic features: The case of Maninka farmers in southwestern Mali. *Geografiska Annaler B (Human Geography)* 90(4): 327-348. [revised version published as: Duvall, C.S. 2011 'Land' and life: Ethnoecology and ethnogeography as complementary approaches to the analyses of landscape perception. In *Landscape in Language: Transdisciplinary Perspectives* (D.M. Mark, A.G. Turk, N. Burenhult, & D. Stea, eds.): 121-141. John Benjamins Publishing: Amsterdam.]
- Duvall, C.S. 2008. Chimpanzee diet in the Bafing area, Mali. *African Journal of Ecology* 46(4): 679-683.
- Duvall, C.S. 2008. Human settlement ecology and chimpanzee habitat selection in Mali. *Landscape Ecology* 23(6): 699-716.
- Duvall, C.S. 2007. Human settlement and baobab distribution in southwestern Mali. *Journal of Biogeography* 34(11): 1947-1961.
- Duvall, C.S. 2006. On the origin of the tree *Spondias mombin* in Africa. *Journal of Historical Geography* 32(2): 249-266.
- Duvall, C.S. 2003. Symbols, not data: rare trees and vegetation history in Mali. *The Geographical Journal* 169(4): 295-312.
- Duvall, C.S. 2001. Habitat, conservation, and use of *Gilletiodendron glandulosum* in southwestern Mali. *Systematics and Geography of Plants* 71(2): 699-737.
- Duvall, C.S. 2000. Important habitat for chimpanzees in Mali. *African Study Monographs* 21(4): 173-203.

Book Chapters

- Duvall, C.S. 2012. *Ceiba pentandra* (L.) Gaertn. In *Plant Resources of Tropical Africa, Vol. 16: Fibers* (M. Brink & E.G. Achigan-Dako, eds.): 75-82. PROTA Foundation: Wageningen, The Netherlands.
- Duvall, C.S. 2011. Ferricrete, forests, and temporal scale in the production of colonial science in Africa. In *Knowing Nature: Conversations at the Interface of Political Ecology and Science Studies* (M.J. Goldman, P. Nadasdy, & M.D. Turner, eds.): 113-127. University of Chicago Press: Chicago.
- Duvall, C.S. 2008. *Pterocarpus erinaceus* Poir. In *Plant Resources of Tropical Africa, Vol. 7: Timbers* (D. Louppe, A. Oteng-Amoako, & M. Brink, eds.): 478-482. Backhuys Publishers: Leiden, The Netherlands.
- Duvall, C.S. and G. Smith. 2005. Republic of Mali. In *The GRASP Atlas of Great Ape Conservation* (J. Caldecott & L. Miles, eds.): 271-279. Great Ape Survival Project and World Conservation Monitoring Center: London. [republished in French as: Duvall, C.S. and G. Smith. 2009. République du Mali. In *Atlas Mondial des Grands Singes et de leur Conservation* (J. Caldecott & N. Miles, eds.): 412-418. Editions UNESCO: Paris.]
- Duvall, C.S. 2003. Agriculture and chimpanzee survival in West Africa. In *The West African Chimpanzee* (R. Kormos, C. Boesch, & M. Bakarr, eds.): 143-145. IUCN: Gland, Switzerland.
- Duvall, C.S., B. Niagaté, and J.-M. Pavy. 2003. Mali. In *The West African Chimpanzee* (R. Kormos, C. Boesch, & M. Bakarr, eds.): 41-50. IUCN: Gland, Switzerland.

Encyclopedia Entries

- Duvall, C.S. 2015. Geography. In *The Princeton Companion to Atlantic History* (J.C. Miller, V. Brown, J. Cañizares-Esguerra, L. Dubois, & K. Ordhal Kupperman, eds.): 225-227. Princeton University Press: Princeton.
- Duvall, C.S. 2010. Landscape and wildlife conservation. In *The Encyclopedia of Geography* (B. Warf, ed.): 1696-1698. Sage Publications: London.
- Duvall, C.S. 2010. Agroforestry. In *The Encyclopedia of Geography* (B. Warf, ed.): 60-62. Sage Publications: London.
- Duvall, C.S. 2003. Arabian-American Oil Company. In *Colonialism: An International Social, Cultural, and Political Encyclopedia* (M. Page, ed.): 24. ABC-CLIO: Santa Barbara, CA.
- Duvall, C.S. 2003. Guinea. In *Colonialism: An International Social, Cultural, and Political Encyclopedia* (M. Page, ed.): 243-244. ABC-CLIO: Santa Barbara, CA.
- Duvall, C.S. 2003. Petroleum. In *Colonialism: An International Social, Cultural, and Political Encyclopedia* (M. Page, ed.): 467-468. ABC-CLIO: Santa Barbara, CA.
- Duvall, C.S. 2003. Sierra Leone. In *Colonialism: An International Social, Cultural, and Political Encyclopedia* (M. Page, ed.): 530-531. ABC-CLIO: Santa Barbara, CA.

Textbook

- Duvall, C.S. 2012. *Learning physical geography in the Southwest: Exercises for introductory physical geography*. Second edition. Contemporary Publishing Company: Raleigh, NC. 272 pp.

Book Reviews

- Duvall, C.S. 2014. Review of *Cannabis: Ethnobotany and Evolution*, by Robert C. Clarke and Mark D. Merlin. *Geographical Review* 104(4): 523-526.
- Duvall, C.S. 2014. Review of *Black Ranching Frontiers*, by Andrew Sluyter. *The AAG Review of Books* 1(4): 154-156.
- Duvall, C.S. 2013. Exploring imaginary worlds: New scholarship linking geography and the humanities. *Journal of Historical Geography* 40: 105-108. [review essay]
- Duvall, C.S. 2010. Review of *In the Shadow of Slavery: Africa's Botanical Legacy in the Atlantic World*, by Judith A. Carney and Richard Nicholas Rosomoff. *The Geographical Review* 100(4): 607-609.

Miscellaneous Publications

- Duvall, C.S. 2015. Decriminalization doesn't address marijuana's standing as a drug of the poor. *The Conversation U.S.* URL: <http://theconversation.com/decriminalization-doesnt-address-marijuanas-standing-as-a-drug-of-the-poor-42345>. [news analysis/opinion essay]
- Goldsberry, K.G. & C.S. Duvall. 2010. Visualizing nutritional terrain: An atlas of produce accessibility in Lansing, Michigan, USA. *Proceedings of the 24th International Cartographic Conference*. URL: http://icaci.org/documents/ICC_proceedings/ICC2009/html/refer/14_6.pdf. [peer-reviewed conference proceedings]
- Duvall, C.S. 2008. Cover photo: Sandstone cliff in Mali, West Africa. *Geografiska Annaler B (Human Geography)* 90(4). [photograph]
- Duvall, C.S. 2007. Cover photo: Baobab tree (*Adansonia digitata* L.) growing at cliff base in Mali. *Journal of Biogeography* 34(11). [photograph]
- Duvall, C.S. 2006. Effects of human settlement on baobab and chimpanzee distribution in southwestern Mali. In *Crossing Disciplinary Boundaries and Re-visioning Area Studies: Perspectives from Asia and Africa. Proceedings of the Kyoto Symposium, 9-13 November 2006* (J. Maruyama, L. Wang, T. Fujikura, & M. Ito, eds.): 516. Graduate School of Asian and African Area Studies, Kyoto University: Kyoto. [abstract]
- Duvall, C.S. 2003. Foreward. In *Bamanankan Learners' Reference Grammar* (A.T. Fofana & M. Traoré, authors): v-vi. NALRC Press: Madison, USA. [book foreword]
- Duvall, C.S. 2000. Conservation status of the endemic tree *Gilletiodendron glandulosum* in southwestern Mali. *Scripta Botanica Belgica* 20: 28-29. [abstract]
- Duvall, C. 1996. Mali: the land and its primates. *IPPL News* 21: 26-31. [news article]

Unpublished Works

- Duvall, C.S. 2002. *Status of chimpanzees (Pan troglodytes verus) and chimpanzee conservation in Mali*. Report prepared for Wild Chimpanzee Foundation, Gland Switzerland. 22 pp.
- Duvall, C.S. & B. Niagaté. 1997. *Inventaire préliminaire des vertébrés de la Réserve de Faune du Bafing*. Report prepared for Direction Nationale de la Conservation de la Nature, Bamako, Mali. 156 pp.

Invited and Refereed Presentations (* denotes presenting author)

- Duvall, C.S.* Anticipated January 2016. “Drugs, labor, and knowledge in western Central Africa and the Atlantic World, 1500-1940”. *American Historical Association 130th Annual Meeting*, Atlanta, GA, January 7-10.
- Duvall, C.S.* Anticipated July 16, 2015. ““Supporting the strength and condition of the slaves’: Drugs, labor, and knowledge circulation in western Central Africa and the Atlantic World, 1500-1940”. *Knowledge Transfers and Cultural Exchanges: 2nd International Conference of the Portuguese Center for World History*, Universidade Nova de Lisboa, July 15-18.
- Duvall, C.S.* July 9, 2014. “Race, class, and post-Columbian *Cannabis* diffusion”. Refereed Presentation: *2nd World Conference on Environmental History*, University of Minho, Guimarães, Portugal, July 8-12.
- Duvall, C.S.* October 31, 2012. “*Cannabis* and/as food: Excavating food–medicine–drug relationships in the Atlantic World”. Invited Presentation: *5th Annual Symposium on Global Culture*, International Studies Institute, University of New Mexico, Albuquerque, NM, October 29-November 2.
- Duvall, C.S.* April 21, 2012. “African Studies and African Environments”. Invited Presentation: *Fifty Forward: A Half-Century of African Studies at Wisconsin*, African Studies Program, University of Wisconsin, Madison, WI, April 20-22.
- Duvall, C.S.* March 30, 2012. “*Cannabis*: An African biogeography, 1500-1940”. Invited Presentation: *Re-mapping Africa: From Humanities to Health*, Annual Conference of the Center for Geographic Analysis, Harvard University, Cambridge, MA, March 29-30.
- Duvall, C.S.* April 18, 2011. “Discussion of Panel II: Migration, settlement, and memories among Africans and their descendants in the Ibero-Atlantic”. Invited discussion: *Greenleaf Colonial Studies Conference: Africans and Their Descendants in the Early Modern Ibero-Atlantic World*, UNM Latin American and Iberian Institute, Albuquerque, NM, April 18-19.
- Duvall, C.S.* March 25, 2011. ““And boy, did the press love it’: Representation of the Peace Corps in U.S. Newspapers, 1961-2011”. Refereed presentation: *Peace Corps and Africa: Honoring 50 Years*, Madison, WI, March 23-27.
- Duvall, C.S. and B. Butt*. November 5, 2010. The trouble with ‘savanna’, particularly in Africa. Refereed Presentation: *17th Mini-Conference on Critical Geography*, Milwaukee, WI, November 5-6. **[Bilal Butt is a former doctoral student.]**
- Laris, P.* & C.S. Duvall. October 19, 2010. “The domesticated biome? Situating humans within ecological models of savanna dynamics”. Refereed presentation: *Global Land Project Open Science Meeting*, Phoenix, AZ, October 17-19. [Non-presenting co-author]
- Duvall, C.S.* & P. Laris. October 18, 2010. “Traditional land-use institutions and the biophysical ecology of landscape change in West African savannas”. Refereed Presentation: *Global Land Project Open Science Meeting*, Phoenix, AZ, October 17-19.
- Birnbaum, P.* , C.S. Duvall, and J. Florence. April 26, 2010. “Hotspots of floristic diversity in the Sudanian forests of Mali”. Refereed Presentation: *19th AETFAT Congress*, Antananarivo, Madagascar, April 25-May 1.
- Goldsberry, K.G.* & C.S. Duvall. November 17, 2009. Visualizing nutritional terrain: An atlas of produce accessibility in Lansing, Michigan, USA. Refereed presentation: *24th International Cartography Conference*, Santiago, Chile, November 15-21.

- Duvall, C.S.* October 29, 2008. "Land and life: Understanding cross-cultural variation and continuity in the ways people conceptualize physical geographic features". Refereed Presentation: *Landscape in Language: A Transdisciplinary Workshop*, organized by David M. Mark and Stephen Levinson, Chinle, AZ, October 26-November 1.
- Duvall, C.S.* October 27, 2007. "Using trees (not stumps) to prove that deforestation has occurred". Refereed Presentation: *Nature Matters Conference: Materiality and the More-than-Human in Cultural Studies of the Environment*, York University, Toronto, Canada, October 25-28.
- Duvall, C.S.* November 10, 2006. "The effects of historic human settlement on baobab and chimpanzee distribution in southwestern Mali". Invited Presentation: *Crossing Disciplinary Boundaries and Re-Visioning Area Studies: Perspectives from Asia and Africa*, University of Kyoto, Kyoto, Japan, November 9-13.
- Duvall, C.S.* November 6, 2006. "Multiscale biogeography of western chimpanzees in the Bafing area, Mali". Invited Presentation: *Primate Origins of Human Evolution Seminar Series*, Primate Research Institute of Kyoto University, Inuyama, Japan.
- Duvall, C.S.* March 6, 2006. "Divergent disciplinary pathways and divergent environmental narratives: Ferricrete and forests in Africa". Refereed Presentation: *EDARC Political Ecology of Science and Knowledge Symposium*, Madison, WI, March 6-7.
- Duvall, C.S.* September 13, 2002. "Chimpanzee conservation and research in Mali". Invited Presentation: *Conservation International/IUCN Workshop on Conservation of West African Chimpanzees*, Abidjan, Côte d'Ivoire, September 12-14.
- Duvall, C.S.* November 12, 2000. "Chimpanzee habitat and diet in Mali". Invited Presentation: *Southern California Primate Research Forum*, Los Angeles, CA.

Professional Conference Presentations (* denotes presenting author)

- Duvall, C.S.* April 24, 2015. "Race, class, and drug use: *Cannabis* in the post-Columbian Atlantic". *Association of American Geographers 111th Annual Meeting*, Chicago, IL, April 21-25.
- Duvall, C.S.* October 24, 2014. "Plant diffusion within and scientific knowledge of the Columbian Exchange: The importance of social processes". *Southwest-Great Plains/Rocky Mountains Joint Regional Meeting of the Association of American Geographers*, Albuquerque, NM, October 23-24.
- Devore-Bitahey, C.* & C.S. Duvall. April 19, 2013. The colonial origins of food insecurity in Dinétah. *New Mexico Public Health Association and New Mexico CARES Health Disparities Center 2013 Joint Conference*, Albuquerque, NM, April 19. [Cherie Devore-Bitahey was a student in Geog 564 in Fall 2012.]
- Duvall, C.S.* April 11, 2013. "Labor and legal regimes of the Columbian Exchange continue to devalue African agricultural expertise". *Association of American Geographers 109th Annual Meeting*, Los Angeles, CA, April 9-13.
- Duvall, C.S.* April 11, 2013. "Discussion of Africa's Green Revolution: Critical perspectives on new agricultural technologies and systems". *Association of American Geographers 109th Annual Meeting*, Los Angeles, CA, April 9-13.
- Duvall, C.S.* February 25, 2012. "Biological versus cultural diffusion of *Cannabis* across the South Atlantic". *Association of American Geographers 108th Annual Meeting*, New York, NY, February 24-28.

- Duvall, C.S.* February 26, 2012. "Discussion contributor: Revisiting core concepts, in critical physical geography". *Association of American Geographers 108th Annual Meeting*, New York, NY, February 24-28.
- Duvall, C.S.* April 14, 2011. "Patterns of produce availability indicate challenges and opportunities for alternative food systems in U.S. cities". *Association of American Geographers 107th Annual Meeting*, Seattle, WA, April 12-16.
- Howard, P.*, C.S. Duvall, & K. Goldsberry. August 13, 2010. "The illusion of diversity: Visualizing ownership in the soft drink industry". *Rural Sociological Society 73rd Annual Meeting*, Atlanta, GA, August 12-15. [Poster]
- Duvall, C.S.* April 18, 2010. "Possible long-term influences of Maroon land management practices in Central America during the 1500s and 1600s". *Association of American Geographers 106th Annual Meeting*, Washington, DC, April 14-18.
- Duvall, C.S.* March 23, 2009. "Sandstone lithology and plant distributions in New Mexico and Mali". *Association of American Geographers 105th Annual Meeting*, Las Vegas, NV, March 22-29.
- Duvall, C.S.* April 17, 2008. "Settlement ecology and chimpanzee habitat in Mali". *Association of American Geographers 104th Annual Meeting*, Boston, MA, April 15-19.
- Duvall, C.S.* April 20, 2007. "Are baobab groves at settlement sites anthropogenic?". *Association of American Geographers 103rd Annual Meeting*, San Francisco, CA, April 16-21.
- Duvall, C.S.* April 20, 2007. "Discussion of Animal Geographies II: People, Parks, and Wildlife—Studies of Conflict from Africa, India, and Elsewhere". *Association of American Geographers 103rd Annual Meeting*, San Francisco, CA, April 16-21.
- Duvall, C.S.* November 17, 2006. "Human settlement history and baobab regeneration in southwestern Mali". *African Studies Association 49th Annual Meeting*, San Francisco, CA, November 16-19.
- Duvall, C.S.* March 8, 2006. "Bedrock, humans, and other causes of floristic variation in southwestern Mali". *Association of American Geographers 102nd Annual Meeting*, Chicago, IL, March 5-10.
- Duvall, C.S.* April 6, 2005. "The tree *Spondias mombin* in Africa: historical and political biogeography". *Association of American Geographers 101st Annual Meeting*, Denver, CO, April 5-9.
- Duvall, C.S.* March 7, 2003. "Symbols, not data: rare trees and vegetation history in Mali". *Association of American Geographers 99th Annual Meeting*, New Orleans, LA, March 5-8.
- Duvall, C.S.* August 30, 2000. "Conservation of the tree *Gilletiodendron glandulosum* in Mali". *16th AETFAT Congress*, Brussels, Belgium, August 28-September 2. [Poster]
- Duvall, C.S.* September 14, 1998. "Somalia: history of current crisis". *Immigration and Refugee Services Association of America Annual Meeting*, San Francisco, CA, September 3-5.

Home Campus Academic Presentations

- Duvall, C.S.* October 23, 2014. "Work and drugs: The origins of marijuana in the Atlantic World". Invited Presentation: *Lightning Lounge Research Presentations Series*, Office of the Associate Provost for Faculty Development, University of New Mexico, Albuquerque, New Mexico.

- Duvall, C.S.* September 9, 2011. "Did Africans introduce *Cannabis* to Brazil?". Invited Presentation: *Brownbag Lecture Series*, Department of Geography, University of New Mexico, Albuquerque, New Mexico.
- Duvall, C.S.* April 25, 2011. "Did Africans introduce *Cannabis* to Brazil? Considering evidence and arguments in the historical geography of the Atlantic World". Invited Presentation: *Students of Latin American Studies Lecture Series*, Latin American and Iberian Institute, University of New Mexico, Albuquerque, New Mexico.
- Duvall, C.S.* November 16, 2010. "Context matters, but what is context? Geographic perspectives on food environments and public health". Invited Lecture: *Public Health Seminar Series*, Masters of Public Health Program, University of New Mexico, Albuquerque, New Mexico.
- Duvall, C.S.* October 1, 2010. "What is animal?". Invited Panelist: *Comparative Literature and Cultural Studies Program Annual Roundtable Discussion*, University of New Mexico, Albuquerque, New Mexico.
- Duvall, C.S.* October 5, 2007. "A Maroon legacy? Sketching the historical geography of live fences in Latin America". Invited Lecture: *Center for the Advanced Study of International Development Seminar Series*, Michigan State University, East Lansing, MI.
- Duvall, C.S.* February 5, 2003. "Questioning the dominant representation of vegetation history in Mali". Invited Lecture: *African Studies Seminar Series*, University of Wisconsin, Madison, WI.

Planning and Organizing Professional Presentations

Session Organizer and Chair:

- Landscape Change in the Atlantic World, Part 1: African Connections. *Association of American Geographers 106th Annual Meeting*, Washington, DC, April 14-18, 2010.
- Landscape Change in the Atlantic World, Part 2: European Connections. *Association of American Geographers 106th Annual Meeting*, Washington, DC, April 14-18, 2010.
- Historical Ecology 1: Plant Distributions. *Association of American Geographers 103rd Annual Meeting*, San Francisco, CA, April 16-21, 2007. (with Antoinette WinklerPrins)

Session Organizer:

- Historical Ecology 2: Land Management Practices. *Association of American Geographers 103rd Annual Meeting*, San Francisco, CA, April 16-21, 2007. (with Antoinette WinklerPrins)
- Historical Ecology 3: Constructing and Manifesting Historical Ecologies. *Association of American Geographers 103rd Annual Meeting*, San Francisco, CA, April 16-21, 2007. (with Antoinette WinklerPrins)
- Applied Biogeography and Cultural Ecology in Semi-arid Africa. *Association of American Geographers 102nd Annual Meeting*, Chicago, IL, March 5-10, 2006. (with Paul Laris)

Session Chair:

- Environmental History and Policy, Session 1. *African Studies Association 49th Annual Meeting*, San Francisco, CA, November 16-19, 2006.

Awards

Research and Travel Grants

- 2014
- Research Grant (Consultant; P. Laris, PI), \$250,000, National Science Foundation, Geography and Spatial Sciences Program: “Creating Woodlands: Integrating Land-Use Practices and New Savanna Models”
- 2010
- Travel Grant, \$1000, College of Arts and Sciences, University of New Mexico
- 2010
- Research Grant (PI), \$19,775, Robert Wood Johnson Center for Health Policy Research: “Geographic Information Tools for Assessing Spatial Relationships Between Food Accessibility, Food Availability, and Diet-Related Public Health”
- 2010
- Travel Grant, \$235, College of Arts and Sciences, University of New Mexico
- 2008
- Research Grant (PI), \$3,799, Research Allocations Committee, University of New Mexico: “Sandstone biogeography in the southern Colorado Plateau, New Mexico”
- 2005
- Vilas Travel Grant, \$600, University of Wisconsin, Madison [declined]
- 2005
- Research Grant (Co-PI), €83,000, Ministère de l’Ecologie et du Développement Durable (République Française): “Les failles et forêts-galeries au sud du Mali comme refuges de faune et flore guinéenes en zone soudanienne”
- 2003
- Research Grant (Co-PI), \$16,000, Great Ape Conservation Fund of United States Fish and Wildlife Service: “Spatial assessment of chimpanzee population and habitat in the Bafing Protected Areas, Mali”
- 2003
- Research Grant (Co-PI), \$5,000, Primate Action Fund of Conservation International: “Spatial assessment of chimpanzee habitat in the Bafing Protected Areas, Mali”
- 2003
- Research Grant (PI), \$2,000, Zoological Society of Milwaukee County: “Chimpanzee population density in the Bafing Protected Areas, Mali”
- 2003
- Research Grant (PI), \$700, Association of American Geographers Biogeography Specialty Group: “Spatial assessment of chimpanzee habitat in southwestern Mali”
- 2003
- Research Fellowship (PI), \$15,000, Wildlife Conservation Society: “Spatial assessment of chimpanzee habitat in the Bafing Protected Areas, Mali”
- 2003
- Travel Grant, \$200, Department of Geography, University of Wisconsin, Madison
- 2001
- Travel Grant, \$200, Department of Geography, University of Wisconsin, Madison
- 2001
- Grant-in-Aid of Research (PI), \$500, Sigma Xi Scientific Research Society [declined]

Curriculum Development Grants

- 2010
- Course Development Grant (PI), \$4,000, Title VI Funding, Latin American and Iberian Studies Institute, University of New Mexico: “Geography 515: Cultural and Political Ecology of Afro-Brazil”
- 2010
- Curriculum Development Grant (Co-PI), \$300,000, U.S. Department of Agriculture, Hispanic-Serving Institutions Education: “Collaborative for Sustainable Foodsheds”

Research Proposals Not Funded

- 2014
- Research Fellowship (PI), approx. €11,000, Fulbright U.S. Scholar Program, Portugal: “Labor and Drugs in the Portuguese Atlantic: Colonial Angola’s *Liamba* Tradition of Drug Use”

- 2014 Research Grant (PI), \$50,400, National Endowment for the Humanities, Awards for Faculty at Hispanic-Serving Institutions: "Medication, Migration, and Marginality in the Atlantic World until 1940"
- 2014 Research Fellowship (PI), \$50,400, National Endowment for the Humanities, Faculty Fellowships Program: "Medication, Migration, and Marginality in the Atlantic World until 1940"
- 2012 Conference Participation Grant (PI), \$2,000, Weatherford Initiative on Global History, Harvard University: "'It gives them strength and vigour': Drug *Cannabis* and the expansion of exploitative labor regimes in the Atlantic World"
- 2012 Research Grant (Co-PI), \$250,000, NIH P-20 Planning Proposal: "Spatial Relationships of Obesity in the Southwest Borderlands"
- 2011 Research Grant (Co-PI), \$702,000, National Institutes of Health, Centers of Excellence Program (P20): "Disparities in Food Environments in the Southwestern Border Region"
- 2011 Research Grant (PI), National Science Foundation, Geography and Spatial Sciences Program, \$163,000
- 2011 Library Research Grant (PI), University of Florida Libraries and Latin American Studies Center, \$1,250
- 2010 Workshop Support Grant (Co-PI), National Science Foundation, \$62,000
- 2009 Research Grant (Subcontracting Co-PI), U.S. Department of Agriculture, CSREES Program, \$1.5 million
- 2008 Committee for Research and Exploration, National Geographic Society, \$21,000
- 2006 International Research Fellowship Program, National Science Foundation, \$157,539

Research Awards and Honors

- 2010 First Place Poster Presentation, 73rd Annual Meeting of the Rural Sociological Society (P. Howard presented, with co-authors C. Duvall and K. Goldsberry)
- 2008 J. Warren Nystrom Dissertation Award, Association of American Geographers
- 2002 A.C. Jordan African Studies Essay Prize, University of Wisconsin, Madison
- 2001 Second, Student Research Competition, California State University System
- 2001 Winner, Student Research Competition, San José State University
- 1994 College, Department, and Thesis Honors, University of California, Santa Cruz
- 1991 Dean's List of High Honors, University of Hawaii, Hilo

Professional Recognitions

- 2014 Nominee, Election for National Counselor, Association of American Geographers
- 2000 Director's Award for Service, San Francisco Conservation Corps

Academic Scholarships

- 2006 University Dissertator Fellowship, University of Wisconsin, Madison
- 2003 Pauline Duvall Memorial Scholarship, Duvall Scholarship Foundation
- 2002 University Fellowship, University of Wisconsin, Madison
- 2001 Foreign Language and Area Studies Fellowship, University of Wisconsin, Madison
- 1999 Graduate Equity Fellowship, San José State University
- 1999 Viola Ruth Perkins Memorial Scholarship, San José State University

1993 Education Abroad Program Alumni Scholarship, University of California

Research Relationship

2013 Research Partnership (Co-PI; Elizabeth Yakes, PI): Albuquerque Public Schools, New Mexico Department of Health, and UNM Faculty in Economics, Family and Community Medicine, Geography, and Political Science: “Analysis of BMI and school nurse data from students in a New Mexico School District” [this relationship enables exchange of complementary data sets and the development of future proposals for diet-related public health in Albuquerque]

Teaching Experience and Training

Teaching Experience as Instructor

Course [course level]	Institution	No. of Semesters	No. of Students	Total Credit Hours
Geog. 101: Introduction to Physical Geography [undergrad.]	Univ. of New Mexico	7	1,138	3,414
Geog. 281L: Survey of Geographic Information Science [undergrad.]	Univ. of New Mexico	3	47	188
Geog 350: Physical Landscapes [undergrad.]	Univ. of New Mexico	1	19	57
Geog 464/564: Food and Natural Resources [undergrad. and grad.]	Univ. of New Mexico	7	226	678
Geog 471: Applied Geography Seminar [undergrad.]	Univ. of New Mexico	2	34	102
Geog 515: Cultural and Political Ecology of Afro-Brazil [grad.]	Univ. of New Mexico	3	31	93
Integrated Social Studies 330a: People and the Environment [undergrad.]	Michigan State Univ.	2	225	675
Geog. 873: Seminar in Human-Environment Geography [grad.]	Michigan State Univ.	1	8	24
Integrated Social Studies 330a: Social Science Perspectives on Africa [undergrad.]	Michigan State Univ.	2	50	150
Geog. 339: Environmental Conservation [undergrad.]	Univ. of Wisconsin	1	140	420
Totals, all semesters:			1,918	5,801

Teaching Experience as Teaching Assistant

Date	Course [course level]	Institution	No. of Semesters	No. of Students
Spring 2006	Geog. 339: Environmental Conservation [undergrad.]	Univ. of Wisconsin	1	75
AY 2002-2003	Geog. 127: Introduction to Physical Geography [undergrad.]	Univ. of Wisconsin	1	90

Supervision of Graduate and Undergraduate Independent Study Classes

UNM courses shown with earned credit hours (crs.) per semester:

<i>Spring 2015:</i>	Geog 491: 1 student, 3 crs. Geog 599: 3 students, 9 crs.		
<i>Spring 2014:</i>	Geog 491: 1 student, 3 crs. Geog 599: 3 students, 9 crs.	<i>Summer/ Fall 2014:</i>	Geog 591: 1 student, 3 crs. Geog 599: 3 students, 9 crs.
<i>Spring 2013:</i>	Geog 593: 1 student, 3 crs. Geog 599: 4 students, 8 crs.	<i>Summer/ Fall 2013:</i>	Geog 491: 1 student, 3 crs. Geog 599: 4 students, 12 crs.
<i>Spring 2012:</i>	Geog 491: 1 student, 3 crs. Geog 493: 1 student, 3 crs. Geog 593: 1 student, 3 crs. Geog 599: 1 student, 3 crs.	<i>Fall 2012:</i>	Geog 491: 2 student, 6 crs. Geog 591: 2 student, 6 crs. Geog 599: 4 students, 12 crs.
<i>Spring 2011:</i>	Geog 491: 1 student, 3 crs. Geog 599: 2 student, 6 crs.	<i>Summer/ Fall 2011:</i>	Geog 491: 2 students, 6 crs. Geog 599: 2 students, 6 crs.
<i>Spring 2010:</i>	Geog 599: 1 student, 3 crs.	<i>Summer/ Fall 2010:</i>	Geog 491: 4 students, 12 crs. Geog 599: 2 students, 6 crs.
<i>Spring 2009:</i>	Geog 494: 1 student, 3 crs. Geog 592: 1 student, 3 crs.	<i>Fall 2009:</i>	Geog 491: 1 student, 3 crs.
		<i>Fall 2008:</i>	Geog 493: 1 student, 3 crs.

Total students, all semesters: 50
Total credit hours, all semesters: 150

Pedagogical Training

Date	Training topic	Length	Institution
1/2012	Using collaborative learning classrooms	1.5 hrs.	Univ. of New Mexico
4/2010	Assigning and responding to student writing	2 hrs.	Univ. of New Mexico
1/2010	Designing courses for effective student learning	12 hrs.	Univ. of New Mexico
11/2009	Teaching effectively with PowerPoint	2 hrs.	Univ. of New Mexico
4/2009	Using writing to assess student learning	3 hrs.	Univ. of New Mexico
3/2009	Enhancing courses with WebCT	2 hrs.	Univ. of New Mexico
4/2008	Active learning in large classes	3 hrs.	AAG
4/2008	Teaching critical thinking using ArcGIS	3 hrs.	AAG

Date	Training topic	Length	Institution
12/2007	Writing and evaluating tests	3 hrs.	Michigan State Univ.
11/2007	Using case studies in teaching	3 hrs.	Michigan State Univ.
10/2007	Group work in large classes	3 hrs.	Michigan State Univ.
4/2007	Accommodating diverse learning styles	2 hrs.	AAG
3/2007	Apathy and the psychology of learning	3 hrs.	Michigan State Univ.
3/2007	Theatrical conventions in lecturing	3 hrs.	Michigan State Univ.
6/2006	Pedagogy and academic career management	1 week	Univ. of Colorado

Mentoring

Chair of Thesis Committees (Departments of Geography unless otherwise noted):

M.S./M.A.: Autumn Carr, Univ. of New Mexico; graduated 2012
Garret Dennison, Univ. of New Mexico; 2012-2013, inactive
Stephen Griego, Univ. of New Mexico; graduated 2013
Sarah Haft, Univ. of New Mexico; 2011-2014, transferred committee chairs
Larry Heard, Univ. of New Mexico; 2011-2013, inactive
Bryan Kinworthy, Univ. of New Mexico; graduated 2015
Joseph Leestma, Univ. of New Mexico; Latin American Studies; graduated 2015
Katherine Lenzer, Univ. of New Mexico; graduated 2011
Kris Lindgren, Univ. of New Mexico; graduated 2013
William Maxwell, Univ. of New Mexico; graduated 2013
Maureen Meyer, Univ. of New Mexico; graduated 2014
Sagert Sheets, Univ. of New Mexico; in progress
Roberto Valdez, Univ. of New Mexico; graduated 2015

B.S./B.A. Honors:
Garrett Denmark, Univ. of New Mexico; graduated 2012
David Jacobs, Univ. of New Mexico; graduated 2010
Jonathan Nelson, Univ. of New Mexico; graduated 2012
John Schwarting, Univ. of New Mexico; 2010-2011, inactive
Chris Sylvan, Univ. of New Mexico; graduated 2011
Heleene Tambet, Univ. of New Mexico; in progress

Member of Thesis Committees (Departments of Geography unless otherwise noted):

Ph.D.: Bilal Butt, Michigan State Univ.; graduated 2007
José Castro Sotomayor, Univ. of New Mexico, Department of Communication and Journalism; in progress
Karen Gaines, Univ. of New Mexico, Department of Biology; 2008-2010, inactive
Itai Roffman, Institute of Evolution, Univ. of Haifa, Israel; 2010-2012, inactive
Judith Van Der Elst, Univ. of New Mexico, Department of Anthropology; graduated 2012

M.S./M.A.: Imogen Ainsworth, Univ. of New Mexico; graduated 2013
Crystiana Baca-Bosiljevic, Univ. of New Mexico; graduated 2014
Michael Chang, Univ. of New Mexico, Department of Biology; graduated 2013
Michael Camponovo, Univ. of New Mexico; graduated 2013
Travis Estep, Univ. of New Mexico; 2008-2010, inactive

Angelica Gerhart, Univ. of New Mexico, Department of Foreign Languages and Literatures [French]; in progress
Joel Gruley, Michigan State Univ.; graduated 2008
Natalie Heberling, Univ. of New Mexico; graduated 2010
Drew Ignizio, Univ. of New Mexico; graduated 2010
Audrey Joslin, Michigan State Univ.; graduated 2008
Gillian D. Joyce, Univ. of New Mexico, Department of Sociology; in progress
Sarrah Kubinec, Univ. of New Mexico; graduated 2012
Erin Marchand, Univ. of New Mexico; graduated 2013
Martin Martinez, Univ. of New Mexico; graduated 2013
Choongman Oh, Univ. of New Mexico; graduated 2012
Jack Orozco, Univ. of New Mexico; Latin American Studies, Department of Nutrition and Dietetics; in progress
Knut Peterson, Univ. of New Mexico; graduated 2012
Susan Staley, Univ. of New Mexico; Latin American Studies; graduated 2012
Calvin Tribby, Univ. of New Mexico; graduated 2009

B.S./B.A. Honors:

Jasmine Bennett, Univ. of New Mexico; graduated 2009

Course Development

8/2013 Adapted course for teaching in collaborative learning classroom: Geog 471: Applied Geography Seminar, University of New Mexico
8/2012 Adapted course for teaching in collaborative learning classroom: Geog 464/564: Food and Natural Resources, University of New Mexico
1/2012 Adapted course for teaching in collaborative learning classroom: Geog 350: Physical Landscapes, University of New Mexico
9/2010 New course proposal: Geog. 515: Cultural and Political Ecology of Afro-Brazil, University of New Mexico
9/2008 New course proposal: Geog. 464/564: Food and Natural Resources, University of New Mexico
9/2008 New course proposal: Geog. 350: Physical Landscapes, University of New Mexico
9/2007 New course proposal: Geog. 410: Geography of Food and Agriculture, Michigan State University

Guest Lecturing Experience

Date	Course	Topic	Institution
11/18/2014	Biology 402/502: Human Dimensions of Natural History (Prof. Joe Cook)	Plant diffusion	AIM-UP project, Univ. of New Mexico
8/26/2011	Land Arts of the American West program (Prof. Bill Gilbert)	Food maps	Univ. of New Mexico
1/27/2011	Geography 350: Physical Landscapes (Cody Wiley, Lecturer)	Geographic field research	Univ. of New Mexico

Date	Course	Topic	Institution
3/3/2010	Geography 350: Physical Landscapes (Cody Wiley, Lecturer)	African parklands	Univ. of New Mexico
3/1/2010	Geography 350: Physical Landscapes (Cody Wiley, Lecturer)	Anthropo-genic biomes	Univ. of New Mexico
11/25/2008	Geography 356: Biogeography (Cody Wiley, Lecturer)	Human biogeography	Univ. of New Mexico
4/12/2007	Political Science 344: Politics in the Third World (Prof. Ravi Bhavnani)	Resource scarcity	Michigan State Univ.
2/20/2007	Geography 401: Geography of Plants in North America (Prof. Catherine Yansa)	Ecological disturbance	Michigan State Univ.
3/4/2006	Geography 277: Africa (Prof. Madeleine Wong)	Food and agriculture	Univ. of Wisconsin
10/7/2005	Geography 675: Agroecology (Prof. Karl Zimmerer)	Indigenous knowledge	Univ. of Wisconsin
3/2000	Environmental Studies 117: Human Ecology (Prof. Gary Klee)	African smallholders	San José State Univ.

Continuing Education

Date	Course	Institution
2/2015	Trained mediator, Basic Mediation Skills Training [36 hours]	UNM Ombuds/Dispute Resolution Services for Faculty, Univ. of New Mexico
3/2012	Creative Visualization Workshop [2 hours]	Employee Training Program, Counseling and Referral Services, University of New Mexico
11/2011	LGBTQ Safe Zone Training [8 hours]	LGBTQ Resource Center, University of New Mexico
6/8/2011	Foodprints and Foodsheds Workshop: Tools for Evaluating the Sustainability of Dietary Patterns and the Geography of the Food System [6 hours]	Cornell University, Salisbury University, Tufts University, and University of New Mexico
Spring 2010	Medical Herbalism 101: Foundations [36 hours]	Department of Continuing Education, University of New Mexico

Teaching Award

2012	Accessibility Resource Center, Outstanding Faculty Member Recognition, University of New Mexico
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Professional Service

Departmental Service

- 10/2013-present* Department of Geography, University of New Mexico
Associate Chair
- 2/2013-present* Department of Geography, University of New Mexico
Learning Outcomes Assessment Coordinator
- 9/2008-present* Department of Geography, University of New Mexico
Physical Geography Lab Coordinator
- 9/2011-3/2012* Department of Geography, University of New Mexico
Member, GIScience Assistant Professor Search Committee
- 9/2008-6/2010* Department of Geography, University of New Mexico
Member, Departmental Chair Search Committee
- 12/2008-5/2009* Department of Geography, University of New Mexico
Faculty Sponsor, Geography Graduate Student Association
- 8/2005-9/2006* Department of Geography, University of Wisconsin, Madison
Human-Environment Discussion Group Coordinator
- 8/2002-6/2003* Department of Geography, University of Wisconsin, Madison
Graduate Student Departmental Representative

Campus Service

- 8/2013-present* Latin American and Iberian Studies Institute, University of New Mexico
Member, Interdisciplinary Committee on Latin American Studies (ICLAS)
- 11/2011-present* LGBTQ Resource Center, University of New Mexico
Certified Safe Zone Provider
- 10/2011-5/2013* Office of the Associate Provost for International Initiatives, University of
New Mexico
Chair, Study Abroad Allocations Committee
- 8/2010-8/2013* Latin American and Iberian Studies Institute, University of New Mexico
Member, Operations Committee
- 10/2011* Student-organized Teach-In in Support of (un)Occupy Albuquerque
Presenter, "Does Food Matter in Social Change?" [public lecture]
- 4/2011-8/2011* University of New Mexico Faculty Senate
Member, Ad Hoc Committee for International Affairs
- 8/2010-4/2011* Latin American and Iberian Studies Institute, University of New Mexico
Member, Planning Committee for 2011 Greenleaf Colonial Studies
Conference
- 12/2008-6/2009* University of New Mexico Faculty Senate
Member, Campus Libraries Committee
- 8/2007-3/2008* Environmental Science and Policy Program, Michigan State University
Member, Assistant Professor Search Committee
- 4/2006* University of Wisconsin, Madison, Residence Halls Programming Board
Presenter for Climate Change Student-Resident Information Seminar

Community Service

- 2/2015* Guest Activity Leader, Biology Instructional Unit

1/2015	Sra. Gonzalez’ first-grade class, Cien Aguas International School, Albuquerque, NM [provided a lecture to 22 students on biogeography] Guest Activity Leader, Earth Science Instructional Unit Sra. Elder’s and Sra. Garcia’s third-grade classes, Cien Aguas International School, Albuquerque, NM [provided a lecture to and led a class of 48 students in a map-making exercise]
3/2014, 3/2012, 3/2015	Judge, High School Behavioral and Social Sciences Central New Mexico Science and Engineering Challenge University of New Mexico STEM Education Outreach Programs
1/2014	Guest Activity Leader, Geography Instructional Unit Sra. Nellos’ second-grade class, Cien Aguas International School, Albuquerque, NM [led a class of 22 students in a map-reading exercise]
12/2013	Guest Activity Leader, Geography Instructional Unit Sra. Magill’s kindergarten class, Cien Aguas International School, Albuquerque, NM [led a class of 20 students in a map-making exercise]
4/2013	Guest Activity Leader, Geography Instructional Unit Sra. Flores’ first-grade class, Cien Aguas International School, Albuquerque, NM [led a class of 22 students in a map-reading exercise]
4/2012	Presenter, “Food and Energy: Does Local Matter?” Annual Youth Conference on the Environment, Sandia National Laboratories Environmental Outreach Program [delivered an interactive lecture to four classes of 20 high school students per class]
7/2011	University of New Mexico College Prep Programs, and U.S. Department of Agriculture Presenter, “Food Shortages and Famines” for Agricultural Leadership Program [provided classroom teaching session to 35 high school students]
9/2010, 5/2010, 1/2011	Presenter, “Human-Environment Relationships of Climate Change” Climate Masters Adult Education Program, Albuquerque Office, Environment Department, State of New Mexico [delivered 45-minute lecture to three classes of 25 adult students per class]

National Service

2015	Student Research Showcase of Sigma Xi, The Scientific Research Society Judge, Social and Behavioral Sciences
2014	Southwest Region of the Association of American Geographers Judge, Graduate Student Paper Competition
2014	Southwest Region of the Association of American Geographers Member, Local Organizing Committee
2010-2012	Association of American Geographers Member, Nystrom Award Committee
2008, 2009	Association of American Geographers, Biogeography Specialty Group Judge, Graduate Student Paper Competition

International Service

- 8/2012 International Union for the Conservation of Nature (IUCN)
World Heritage Site Program
Designation Proposal Reviewer, Bijagos Islands, Guinea-Bissau
- 2/2010-present *Notes and Records: International Journal of African and African Diaspora Studies* (Kentucky State University)
Member, Editorial Advisory Board
- 11/2007-present *African Journal of Ecology* (Blackwell Publishing)
Member, International Review Panel
- 8/2003-present IUCN Species Survival Commission Primate Specialty Group
Member, Great Ape Subsection
- 9/2007-9/2012 *Taking Sides: Clashing Views on African Issues* (McGraw-Hill Publishing)
Member, Editorial Review Board

Grant Proposal Reviews (10 proposals)

- 2014 National Geographic Society, Committee for Research and Exploration
- 2012 The Hans Rausing Endangered Languages Project, School of Oriental and African Studies, University of London; National Science Foundation, Geography and Spatial Science Program (2 proposals)
- 2011 National Science Foundation, Geography and Spatial Science Program
- 2010 National Geographic Society, Committee for Research and Exploration; National Science Foundation, Geography and Spatial Science Program
- 2008 IUCN National Committee of the Netherlands, Ecosystem Grants Program; National Geographic Society, Committee for Research and Exploration
- 2007 U.S. Fish and Wildlife Service, Great Ape Conservation Fund

Manuscript Reviews (69 papers, 5 books)

- 2015 *African Journal of Ecology* (2 manuscripts), *Royal Society Open Science*, University Press of Kansas (book proposal)
- 2014 *African Journal of Ecology* (2 manuscripts), *Geographical Review*, *Global Environmental Change* (2 manuscripts), *Historical Geography*, *Journal of Environmental Studies and Sciences*, *Progress in Physical Geography* (2 manuscripts), *Royal Society Open Science*, *Society and Natural Resources*
- 2013 *African Journal of Ecology*, *Annals of the Association of American Geographers*, *Environment & History* (3 manuscripts), *Journal of Ethnobiology*, *Journal of Historical Geography*, *Revue de Primatologie*, *Scientia Agriculturae Bohemica*, *Society & Natural Resources*
- 2012 *Annals of the Association of American Geographers*, *Conservation Letters*, *Society and Natural Resources*, *Journal of Environmental Sciences and Studies*, *African Journal of Ecology* (2 manuscripts), Oxford University Press (book proposal), *Geoforum*
- 2011 *African Journal of Ecology* (8 manuscripts), *Economic Botany*, *Journal of Applied Geography*, *Journal of Land Use Science*

2010	<i>African Journal of Ecology</i> (2 manuscripts), <i>Agriculture and Human Values</i> , <i>Forests Trees and Livelihoods</i> , John Benjamins Publishing Company (book chapter manuscript)
2009	University of Chicago Press (book manuscript, in French), Pearson/Prentice-Hall (book manuscript), <i>African Journal of Plant Science</i> , <i>Annals of the Association of American Geographers</i> , <i>Forests Trees and Livelihoods</i> , <i>Geography Compass</i> , <i>Society & Natural Resources</i>
2008	<i>African Journal of Ecology</i> (8 manuscripts), <i>Annals of the Association of American Geographers</i> , <i>Geography Compass</i> , <i>Physical Geography</i> , <i>Society & Natural Resources</i>
2007	<i>African Journal of Ecology</i> , <i>Singapore Journal of Tropical Geography</i> , <i>Journal of Ethnobiology and Ethnomedicine</i>
2006	<i>Geoforum</i>
2004	<i>The Geographical Journal</i>

Professional Affiliations

Member, Association of American Geographers (Biogeography, Cultural and Political Ecology, Africa, and Latin America specialty groups)
Full Member, Sigma Xi, the Scientific Research Society (University of New Mexico Chapter)

Language Skills

Language	Speaking, listening	Reading	Writing	
English	fluent	fluent	fluent	native speaker
French	advanced	advanced	advanced	undergraduate study, multi-year use in West Africa
Bamanan (Bambara)	advanced	basic	basic	Peace Corps training, multi-year use in West Africa
Portuguese	basic	intermediate	basic	self-taught for research use, practical use in Portugal and Guinea-Bissau
Spanish	basic	intermediate	basic	self-taught for research use, practical use in U.S.
Arabic	minimal	minimal	minimal	Ph.D. minor, no practical experience

Additionally, I have studied Latin, Maninka (Malinké), and Crioulo da Guiné-Bissao

Select Athletic Accomplishments

Finisher (2:56:17), 2014 Jemez Mountains Trail Run Half Marathon, Los Alamos, NM. [ran]
Finisher (2:54:19), 2013 Jemez Mountains Trail Run Half Marathon, Los Alamos, NM. [ran]

Finisher (7:14:07), 2012 Mt. Taylor 50k Trail Run, Grants, NM. [ran]
Finisher (2:21:59), 2012 La Luz Trail Run, Albuquerque, NM. [ran]
Finisher (2:03:16), 2011 Capulin Volcano Half Marathon, Folsom, NM. [ran]
Finisher (2:19:54), 2011 La Luz Trail Run, Albuquerque, NM. [ran]
Finisher (5:24:25), 2011 Run the Caldera Marathon, Valles Caldera, NM. [walked]
Finisher (2:07:41), 2010 Capulin Volcano Half Marathon, Folsom, NM. [ran]
Finisher (9:16:31), 2007 North Country 50-mile Trail Run, Manistee, MI. [ran]
Second-place Team Member, Mixed Masters Division, 2006 Lake-to-Lake Triathlon, Loveland, CO. [bicycle leg]
Second-place Team Member, Competitive Division, 2006 Intramural Basketball Tournament, University of Wisconsin, Madison, WI. [center, forward]
Winning Team Member (1:11:53), Half-marathon Relay Division, 2005 Gulshan Lake Hot Trot, Dhaka, Bangladesh. [ran]
Winner (5:22:26), Marathon Walk Division, 2003 Lake Geneva Marathon, Lake Geneva, WI. [walked]
Winner (31:49), 5K Walk Division, 2003 Run for the Refuge, Horicon Marsh National Wildlife Refuge, WI. [walked]
Finisher (4:21:00), 1997 Seattle Marathon, Seattle, WA. [ran]

SCOTT M. FREUNDSCHUH
CURRICULUM VITAE

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1University of New Mexico
Albuquerque, NM 87130

email: sfreunds@unm.edu
fax: 505.277.6314

EDUCATION

- June, 1992 State University of New York Buffalo, Department of Geography. Doctor of Philosophy; Cartography, Geographic Information Science, Spatial Cognition; Navigation and Wayfinding; Thesis Title: *Spatial Knowledge Acquisition of Urban Environments from Maps and Navigation Experience*
- June, 1987 State University of New York Buffalo, Department of Geography. Master of Art; Cartography; Map Use Education; Geographical Information Science; Thesis Title: *Assessing the Ability of Preliterate Children to Use Maps*
- August, 1985 University of Minnesota Duluth, Department of Geography. Bachelor of Art; Cartography; Physical Geography
- August, 1985 University of Minnesota Duluth, Department of Geology. Bachelor of Science; Glacial; Structural Geology

RESEARCH AND TEACHING INTERESTS

Scale and Size in the Development of Spatial Cognition; Children and Adult Understanding of Locatives/Spatial Concepts; Map Design; Spatial Thinking; Geographic Information Science, Geospatial Privacy, VGI in Emergency Response

PROFESSIONAL ACTIVITIES

Academic Appointments

- Aug. 2014-present Professor, Department of Geography and Environmental Studies, University of New Mexico
- Aug. 2010-Aug. 2014 Professor and Chair, Department of Geography and Environmental Studies, University of New Mexico
- May, 2010-Aug. 2010 Professor, University of Minnesota Duluth, Department of Geography (Promotion to full professor approved by the Board of Regents May 13, 2010)
- Aug., 2008-Aug. 2010 Program Officer - Geography and Spatial Sciences Program, Technical Coordinator - Spatial Intelligence & Learning Center; Division of Social, Behavioral and Economic Sciences/Behavioral and Cognitive Sciences, National Science Foundation (on leave from the University of Minnesota)
- Jan., 2007-Aug. 2008 Director, Urban and Regional Studies Program, University of Minnesota Duluth, College of Liberal Arts
- June, 2002-Aug. 2008 Department Head, University of Minnesota Duluth, Department of Geography
- May 1999-Aug. 2008 Director, Environmental Studies Program, University of Minnesota Duluth, College of Liberal Arts
- Sept., 1997-May, 2010 Associate Professor, University of Minnesota Duluth, Department of Geography; Cartography, Geographic Information Science, Spatial Cognition
- Sept., 1994-Aug., 1997 Assistant Professor, University of Minnesota Duluth, Department of

July 5-29, 1994	Geography Cartography, Geographic Information Science, Spatial Cognition Lecturer, Center for Cognitive Science, State University of New York at Buffalo; <i>Geographic Organization of Space</i> , the First International Summer Institute in Cognitive Science (taught with Professor David Mark)
Aug., 1993-July, 1994	Post-Doctoral Research Associate, National Center for Geographic Information and Analysis (NCGIA), University of Maine; Spatio-temporal Reasoning, User Interfaces for GIS (w/ Max Egenhofer and Reg Golledge)
Sept., 1990-Aug., 199	Assistant Professor, Memorial University of Newfoundland, Department of Geography; Cartography, Geographical Information and Analysis Systems, Spatial Cognition (on leave from 8/1/93 to 9/1/94)
May, 1989-Sept., 1990	Research Assistant, National Center for Geographic Information and Analysis (NCGIA), State University of New York at Buffalo
July, 1987-Aug., 1989	Lecturer, State University of New York at Buffalo, Department of Geography; Introduction to Maps and Airphotos

Professional Development

2010	Leader/presenter, 7th Annual Association of American Geographers Department Leadership Workshop: Beyond the Ivory Tower, Boulder, Colorado, 17-19 June
2010	Leader/Presenter, Summer Workshop for Graduate Students & Early Career Faculty, University of Colorado at Boulder, Boulder, Colorado, 13-19 June
2004	Provost's Academic Leadership Initiative, University of Minnesota Twin Cities (program spanned the entire 2004-2005 Academic Year)
2004	AAG Healthy Departments Workshop, Seattle, WA, June

Other Professional Activities

2015-2016	Program Chair, AutoCarto Conference, to be held in Albuquerque, NM September 14-16, 2016.
2015	Chair Elect, Coalition of Geospatial Organizations (COGO)
2014 - 2015	Co-Organizer and Program Chair, Conference on Spatial Information Science (COSIT), Santa Fe, NM, October 12-16, 2015
2012	Program Committee Member, AutoCarto Conference, Columbus, OH
2011	<i>Past President</i> , Cartography and Geographic Information Society
2010	<i>President</i> , Cartography and Geographic Information Society
2010	<i>Program Committee Member</i> , Workshop on User Studies: International Cartographic Commission (ICA) on Use and User Issues, GIScience 2010 Conference, Zurich, Switzerland
2009	<i>President Elect</i> , Cartography and Geographic Information Society
2009 - 2010	<i>Member</i> , Local Organizing Committee for Annual Meeting of the Association of American Geographers in April, 2010, Washington, DC
2008	Member of the National Science Foundation's Program in Geography and Regional Science's Strategic Planning Committee (along with Program Officers Thomas Baerwald, Kenneth Young and Daniel Hammel), 24-27 June, Charlottesville, VA
2008	<i>Vice President</i> , Cartography and Geographic Information Society (CaGIS)
2007 - 2008	<i>Director</i> , Center for Community and Regional Research, University of Minnesota Duluth, College of Liberal Arts
2006 - 2008	<i>Board member</i> , North American Cartographic Information Society (NACIS)
2004 - 2005	<i>Academic Director</i> , Environmental Perception and Behavioral Geography Specialty Group, Association of American Geographers
2003	<i>Scientific Committee</i> , Conference on Spatial Information Theory (COSIT) Ittingen, Switzerland
2001	<i>Scientific Committee</i> , Conference on Spatial Information Theory (COSIT), Santa Barbara, California
1999	<i>Co-organizer and Co-leader</i> (with Dr. Holly Taylor), National Center for Geographic Information and Analysis (NCGIA) Varenus Project Specialist Meeting <i>Multiple Input</i>

- 1999 *Modes and Multiple Reference Frames for Spatial Knowledge*, 25 Feb-3 March Scientific Committee, Conference on Spatial Information Theory (COSIT), Hamburg, Germany
- 1998 - 1999 *Chair*, Cartography Specialty Group, Association of American Geographers
- 1996 - 2008 *Alternate delegate*, University Consortium for Geographic Information Science
- 1996 - 1998 *Academic Director*, Cartography Specialty Group, Association of American Geographers
- 1995 - 1997 *Chair*, Environmental Perception and Behavioral Geography Specialty Group, Association of American Geographers
- 1989 - 1990 *Student Director*, Cartography Specialty Group, Association of American Geographers

Journal Boards and Editorships

- 2012 - present Executive Editor, *Cartography and Geographic Information Sciences*
- 2010 - 2012 Managing Editor, *Cartography and Geographic Information Sciences*
- 2001 - 2007 Editor *Cartographic Perspectives*
- 1998 - 2000 Editorial Board, *Cartographic Perspectives*
- 1999 Guest Co-editor (with Rob Kitchin) *Professional Geographer: Contemporary Thought and Practice in Cognitive Mapping Research*, 51:4.
- 1995 Guest Co-editor (with Daniel Montello) *Geographical Systems: Sources of Spatial Knowledge and Their Implications for GIS*, 2:3.

Reviewed Manuscripts for

ANNALS of the Association of American Geographers; Basil Blackwell; *Canadian Institute for Surveying and Mapping*; *Cartographic Perspectives*; *Cartography and Geographic Information Science*; *Environment and Planning A*; *Geographical Analysis*; *International Journal of Human Computer Systems*; *Journal of Environmental Psychology*; *Journal of Geography*; Kluwer Academic Press; *Papers of the Applied Geography Conference*; Prentice Hall; *Research in Geographic Education*; *Transactions in GIS* *Transportation in GIS*; *Visualization in Modern Cartography*; *International Journal of GIScience*

Honors and Awards

- 1996 Research Award Nominee, College of Liberal Arts, University of Minnesota
- 1993 Finalist, Nystrom Awards Competition, Association of American Geographers
- 1990 National Science Foundation Travel Award
- 1990 NATO Advanced Study Institute Award
- 1988-1990 Research Assistantship, National Center for Geographic Information and Analysis (NCGIA), SUNY at Buffalo
- 1985-1989 Graduate Assistantship, Department of Geography, SUNY at Buffalo
- 1984 Scholarship, University of Minnesota Department of Geology
- 1982-1983 Scholarship, National Council for Geographic Education

PUBLICATIONS

Books

- 2016 Freundsuh, S.M. (Ed.) forthcoming, *Proceedings AutoCarto 2016*, Albuquerque, NM, U.S.A., September 14-16, 2016.
- 2015 Fabrikant, S.I., M. Raubal, M. Bertolotto, C. Davies, S. Freundsuh, and S. Bell (Eds.). *Proceedings, Conference on Spatial Information Theory (COSIT 2015)*, Santa Fe, NM, USA, Oct. 12-16, 2015. Lecture Notes in Computer Science (LNCS) 9368, Springer, Berlin, Germany.
- 2015 Kitchin, R. and S.M. Freundsuh, (Eds.) *Cognitive Mapping: Past, Present and Future*, Taylor and Francis (released in paperback), 280 pp. ISBN 0415757800
- 2000 Kitchin, R. and S. M. Freundsuh, (Eds.) *Cognitive Mapping: Past, Present and Future*, Routledge, 266 pp. ISBN 10: 0415208068
- Freundsuh, S. M., *Chapter 8: Macro- and Micro-scale Environments*, pp. 125-146.

- Kitchin, R. and S. M. Freundsuh, Chapter 1: Cognitive Mapping, pp. 1-8.
- Kitchen, R. and S. M. Freundsuh, Chapter 14: The Future of Cognitive Mapping Research, pp. 249-263.

Peer-reviewed Articles and Book Chapters

- 2015 Zhang, S., S.M. Freundsuh, K. Lenzer and P.A. Zandbergen. The Location Swapping Method for Geomasking. *Cartography and Geographic Information Science*. Published online Oct 15. <http://cx.doi.org/10.1080/15230406.2015.1095655>
- 2014 Camponovo, M. and S.M. Freundsuh. Assessing Uncertainty in VGI for Emergency Response. *Cartography and Geographic Information Science*. <http://dx.doi.org/10.1080/15230406.2014.950332>
- 2014 Carr, J., S. Vallor, S. Freundsuh, W. Gannon and P. Zandbergen. Hitting the moving target: the challenges of creating a dynamic curriculum addressing the ethical dimensions of geospatial data. *Journal of Geography in Higher Education*, 38(4): 444-454. <http://dx.doi.org/10.1080/03098265.2014.936313>
- 2012 Freundsuh, S.M. and M. Blades, The Cognitive Development of the Spatial Concepts NEXT, NEAR, AWAY and FAR, In M. Raubal, A. Frank and D. Mark (Eds.) *Cognitive and Linguistic Aspects of Geographic Space - New Perspectives on Geographic Information Research*, Springer, pp. 43-62.
- 2012 Institutional Review for Research in the Social Sciences from the Federal Perspective, *Professional Geographer*, Focus Section titled *Protecting Human Subjects Across the Geographic Research Process*, 64(1): 43-48. <http://dx.doi.org/10.1080/00330124.2011.596791>
- 2005 Montello, D. R. and S.M. Freundsuh, Cognition of geographic information. In McMaster, R. B and Usery, E. L. (Eds.), *A research agenda for geographic information science*. Boca Raton, FL: CRC Press, 61-91.
- 2001 Navigation and Wayfinding Behavior. *International Encyclopedia for the Social and Behavioral Sciences*, Elsevier Sciences, 16391-16394.
- 1999 Freundsuh S. M. and R. Kitchin, Contemporary Thought and Practice in Cognitive Mapping Research: An Introduction, *The Professional Geographer*, 51:4:507-510.
- 1999 Freundsuh, S. M. and W. Hellevik, Multimedia Technology in Cartography and Geographic Education. In Cartwright, W., M. Peterson, G. Gartner (Eds.) *Multimedia Cartography*, Springer-Verlag, 271-280.
- 1998 The Relationship Between Geographic Scale, Distance, and Time as Expressed in Natural Discourse. In Egenhofer, M. and R. Golledge (Eds.), *Spatial and Temporal Reasoning in Geographic Information Systems*, Oxford University Press, 131-142.
- 1998 Freundsuh, S. M. and M. J. Egenhofer, Human Conceptions of Spaces: Implications for Geographic Information Systems, *Transactions in GIS*, 2:4:361-375
- 1996 Freundsuh, S. M. and M. Sharma, Spatial Image Schemata, Locative Terms and Geographic Spaces in Children's Narrative: Fostering Spatial Skills In Children. *Cartographica, Monograph 46, Orienting Ourselves in Space: Implications for the School Curriculum*, 32:2, 38-49.
- 1995 Montello, D. R. and S. M. Freundsuh, Sources of Spatial Knowledge and Their Implications for GIS: An Introduction, *Geographical Systems*, Issue on Spatial Cognitive Models, 2, 169-176.
- 1995 Freundsuh, S. M. and D. Mercer, Spatial Cognitive Representations of Story Worlds Acquired From Maps and Narrative, *Geographical Systems*, 2, 217-233.
- 1995 Mark, D. M. and S. M. Freundsuh, Spatial Concepts and Cognitive Models for Geographic Information Use. In Nyerges, T. L., D. M. Mark, R. Laurini and M. J. Egenhofer (Eds.), *Cognitive Aspects of Human Computer Interaction for Geographic Information Systems*. Dordrecht: Kluwer Academic Publishers, 21-28.
- 1991 The Effect of the Pattern of the Environment on Spatial Knowledge Acquisition. In Mark, D. M. and A. Frank (Eds.), *Cognitive and Linguistic Aspects of Geographic Space*, Kluwer Academic Press, 167-183.
- 1990 Vasiliev, I., S. M. Freundsuh, D. M. Mark, G. D. Theisen, and J. McAvoy, What is a Map? *The Cartographic Journal*, 119-123.

- 1990 Can Young Children Use Maps to Navigate?, *Cartographica*, 27:1, 54-66.

Refereed Articles and Book Chapters

- 2010 Mickey, K.W., Carlson, L.A., & Freundschuh, S.M. Location, location, location: Environmental constraints on interpreting spatial terms [Abstract]. In S. Ohlsson & R. Catrambone (Eds.), *Proceedings of the 32nd Annual Conference of the Cognitive Science Society* (p. 579). Austin, TX: Cognitive Science Society
- 2009 Map Perception and Cognition. In Kitchin, R. and Thrift, N. (Eds.) *International Encyclopedia of Human Geography*, Oxford: Elsevier, 1:334-338.
- 2007 Map Legends, in Kemp, K. (Ed.) *Encyclopedia of Geographic Information Science*, SAGE, 252-253.
- 2007 Symbolization, in Kemp, K. (Ed.) *Encyclopedia of Geographic Information Science*, SAGE, 458-460.
- 1995 Mark, D. M., D. Comas, M. J. Egenhofer, S. M. Freundschuh, Gould, M. D, and J. Nunes. Evaluating and Refining Computational Models of Spatial Relations Through Cross-linguistic Human-subjects Testing, In Frank, A. U. and W. Kuhn, (Eds.) *Spatial information theory: A theoretical basis for GIS*. Berlin: Springer-Verlag, Lecture Notes in Computer Science 988.
- 1992 Is there a relationship between spatial cognition and environmental patterns? In Frank, A.U., Campari, I., and Formentini, U. (Eds.), *Theories and Methods of Spatio-Temporal Reasoning in Geographic Space*, Springer-Verlag: New York, 288-304.
- 1990 Freundschuh, S. M., D. M. Mark, S. Gopal, M. Gould, and H. Couclelis, Verbal Directions for Wayfinding: Implications for Navigation and Geographic Information and Analysis Systems. *Proceedings of the Fourth International Symposium on Spatial Data Handling*, Zurich, Switzerland, 478-487.

Other Publications

- 1997 Research in Geography, Space and Development: How Can it Inform Geographic Education?, *Proceedings of The First Assessment: Research in Geographic Education*, The Gilbert M. Grosvenor Center for Geographic Education, 67-79.
- 1991 Freundschuh, S. M., and M. D. Gould, Empirical User Testing for Validation of GIS Design. *Proceedings of the GIS/LIS Annual Conference and Exposition: Volume 2*, Atlanta, Georgia, 922-931.
- 1989 Does 'Anybody' Really Want (or Need) Vehicle Navigation Aids?. *Proceedings of the IEEE International Conference (VNIS '89)*, Toronto, Ontario, Canada, 439-442

Technical Reports

- 2001 Freundschuh, S. M., and H. Taylor, Multiple Modalities and Multiple Frames of Reference for Spatial Knowledge, *NCGIA Technical Report*.
- 1996 Vlaming, J. and S. M. Freundschuh, *Voyagers National Park 1996 Recreation Survey: Final Report*. Technical report prepared for the Center for Community and Regional Research at the University of Minnesota, Voyagers Region National Park Association, and The Quetico-Superior Foundation, 65 pp.
- 1994 Review of Specialists Meeting. In Egenhofer, M. J. and R. G. Golledge (Eds.), *Time in Geographic Space*. *NCGIA Technical Report*, 40 pp.
- 1991 Taylor, C., E. Lambert, and S. M. Freundschuh, *A Geographical Information Systems Approach to Protected Areas Planning for the Island of Newfoundland*. Technical report prepared for, and published by, Protected Areas Association (PAA) of Newfoundland, May, 54 pp.
- 1990 Freundschuh, S. M., M. D. Gould and D. M. Mark, Issues in Vehicle Navigation and Information Systems. *NCGIA Technical Paper 89-15*, 31 pp.
- 1989 Mark, D. M., M. D. Gould, S. M. Freundschuh, M. Egenhofer, W. Kuhn, M. McGranaghan, and S. Svorou, Spatial Languages "Including Vehicle Navigation and Wayfinding": A Working Bibliography. *NCGIA Technical Report 89-10*, 33 pp.
- 1989 Mark, D. M., A. U. Frank, M. J. Egenhofer, S. M. Freundschuh, M. McGranaghan, and R. M.

White, Languages of Spatial Relations. *NCGIA Technical Report 89-2*, 62 pp.

OTHER RESEARCH ACTIVITIES

Invited Lectures

- 2009 Colloquium presentation, Department of Geography, University of North Carolina Greensboro: Put the Horse NEXT to the Lake and FAR from the Water Tower: The Development of Spatial Concept Understanding in Large-scale, Geographic Spaces, Greensboro, NC, 13 February
- 2002 Colloquium presentation, Department of Geography, Ball State University: *The Development of Locative Understanding in Large- and Small-scale Model Spaces*, Muncie, IN, July
- 2002 Campus wide presentation for UMD's Geography Awareness Week: *Visualizing Campuses from 2D and 3D Maps*, Duluth, MN, November
- 1995 Cognition, Cartography and GIS. Paper presented to the Departamento of Geografía, Universidad de Extremadura, Cáceres, Espana, 28 February
- 1992 Geographic Information Systems: A Graphical, Analytical, and Informational Tool. Paper presented at the Industry, Science and Technology, Canada Seminar, *Geomatics and the Applications of Geographic Information Systems*, in St. John's, Newfoundland, Canada, 8 April

Invited Participation at Workshops and Research Symposia

- 2014 NSF Unplugged: Writing Competitive Proposals for the Social and Behavioral Sciences, Presented for the Office of Research, UNM, April
- 2011 Writing Competitive Grant Proposals for the National Science Foundation, Presented to faculty and PhD students in the College of Liberal Arts, UNM. April
- 2010 *Writing Grants Submitted to the Social, Behavioral and Economic Sciences at the National Science Foundation*, Presented at the New Mexico EPSCoR NSF Day Workshop
- 2009 *Grant Writing Strategies for Grants Submitted to the National Science Foundation*, presented at the American Society for Photogrammetry and Remote Sensing workshop in Baltimore, MD, 13 March
- 1999 *Transitions From the Classroom to the Workplace*, held in Santa Barbara, CA, 10-11 September
- 1998 Specialist Meeting of the NCGIA's Varenus Project Initiative *Scale and Detail in the Cognition of Geographic Information* held in Santa Barbara, CA, 14-16 May
- 1998 The Development of Spatial Concept Understanding. Paper presented at a mini-conference titled *The Ins and Outs of Spatial Cognition*, held at Northwestern University, Department of Psychology, Chicago, IL, 30-31 January
- 1997 Research in Geography, Space and Development: How Can it Inform Geographic Education? Paper presented at *The First Assessment: Research in Geographic Education Workshop* at Southwest Texas State University, San Marcos, TX, 24-26 May
- 1992 Specialist Meeting of the NCGIA Initiative #21, *Common-Sense Reasoning in Geographic Space*, held in San Marcos, TX, 30 October - 2 November
- 1993 Cognitive Distance At Various Geographic Scales. Paper presented at the Specialist Meeting of the NCGIA Initiative #10, "*Spatio-Temporal Reasoning in GIS*", held in Lake Arrowhead, CA, 8-11 May
- 1992 *International Workshop: Reasoning in Geographic Space in Time*, held in San Miniato, Italy, 23-25 September
- 1990 The Effect of the Pattern of the Environment on Spatial Knowledge Acquisition. Paper presented at the NATO ASI, *Cognitive and Linguistic Aspects of Geographic Space*, in Las Navas, Spain, 8-20 July
- 1989 Specialist Meeting of the NCGIA Initiative #2, *Languages of Spatial Relations*, held in Goleta and Montecito, CA, 15-19 January
- 1988 Navigation and Spatial Knowledge Acquisition. Paper presented at a workshop, *Cognitive and Linguistic Aspects of Space*, at SUNY Buffalo, Buffalo, NY, 11-12 June

Conference Organization/Participation

- 2010 Cognitive Geography. Special Session of the Cartography, Environmental Perception and Behavioral Geography Specialty Groups and the National Science Foundation, Association of American Geographers Annual Meeting, Washington, DC, 14-18 April. (*Organizer and Chair*)
- 2000 Thirteenth Annual Student Honors Paper Competition. Special Session of the Cartography Specialty Group, Association of American Geographers Annual Meeting, Pittsburgh, PA, 4-8 April. (*Chair*)
- 2000 Visualization III: Development Issues. Special Session of the Cartography and GIS Specialty Groups, Association of American Geographers Annual Meeting, Pittsburgh, PA, 4-8 April. (*Chair*)
- 1999 Spatial Cognition I: Spatial Learning, Structures and Perceptions. Special Session of the Environmental Perception and Behavioral Geography, Cartography, and Geography Education Specialty Groups, Association of American Geographers Annual Meeting, Honolulu, HI, 23-27 March. (*Co-organizer and Chair*)
- 1999 Spatial Cognition II: Spatial Learning, Education and Policy. Special Session of the Environmental Perception and Behavioral Geography, Cartography, and Geography Education Specialty Groups, Association of American Geographers Annual Meeting, Honolulu, HI, 23-27 March. (*Co-organizer and Chair*)
- 1998 Eleventh Annual Student Honors Paper Competition. Special Session of the Cartography Specialty Group, Association of American Geographers Annual Meeting, Boston, MA, 25-29 March. (*Organizer and Chair*)
- 1998 Kids and Maps and Spatial Learning. Special Session of the Cartography Specialty Group, Association of American Geographers Annual Meeting, Boston, MA, 25-29 March. (*Organizer*)
- 1998 Spatial Cognition: Making Sense of Maps, Virtual Worlds and Real Environments. Joint Special Session of the Cartography and Environmental Perception & Behavioral Geography Specialty Groups, Association of American Geographers Annual Meeting, Boston, MA, 25-29. (*Organizer and Chair*)
- 1998 Environmental Perception and Behavioral Geography: Contrasting Approaches to Psychological Geography. Special Session of the Environmental Perception & Behavioral Geography Specialty Group, Association of American Geographers Annual Meeting, Boston, MA, 1-6 April. (*Chair*)
- 1997 Tenth Annual Student Honors Paper Competition. Special Session of the Cartography Specialty Group, Association of American Geographers Annual Meeting, Fort Worth, TX, 1-6 April. (*Co-organizer and Chair*)
- 1997 Cognitive Mapping Symposium. Comprised of 6 sessions titled Cognitive Mapping and (1) Spatial Abilities and Disabilities (2) Development and Representation (3) Image and Narrative Learning (4) Route Learning and Wayfinding (5) Environmental Learning and Virtual Worlds (6) The Current State of Play and the Future in Cognitive Mapping Research. Symposium jointly sponsored by the Cartography Specialty Group and the Environmental Perception and Behavioral Geography Specialty Group, Association of American Geographers Annual Meeting, Fort Worth, TX, 1-6 April. (*Co-organizer with Rob Kitchen and Chair*)
- 1996 What is a Map? Revisited. Special Session of the Cartography Specialty Group, Association of American Geographers Annual Meeting, Charlotte, NC, April. (*Organizer*)
- 1995 Representing Space. Special Session of the Environmental Perception and Behavior Specialty Group, Association of American Geographers Annual Meeting, Chicago, IL, March. (*Organizer*)
- 1995 The Nature and Nurture of Map Use: Development, Culture, and Innate Skills. Joint Special Session of the Cartography Specialty Group, the Environmental Perception and Behavior Specialty Group and the National Center for Geographic Information and Analysis, Association of American Geographers Annual Meeting, Chicago, IL, March. (*Co-Organizer*)
- 1994 Cognitive Cartography. Special Session of the Cartography Specialty Group, Association of

- American Geographers Annual Meeting, San Francisco, CA, 29 March - 2 April. (*Organizer and Chair*)
- 1994 Sources of Spatial Knowledge and Resulting Cognitive Representations: Part I and Part II (two sessions). Joint Special Sessions of the Environmental Perception and Behavior Specialty Group and the Cartography Specialty Group, Association of American Geographers Annual Meeting, San Francisco, CA, 29 March - 2 April. (*Co-organizer with Dan Montello and Chair*)
- 1993 Cognition and Cartography. Special Session of the Cartography Specialty Group, Association of American Geographers Annual Meeting, Atlanta, GA, 6-11 April. (*Organizer /Chair*)
- 1993 Research in Navigation and Wayfinding. Joint Special Session of the Environmental Perception and Behavior Specialty Group and the Cartography Specialty Group, Association of American Geographers Annual Meeting, GA, 6-11 April. (*Organizer*)
- 1991 "GI 2000", a geographical information systems conference sponsored by the Newfoundland Branch of the Canadian Institute for Surveying and Mapping, St. John's, Newfoundland, Canada, 14-15 November. (*Member Organizing Committee and Session Chair*)
- 1990 Verbal Directions for Wayfinding: Implications for Geographic Information and Analysis Systems. Joint Special Session of the Cartography Specialty Group and the GIS specialty Group, Association of American Geographers Annual Meeting, Toronto, Ontario, Canada, 19-22 April. (*Organizer*)
- 1990 Natural Language, User Interfaces, and GIS. Special session of the GIS Specialty Group, Association of American Geographers Annual Meeting, Toronto, Ontario, Canada, 19-22 April. (*Chair*)
- 1989 Navigation and Wayfinding. Special Session of the Cartography Specialty Group, Association of American Geographers Annual Meeting, Baltimore, MD, 19-22 March. (*Organizer*)

Presentations at Professional Conferences

- 2013 Honoring the Scholarship of Professor David M. Mark: David Michael Mark Unplugged. Presented at the Annual Meeting of the Association of American Geographers, LA, CA, April.
- 2013 NSF: What is the Real Story Behind a Winning Proposal. Presented at the Annual Meeting of the Association of American Geographers. LA, CA, April.
- 2012 Speed Dating with an NSF Officer. Participated as a recent program officer in this Q&A session. NYC, February.
- 2010 Mickey, K. W, L.A. Carlson and S.M. Freundsuh. Location, location, location: Environmental constraints on interpreting spatial terms. Paper presented at CogSci 2010: The Annual Meeting of the Cognitive Science Society, Portland, Oregon, 11-14 August.
- 2010 *Writing Competitive Proposals for Regular, CAREER and DDRI Competitions at the National Science Foundation*. Paper presented at the Representing Reality IGERT Conference, Buffalo, NY, 12-15 May.
- 2010 Presented/participated in four NSF Workshops on *Writing Proposals for Regular, CAREER and DDRI Competitions at the National Science Foundation* at the Annual Meeting of the Association of American Geographers, Washington, DC, 14-18 April.
- 2009 Panel Presentation: *The Future of Cartographic Journals*. Presented at the Annual meeting of the North American Cartographic Information Society, Sacramento, CA, 7-9 October.
- 2009 Presented/participated in three NSF Workshops on *Writing Proposals for Regular, CAREER and DDRI Competitions at the National Science Foundation* at the Annual Meeting of the Association of American Geographers, Las Vegas, NV, 22-27 March.
- 2009 Panel Participation. *Protecting Human Subjects Across the Geographic Research Process*, Annual Meeting of the Association of American Geographers, Las Vegas, NV, 22-27 March.
- 2008 Panel Participation. GI Science Journal Editors Panel, GIScience 2008, Park City, Utah, 23-26 September.
- 2004 *Put the Horse NEXT to the Lake and FAR from the Water Tower: Part II*. Paper presented at the Annual Meeting of the Association of American Geographers, Philadelphia, PA, 14-19 March.
- 2001 Scott M. Freundsuh and Cathryn Campbell, *Visualizing Campuses from 2D and 3D maps*.

- Paper presented at the Annual Meeting of the Association of American Geographers, New York, NY, 27 February-3 March.
- 2000 *Animated Maps—What's the Big Deal? Comparing Knowledge Acquisition from Static and Animated Maps*. Paper presented at the Annual Meeting of the Association of American Geographers, Pittsburgh, PA, 4-8 April.
- 2000 Panel Presentation. In Honor of Reg Golledge: A Panel Discussion. Presented at the Annual Meeting of the Association of American Geographers, Pittsburgh, PA, 4-8 April.
- 2000 Panel Presentation. *New Perspectives on Young Children's Mapping Abilities*. Presented at the Annual Meeting of the Association of American Geographers, Pittsburgh, PA, 4-8 April.
- 1999 Scott M. Freundschuh, Wesley Hellevik and Brian St. George, *Learning Spatial Change from Static vs. Animated Maps*. Paper presented at the Annual Meeting of the Association of American Geographers, Honolulu, HI, 23-27 March.
- 1998 *Spatial Cognition of Small and Large-scale Spaces*. Paper presented at the Annual Meeting of the North American Cartographic Information Society, Milwaukee, WI, 3-7 October.
- 1998 *Put the Horse NEXT to the Lake and FAR from the Water Tower: The Development of Locative Understanding in Large- and Small Scale Model Spaces*. Paper presented at the Annual Meeting of the Association of American Geographers, Boston, MA, 25-29 March.
- 1997 Freundschuh, S. M. and M. Blades, *Locative Understanding in Large-Scale (Geographic) Environments*. Presented at the Annual Meeting of the Society for Research in Child Development, Washington, DC, 6-9, April.
- 1997 Freundschuh, S. M., T. Bienapfl and D. Swanson, *Buildings as Buildings: Determining Routes and Locating Places on 2D and 3D Campus Maps*. Presented at the Annual Meeting of the Association of American Geographers, Fort Worth, TX, 1-6 April.
- 1997 *What Knowledge Constitutes "Naive" Geographic Knowledge?* Position paper. Panelist, special session on Naive Geographic Reasoning, at the Annual Meeting of the Association of American Geographers, Fort Worth, TX, 1-6 April.
- 1996 Freundschuh, S. M., *What is a Map? Position paper*. Panelist, specialty session on "What is a Map?", presented at the Annual Meeting of the Association of American Geographers, Charlotte, NC, 9-13 April.
- 1996 Freundschuh, S. M. and Blades, M., *Children and Adult's Use of Locatives*. Presented at the Annual Meeting of the Association of American Geographers, Charlotte, NC, 9-13 April.
- 1996 Gould, M., J. Nunes, D. Comas, M. J. Egenhofer, S. Freundschuh and D. M. Mark, *Formalizing Informal Geographic Information: Cross-cultural Human Subjects Testing*. Presented at the Joint European Conference/Exhibition on Geographical Information, Barcelona, Spain, 27-29 March.
- 1995 *An 'Experientially Based' Classification of Geographic Spaces*. Presented at the Annual Meeting of the Minnesota Academy of Sciences, Morris, MN, 28-29 April.
- 1995 Freundschuh, S. M. and Egenhofer, M. J., *A Unifying Categorization of Geographic Space*. Presented at the Annual Meeting of the Association of American Geographers, Chicago, IL, 14- 16 March.
- 1994 Freundschuh, S. M. and Sharma, M., *Spatial Image Schema, Locative (Spatial) Terms and Geographic Spaces in Children's Narrative: Fostering Spatial Skills In Children*. Presented at the Joint Meeting of the Canadian Cartographic Association and the North American Cartographic Information Society, Ottawa, Quebec, Canada, 9-13 August.
- 1994 *Spatial Knowledge Acquisition from Maps Versus Narrative*. Presented at the Annual Meeting of the Association of American Geographers, San Francisco, CA, 29 March - 2 April.
- 1993 *The Learning of Urban Environments From Maps and Navigation Experience*. Presented at the Annual Meeting of the Association of American Geographers, (Nystrom Award Competition), Atlanta, GA, 6-11 April.
- 1992 *Spatial Knowledge Acquisition from Narrative*. Presented at the Twelfth Annual Meeting of the North American Cartographic Information Society, St. Paul, MN, 14-17 October.
- 1992 *Is there a relationship between spatial cognition and environmental patterns?* Presented at the International Conference on GIS, From Space To Territory: Theories And Methods Of

Spatio- temporal Reasoning, Pisa, Italy, 21-23 September.

1992 Freundschuh, S. M. and M. D. Gould, *Cognitive Testing and Task Analysis in GIS Design*. Presented at the Annual Meeting of the Association of American Geographers, San Diego, CA, 18-22 April.

1991 *Vector or Raster? Selecting a GIS*. Paper presented at the 3rd “GI 2000”, a Geographical Information Systems Conference of the Newfoundland Branch of the Canadian Institute for Surveying and Mapping, St. John’s, Newfoundland, Canada, 14-15 November.

1991 *Gender Differences in Spatial Cognitive Abilities*. Paper presented at the Joint Annual Meeting of the Canadian Cartographic Association and the Ontario Institute of Chartered Cartographers, St. Catharines, Ontario, Canada, 31 May - 3 June.

1990 Freundschuh, S. M. and D. M. Mark, *Comparing Written and Spoken Driving Directions*. Paper presented at the Annual Meeting of the Association of American Geographers, Toronto, Ontario, Canada, 19-22 April.

1989 *Can Survey (Map View) Knowledge Be Acquired From Procedural Knowledge?* Paper presented at the Annual Meeting of the Association of American Geographers, Baltimore, MD, 19-22, March.

1989 Mark, D. M. and S. M. Freundschuh, “Excuse me. Can You Please Tell Me How To Get To ____?” *A Study of Informal Driving Instructions*. Paper presented at the Annual Meeting of the Association of American Geographers, Baltimore, MD, 19-22 March.

1988 *On Developing Effective Vehicle Navigation Aids*. Paper presented at the Annual Meeting of The East Lakes Division of the Association of American Geographers, Akron, OH, 28-29 October.

1988 *Model for Child and Adult Spatial Knowledge Acquisition*. Paper presented at the Joint Annual Meeting of the Canadian Cartographic Association/Ontario Institute of Chartered Cartographers, Toronto, Ontario, Canada, 25-27 May.

1988 *Theories on Child and Adult Navigation: A Comparison*. Paper presented at the Annual Meeting of the Association of American Geographers, Phoenix, AZ 6-10 April.

1987 *Can Young Children Use Maps to Navigate?* Paper presented [read by John Sutherland] at the Annual Meeting of the North American Cartographic Information Society, Atlanta, GA 28-31 October.

1987 Freundschuh, S. M., J. McAvoy, G. Theisen, and M. Yusuf, *What is a Map? 3. An Experimental Approach*. Paper presented at the Annual Meeting of the Canadian Association of Geographers, Hamilton, Ontario, Canada, 25-31 May.

1987 *Assessing the Ability of Children to Use Maps*. Paper presented at the Annual Meeting of the Association of American Geographers, Portland, OR, 21-26 April.

GRANTS AND CONTRACTS

External

2012 National Science Foundation, Workshop, *Geospatial Privacy: Legal, Social and Ethical Implications for Users of Geocoded Data* (PI John Carr, CoPIs Freundschuh, Zandbergen, Vallor, Gannon), \$30,000.

2001 Civic Engagement Grant, *Renewing the Land-grant Mission: Developing a GIS database for Hartley Nature Center*, \$6541.

1998 *National Center for Geographic Information and Analysis Seed Grant*. CO-PIs: David Uttal (Department of Psychology, Northwestern University) and Mark Blades (Department of Psychology, University of Sheffield), \$2780.

1998 *University of Minnesota/Minnesota Independent School District 709 Lab School*. Funded by the Minnesota Department of Children, Families and Learning. PI: Kathryn Martin, Chancellor (UMD); CO-PIs: Mitzi Doane, Dean CEHSP (UMD), Terrie Shannon, Head, Department of Education (UMD), Scott Freundschuh, Department of Geography (UMD), and Joan Karp, Department of Education (UMD), \$450,000.

1996 *Recreation Activities and Preferences of Resort Visitors in the Voyageurs National Park Region*, CO-PI: Jonathan Vlaming. Collaborative grant funded by Voyageurs Region National Park Association, National Park Service, and the Center for Community and Regional

Research, \$8,705.

- 1996 *Economic Development Marketing on the Internet*, CO-PIs: Cindy Johns and Keith Hamre, Arrowhead Regional Development Commission (ARDC). Collaborative grant funded by US West Foundation, Iron Range Resources and Rehabilitation Board, Northspan Group, Inc., ARDC, and the Center for Community and Regional Research, \$73,206.
- 1994 *Cross-cultural Differences in Spatial Concepts: Application to Spatial Information System Use*. CO-PIs: Michael Gould, Max Egenhofer, David Mark and Joan Nunes. Collaborative research grant from the NATO International Scientific Exchange Programmes, \$4100.
- 1991 *A Geographical Information Systems Approach to Protected Areas Planning for the Island of Newfoundland*. Protected Areas Association of Newfoundland, Canada, Grant #3-33132, \$4885.
- 1991 Southside Hills Corporation Limited (SOHILCO), Newfoundland, Canada: Contract, March - June. GIS database creation, spatial analysis, and map plots at 1:5000 of the Southside Hills area, St. Johns, Newfoundland, \$8920.

University Wide Grants

- 2005 Diversity Grant (with Larry Knopp), Campus Visit by Dr. J. W. Harrington, Jr., Faculty in Residence Program, \$3054.
- 2002 *Chancellor's Faculty Small Grants*, University of Minnesota, \$750 (also 2000: \$1500; 1999: \$750; 1998: \$1500; 1997: \$1500; 1996: \$500; 1995: \$750).
- 1995 *Children and Adult Use of Locatives*. CO-PI, Mark Blades, University of Sheffield, UK. Grant-in-Aid, University of Minnesota, Grant #16783, \$15,950.
- 1995 *Institute of International Studies & Programs Grant*, University of Minnesota, \$600.
- 1993 *The Evolution of Spatial Knowledge*. The Natural Sciences and Engineering Research Council of Canada (President's NSERC) Grant #3-34096; explore stages of spatial knowledge, \$5000.
- 1992 The Social Sciences and Humanities Research Council (SSHRC) of Canada Travel Grant. To attend the International Conference GIS, From Space to Territory: Theories and Methods of Spatio-Temporal Reasoning in Pisa, Italy, September, 1992, \$1200.
- 1991 *Spatial Knowledge Acquired From Narrative*. The Natural Sciences and Engineering Research Council of Canada (President's NSERC) Grant #3-33638; to explore the form of spatial knowledge acquired from narrative, \$3162.

College Level Grants

- 2002 College of Liberal Arts Teaching/Research/Travel Grants, University of Minnesota, \$400 (also 2001: \$400; 2000: \$400; 1999: \$700; 1998: \$700; 1997: \$600; 1996: \$800; 1995, \$400; 1994: \$350).

Undergraduate Research Opportunities Grants

- 2007 *Map Art: Memory Maps of Duluth*, CO-PI: Jennifer Olson, \$1,672.
- 2002 *Spatial Knowledge Acquired from 2D and 3D Campus Maps*, CO-PI: Mark Paschke, \$1,700.
- 2001 *Locative Understanding in Large- and Small-scale Spaces*, CO-PI: James Lehnhoff, \$1,700.
- 1999 *Determining the Effects of Experience and Task Difficulty in the Performance of Location and Navigation Tasks on 2D and 3D Campus Maps*, CO-PI: Cathryn Campbell, \$1,700.
- 1999 *Spatial Learning from Multimedia Software*, CO-PI: Wesley Hellevik, \$1300.
- 1998 *Perceptions and Realities of Personal Safety on the University of Minnesota-Duluth Campus*, CO-PI: Christa Salo, \$1200.
- 1998 *Pequawyan Lake Snowmobile Trail: Mapping for Emergency Rescue Services Using GIS and GPS*, CO-PIs: Kjersti Hagman and Andy Hubley, \$2400.
- 1997 *Linking Off-campus Student Housing to Maps on the World Wide Web*, CO-PIs: Aaron Buffington and Mark Kill, \$2000.
- 1997 *Assessment of Utilization and User Needs of Duluth's Cross-country Ski Trails*, CO-PI: Aaron Buffington, \$1022.
- 1997 *Determining Routes and Locating Places on 2-D and 3-D Campus Maps*, CO-PI: Theodore

Bienapfl, \$1200.

Grant Proposal Reviewing

- 2015 November, will serve on NSF's Geography and Spatial Sciences Fall Panel
- 2015 Ad-hoc Proposal Review, NSF (also in 2014, 2013 2012, 2011, 2010; 2007; 2006; 2005; 2004; 2003; 2002; 2001; 2000; 1999; 1998; 1996)
- 2013 May, Served on NSF's Geography and Spatial Sciences Spring Panel
- 2013 February, Served on NSF's Arctic Social Sciences Panel
- 2012 December, Served on NSF's Geography and Spatial Sciences Fall Panel
- 2012 June, Served on NSF's Science, Engineering and Education for Sustainability SEES SRN Panel (full proposals)
- 2012 January, Served on NSF's Science, Engineering and Education for Sustainability (SEES) SRN Panel (pre-proposals)
- 2010-12 Program Officer, Geography and Spatial Sciences, National Science Foundation
- 2003 Served on a review panel (STC A) for NSF's Science and Technology Center's program, September.

Graduate Advising

Ph.D. Completed

Committee Member

- 2009 Ian Muehlenhaus, Geography, University of Minnesota Twin Cities. Doctoral Thesis: *Political Cartographic Manipulation: A Systematic Analysis of Techniques*

M.S. Completed

Advisor

- 2013 Michael Camponovo, Geography; Thesis: Assessing Uncertainty in VGI for Emergency Response
- 2012 Choongman Oh, Geography; Thesis: Evacuation Vulnerability Mapping Using GIS Network Analysis
- 1996 David Woodward, IDIS Archeology; Thesis: *Site Location Analysis and Prehistoric Human Ecology: Wojnowo Region, Poland* (co-advisor)

Committee Member

- 2014 Sarah Haft, Geography; Thesis: Blue Carbon Potential for the Mangrove Ecosystems of NW Madagascar
- 2014 Sandra Daras, Geography; Thesis: Crime and Immigrations in Albuquerque, NM: Real or Misperception?
- 2013 Eric Cox, Geography; Thesis: The Effect of Airport Delays on the Evolution of the U.S. Air Travel Network
- 2012 Brian Deaton, Geography; Thesis:
- 2008 Sally Goodman, Geology, Thesis: Structural and Kinematic Analysis of the Kawishiwi Shear Zone, Superior Province: Insight on Granite-greenstone Terrain Tectonics and Archean (2.7 Ga) Crustal Evolution.
- 2008 Emerald Erickson, Geology, Thesis: Structural and Kinematic Analysis of the Shagawa Lake Shear Zone, Superior Province, Northeastern Minnesota: Implications for Archean (2.75 Ga) Crustal Evolution.
- 2008 Susan Karberg, Geology, Thesis: Structural and Kinematic Analysis of the Mud Creek Shear Zone, northeastern Minnesota; Implications for Archean (2.7 Ga) Tectonics
- 2008 Bhairavi Shankar, Geology, Thesis: A Global Survey of Circular Lows: A Subset of Coronae, Venus
- 2006 Roger Bannister, Geology, Thesis: Geologic Analysis of Deformation in the Interior of Artemis (Venus, 34° S, 132° E)

In Progress

Advisor

David Sanchez
Erin Manning
Susan Irwin

Committee Member

Zu Zhang

M.A. Completed Advisor

2002 Amy Peterson, Liberal Studies, Geographic Information Science
2001 Andrew McDonald, Liberal Studies, Geographic Information Science

Committee Member

1997 Linda Peterson, Communication Disorders and Sciences, Thesis: *Sex-related Differences in the Demonstration of Children and Adult's Understanding of Locatives*
1997 Jennifer Ruzicka, Communication Disorders and Sciences, Thesis: *Children's and Adults' Interpretations of Two-step Directives Containing Locatives*
1997 Brea Hallman, Communication Disorders and Sciences; Thesis: *The Development of Locative Comprehension in Children*

Courses Taught

At University of New Mexico

Introduction to Maps and Geospatial Information	Applications in GIScience
Map Design and Geovisualization	Seminar in GIScience
Computer Cartography	Senior Capstone Seminar

At University of Minnesota

Introduction to Computer Cartography	Introduction to Maps and Cartographic Methods
Introduction to Geographic Information Science	Map Design and Graphic Methods Advanced
Cartographic Methods	Environmental Conservation Advanced Geographic
Information Science	Physical Geography
Environmental Studies Internship Preparation	Learning Community Integrative Seminar

At Memorial University

Introduction to Cartography	Computer Cartography
Introduction to Mapping Techniques	Introduction to Geographic Information Systems
Special Topics in Cartography and GIS	Advanced Research Methods

At SUNY Buffalo

Maps and Airphoto Interpretation	Cartographic Design (<i>Teaching Assistant</i>)
Geographic Organization of Space (with David Mark)	Map Production Techniques (<i>Teaching Assistant</i>)

SERVICE

Professional

Memberships in Learned Societies

Association of American Geographers
 Cartography Specialty Group
 Geographic Information Systems Specialty Group
 Environmental Perception and Behavioral Geography Specialty Group
North American Cartographic Information Society
Cartography and Geographic Information Science

Service in Learned Societies

2000	Judge, Thirteenth Annual Student Honors Paper Competition, Cartography Specialty Group, Association of American Geographers
1998	Judge, Eleventh Annual Student Honors Paper Competition, Cartography Specialty Group, Association of American Geographers
1998	Judge, National Geographic Society Cartography Award
1997	Judge, Tenth Annual Student Honors Paper Competition, Cartography Specialty Group, Association of American Geographers
1997	Judge, National Geographic Society Cartography Award
1996	Judge, Student Paper Competition, Environmental Perception and Behavioral Geography Specialty Group, Association of American Geographers
1994	Judge; Seventh Annual Student Honors Paper Competition, Cartography Specialty Group, Association of American Geographers
1990	Judge; Third Annual Student Honors Paper Competition, Cartography Specialty Group, Association of American Geographers
1990	Judge; National Geographic Society Scholarship
1990	Chair, Committee for Master Thesis Grants, Cartography Specialty Group, Association of American Geographers

University*Campus Wide*

2011 - 2013	Member, Research Policy Committee, University of New Mexico
1999 - 2001	College of Liberal Arts Representative, Admissions, Retention and Graduation, subcommittee, University of Minnesota Duluth
1997 - 2000	College of Liberal Arts Representative, Physical Facilities and Planning Committee, University of Minnesota Duluth
1996 - 1997	Faculty Representative (Awards Committee), Outstanding Teacher Award, Kirby Student Association, University of Minnesota Duluth (also in 1995-1996)

College

2014-2015	Chair, Promotion and Tenure Committee, College of Arts and Sciences, University of New Mexico
2011 - present	Member, College of Arts and Sciences Academic Affairs, University of New Mexico
1999 - 2001	<i>Chair</i> , College of Liberal Arts, Research Committee, University of Minnesota Duluth
1998 - 1999	<i>Chair</i> , Search Committee, Humanities/Environmental Studies position, College of Liberal Arts, University of Minnesota Duluth (unsuccessful search)
1995 - 1999	College of Liberal Arts Academic Affairs Committee, University of Minnesota Duluth
1995 - 1998	College of Liberal Arts Student Affairs Committee, University of Minnesota Duluth
1991 - 1993	Faculty of Arts Academic Computing Committee, Memorial University of Newfoundland
1991 - 1993	Faculty of Arts Representative to Faculty of Science Academic Computing Committee, Memorial University of Newfoundland

Departmental

2013 (fall)	Interim Director of Graduate Studies, Department of Geography, University of New Mexico
2011-2013	Director of Undergraduate Studies, Department of Geography, University of New Mexico
2012	Search Committee (Department Chair), Biogeography and Remote Sensing Position, Department of Geography, University of New Mexico
2012	Search Committee (Department Chair), GIScience and Remote Sensing Position, Department of Geography, University of New Mexico
2011	Search Committee (Department Chair), Environmental Geography Position, Department of Geography, University of New Mexico

2008 Search Committee, Cartography and GIS position, Department of Geography, University of Minnesota Duluth (hired Kate Carlson)

2006 - 2007 Search Committee, Urban and Regional Geography position, Department of Geography, University of Minnesota Duluth (hired Adam Pine)

2005 - 2006 Search Committee, Temporary Physical Geography position, Department of Geography, University of Minnesota Duluth (hired Susan Hartley)

2005 - 2006 Search Committee, Economic/Development Geography position, Department of Geography, University of Minnesota Duluth (hired Sutapa Chattopadhyay)

1995 - 2004 *Director*, Geographical Information Sciences Laboratory (GISL), Department of Geography, University of Minnesota Duluth

2000 - 2002 *Faculty Advisor*, Environmental Studies Club, University of Minnesota Duluth

1994 - 2002 *Faculty Advisor*, Undergraduate Geography Club, University of Minnesota Duluth

2001 - 2002 *Chair*, Search Committee, Senior Executive Office Manager, Department of Geography, University of Minnesota Duluth (hired Linda Klint)

2001 - 2002 *Chair*, Search Committee, Human/Cultural Ecologist, Department of Geography, University of Minnesota Duluth (hired Olaf Kuhlke)

2000 - 2001 *Chair*, Search Committee, Geographic Information Scientist, Department of Geography, University of Minnesota Duluth (hired Stacey Stark)

1998 - 1999 Search Committee, Human Geography position, Department of Geography, University of Minnesota Duluth (hired Maureen Sioh)

1997 - 1998 *Chair*, Search Committee, Physical/GIS Geography Position, Department of Geography, University of Minnesota Duluth (hired Tongxin Zhu)

1996 - 1997 *Chair*, Search Committee, Environmental Geography Position, Department of Geography, University of Minnesota Duluth (hired Pat Farrell)

1995 - 1996 Search Committee, Temporary Physical Geography position, Department of Geography, University of Minnesota Duluth (hire Raoul Miller)

1990 - 1993 Curriculum and Planning Committee, Department of Geography, Memorial University of Newfoundland

1990 - 1992 Space and Equipment Committee, Department of Geography, Memorial University of Newfoundland

1988 - 1990 *President*, Geography Graduate Student Association, State University of New York Buffalo

1987 - 1988 *Ph.D. Student Representative*, Department of Geography, State University of New York Buffalo

1986 - 1987 *Master's Student Representative*, Department of Geography, State University of New York Buffalo

COMMUNITY SERVICE

Discipline Related Activities

1997 - 1998 Lab School Committee, ISD 709, Chester Park Elementary and the University of Minnesota Duluth, Duluth, Minnesota

1995 - 1996 Chester Park Elementary Site Council, Duluth, Minnesota

1994 - 1996 *Chairman*, Invention Convention, Chester Park Elementary, Duluth, Minnesota

General/Community Service

2010 - 2012 Member, National Ski Patrol, Sandia Ski Resort, Albuquerque, New Mexico

2000 - 2007 Instructor, Outdoor Emergency Care, National Ski Patrol

1999 - 2010 Member, National Ski Patrol, Spirit Mountain, Duluth, Minnesota

1994 - 2009 Member, Chester Bowl Improvement Club, Duluth Parks and Recreation, Minnesota

1997 - 2005 Coordinator, Ski Cadet Program, Chester Bowl, Duluth Parks and Recreation, Minnesota

1995 - 2002 Coach, Arrowhead Youth Soccer Association, Duluth, Minnesota

1995 - 1999 Member, Woodland Middle School PTA, Duluth, Minnesota

1998 - 1999 Secretary, PTA, Chester Park Elementary, Duluth, Minnesota

1996 - 1998	President of PTA, Chester Park Elementary, Duluth, Minnesota
1996 - 1997	Coach, Kenwood Little League, Duluth, Minnesota
1994 - 1995	Coach, Duluth East Youth Basketball Association, Duluth, Minnesota
1994	Coach, Bangor YMCA Little League, Bangor, Maine
1993 - 1994	Parent Volunteer, Reading Skills, Fruit Street Elementary School, Bangor, Maine
1992 - 1993	Coach, Mount Pearl Soccer Association, Mount Pearl, Newfoundland, Canada
1989 - 1990	Fire Prevention Captain, Kenilworth Fire Department, Town of Tonawanda, New York
1989 - 1990	Town Delegate for the Kenilworth Fire Department, Town of Tonawanda, New York
1987 - 1990	Volunteer Firefighter, Kenilworth Fire Department, Town of Tonawanda, New York

Xi Gong

2324 10th Street, Apt 414
Brookings, SD, 57006
Email: gong@txstate.edu Phone: 512-618-1265

SUMMARY

- 10 years of **Geographic Information Science/Remote Sensing (GIS/RS)** teaching/research experience.
- Strong **software engineering** knowledge, **programming & communication** skills.
- Seeking an employment opportunity utilizing my GIS/RS, software engineering, programming, or big data analysis knowledge.

EDUCATION

Ph.D. in **Geographic Information Science**,
Texas State University, San Marcos, TX Expected May 2016
M.Sc. in **Cartography & Geographic Information System**,
University of Chinese Academy of Sciences, Beijing, China June 2011
B.Eng. in Spatial Informatics and Digitalized Technology (**GIS & Software Engineering**),
Wuhan University, Wuhan, China June 2008

TEACHING EXPERIENCE

Teaching Assistant, Lab Instructor Texas State University 08/2011-05/2015

- GIS (II) (**Python scripting for geospatial modeling**), Graduate Course.
- GIS (I) (**Spatial & statistical analysis, image processing**), Graduate Course.
- Advanced GIS, Undergraduate Course.
- Fundamentals of GIS, Undergraduate Course.

Teaching Assistant Wuhan University 09/2006-05/2008

- Professional English, Undergraduate Course.

RESEARCH EXPERIENCE

Prospect Research Analyst South Dakota State University Foundation 02/2016 till now

- Conduct proactive and reactive research to identify new prospects; identify and evaluate philanthropic capability.
- Review and select prospects for consideration for various fundraising projects.

Research Assistant Texas State University 08/2011-05/2015

- **“Air Pollution-Exposure-Health Effect Indicators: Mining Massive Geographically Referenced Environmental Health Data to Identify Risk Factors for Birth Defects”**.
- U.S. Environmental Protection Agency (USEPA) Science to Achieve Results (STAR) Program.

Research Assistant University of Chinese Academy of Sciences 09/2009-06/2011

- **“Knowledge Discovery on Spatio-temporal Data”**.
- Knowledge Innovation Program of the Chinese Academy of Sciences.

Research Assistant University of Chinese Academy of Sciences 09/2008-09/2009

- “Spatial Data Cognitive Pattern & Massive Spatial Data Knowledge Discovery”.
 - National Basic Research Program of China (973 Program).
- Research Assistant** University of Chinese Academy of Sciences 07/2009-06/2011
- “Spatio-temporal Data Mining and Typical Land Surface Parameters”.
 - Independent Innovation Project of IGSNRR, Chinese Academy of Sciences.
- Research Assistant** University of Chinese Academy of Sciences 02/2008-06/2008
- “Soft Spatial Data Co-Statistics Methods Research”.
 - Supported by the National Natural Science Foundation of China (NSFC).

PUBLICATIONS

Refereed Journal Articles

- **Gong, X.**, Brender, J.D., Langlois, P.H., Lin, Y., Zhan,F.B. 2016. Validity of the Emission Weighted Proximity Model in estimating air pollution exposure intensities in large geographic areas. *Science of the Total Environment*. (In press)
- Lin, Y., **Gong, X.** 2015. Risk Assessment of Water Pollution Exposure to Hazardous Waste Sites: A case study in Bexar County, Texas. *Papers in Applied Geography*. (In press)
- Zhang, C., Yang, J., Zhan, F.B., **Gong, X.**, Brender, J.D., Langlois, P.H., Barlowe, S., Zhao, Y. 2015. A Visual Analytics Approach to High-Dimensional Logistic Regression Modeling and its Application to an Environmental Health Study. *IEEE PacificVis 2016*.
- Brender, J.D., Shinde, M.U., Zhan, F.B., **Gong, X.**, Langlois, P.H. 2014. Maternal Residential Proximity to Chlorinated Solvent Emissions and Birth Defects in Offspring: A Case-Control Study. *Environmental Health*, 13(96): 1-16.
- Zhan, F.B., **Gong, X.**, Liu, X. 2013. Mark on the Globe: A Quest for Scientific Bases of Geographic Information and its International Influence. *International Journal of Geographic Information Science*. 28(6): 1233-1245.
- Pei, T., **Gong, X.**, Shaw, S., Ma, T., Zhou, C. 2012. Clustering of Temporal Event Processes, *International Journal of Geographical Information Science*. 27(3): 484-510.
- **Gong, X.**, Pei, T., Sun, J., Luo, M. 2011. Review on Research Progress in Trajectory Clustering Methods. *Progress in Geography*. 30(5): 522-534.
- Sun, J., Pei, T., **Gong, X.**, Zhou, C. 2011. Review on Research Progress in Web Spatio-temporal Data Mining. *Advances in Earth Science*. 26(4): 449-459.
- Zhang, C., Yang, J., Zhan, F.B., **Gong, X.**, Brender, J.D., Langlois, P.H., Barlowe, S. 2013. Identifying Risk Factors for Birth Defects in High Dimensional Environmental Health Data. *IEEE VIS 2013*. (VIS Poster (2-page abstract)).

Under Review/In Preparation

- **Gong, X.**, Zhan,F.B., Lin, Y. An Examination of Associations between Maternal Residential Proximity to Nuclear Facilities and Low Birth Weight in Offspring in Texas. *Radiation and Environmental Biophysics*. (Under review)
- **Gong, X.**, Zhan,F.B., Lin, Y. Toxic Release Inventory Air emissions and Low Birth Weight in Texas. (In preparation)
- **Gong, X.**, Zhan,F.B., Lin, Y. Maternal residential proximity to TCEQ chemical emissions and birth defects in offspring: a case-control study. (In preparation)

Published Abstracts

- **Gong, X.**, Zhan, F.B., Lin, Y. 2016. Exploring Associations between Air Emission from Industry Facilities and Low Birth Weight in Offspring Using Big Geographic Data, in the Program of the 2016 Annual Meeting of the Association of American Geographers (AAG). San Francisco, CA, USA.
- **Gong, X.**, Zhan, F.B., Lin, Y. 2015. Exploring Associations between Residential Proximity to Nuclear facilities and Low Birth Weight in Texas, in the Program of 2015 Annual Meeting of the Southwest Divisions of the Association of American Geographers (SWAAG). San Antonio, TX, USA.
- Zhan, F.B., **Gong, X.**, Brender, J.D., Langlois, P.H. 2015. Development of an Environmental Health Indicator, in the Program of the Applied Geography Conference (AGC). San Antonio, TX, USA.
- Lin, Y., **Gong, X.** 2015. Measuring Access to Primary Care Physicians among American Indian Population in South Dakota - Integrating Spatial and Aspatial Factors, in the Program of the Applied Geography Conference (AGC). San Antonio, TX, USA.
- **Gong, X.**, Zhan, F.B., Brender, J.D., Langlois, P.H. 2015. The Emission Weighted Proximity Model Performance for Estimating Long Term Air Pollution Exposure Risks In Large Geographic Areas, in the Program of the 2015 Annual Meeting of the Association of American Geographers (AAG). Chicago, IL, USA.
- **Gong, X.**, Lu, Y., Lin, Y., Zhan, F.B. 2014. A 3D Ripley's K method for Vector Autocorrelation analysis, in the Program of the Sixth Annual International Research Conference for Graduate Students. San Marcos, TX, USA.
- Lin, Y., **Gong, X.** 2014. A GIS-based Risk Assessment of Water Pollution Exposure to Hazardous Waste Sites, in the Program of 2014 Joint Meeting of the Southwest and Great Plains-Rocky Mountain Divisions of the Association of American Geographers (SWAAG-GPRM). Albuquerque, NM, USA.
- **Gong, X.**, Lu, Y., Lin, Y., Zhan, F.B. 2014. K-Vec: A Global and Cross-scale Analysis Method of Vector Autocorrelation, in the Program of 2014 Joint Meeting of the Southwest and Great Plains-Rocky Mountain Divisions of the Association of American Geographers (SWAAG-GPRM). Albuquerque, NM, USA.
- **Gong, X.**, Zhan, F.B., Chow, T.E. 2014. The Importance of "Space" in Strategies of Team Sports: An Agent-based Modeling Approach, in the Program of the 2014 Annual Meeting of the Association of American Geographers (AAG). Tampa, FL, USA.
- **Gong, X.**, Zhan, F.B. 2013. Health Risk Assessment of TRI Toxic Air Pollutants in Texas from 1996 to 2008, in the Program of the 2013 Annual Meeting of the Association of American Geographers (AAG). Los Angeles, CA, USA.
- Zhan, F.B., Yang, J., **Gong, X.**, Brender, J.D., Langlois, P.H. 2013. Visual Exploration of Geospatial Data to Identify Risk Factors of Birth Defects: Fetching a Trace of Bad Air in the Sky, in the Program of the 2013 Annual Meeting of the Association of American Geographers (AAG). Los Angeles, CA, USA.
- **Gong, X.**, Pei, T., Zhan, F.B. 2012. Clustering Methods of Trajectory Data: A Review (poster), in the Program of the 2012 Annual Meeting of the Association of American Geographers (AAG). New York, NY, USA.

SKILLS

- Strong programming and debugging skills in **Python, C/C++, VB.NET, JavaScript, OpenGL, GsTL, ArcObjects**.
- **Relational database** (SQL Server, PostgreSQL, Oracle, MySQL) experience.
- Comprehensive knowledge of **GIS/RS**; proficient with **digital image/signal processing techniques**.
- Proficient in **GIS/RS software** (ArcGIS, ENVI, ERDAS IMAGE) and **statistical tools** (SPSS, Matlab and R).
- **OS** (Windows/Unix/Linux) knowledge.
- **Teamwork experience** with good **verbal and written communication** skills.
- Strong knowledge of **software engineering** and **computer science**.
- Strong **learning ability** for new tools and knowledge.
- Good **troubleshooting/problem solving skills**.

PROJECT EXPERIENCE

- Mining Massive Geographically Referenced Environmental Health Data 08/2011-05/2015
- **Research Assistant** - Designed algorithm for data mining analysis, geospatial modeling, and statistical analysis.
 - Developed data mining and data visualization tools for **large-volume high-dimensional GIS data**, using **Python, JavaScript, ArcGIS, SQLite, MonetDB**.
 - Map-making, production of posters, manuscripts, and reports.
- Knowledge Discovery on Spatio-temporal Data 09/2009-06/2011
- **Research Assistant** - Visualization and statistical analysis of spatial-temporal data.
 - Designed & implemented spatial data mining algorithm (**Matlab, C/C++, SQL Server**).
 - Extracted **large volumes of GIS data** from web; conducted text data mining.
- Online Real Estate Sales Information System based on WebGIS 04/2007-02/2008
- **Team Leader & Major Software Developer** - requirement analysis, systems design, budget planning, personnel planning and scheduling.
 - Using **JavaScript, ArcIMS, ArcSDE, and MySQL**.
 - Student scientific research project of Wuhan University.
- Software for Real-time Video Surveillance System 06/2007-07/2007
- **Major Software Developer** - requirement analysis, systems design, client module development and client/server integration.
 - Using **C++, SQL Server, and Oracle**.
 - Software engineering intern program, ChinaSoft International Limited.
- Water Pollution Information System of East Lake, Wuhan, China 06/2006-08/2006
- **Team Leader & Major Software Developer** – team organizing, requirement analysis, systems design, and inquiry module development.
 - Using **VB.NET, Access, and ArcObject**.
 - The 2nd Prize in ESRI GIS Development Contest, China (*Top 2-4 of 100 groups*).
- JoyBog Personal Multimedia Diary 04/2006-05/2006
- **Major Software Developer** – developed management & display modules.
 - Using **Java and JavaDB**.
 - The 1st Prize in the Software Designing Contest of ISS, Wuhan University.

- **Designer & Software Developer** – systems design, client module development, database development, software testing.
- Using **JSP, Html, Xml, and MySQL**.

AWARDS/HONORS

- **ESRI Graduate Awards for Excellence**, Texas State University 2014, 2015
- The **Detlefsen Doctoral Dissertation Scholarship**, Texas State University 2015
- **Graduate College Scholarships**, Texas State University 2012, 2013, 2014, 2015
- **Associated Student Government Scholarship**, Texas State University 2012-2014
- **Doctoral Research Support Fellowship Award**, Texas State University 2014
- The **Detlefsen Doctoral Candidate Scholarship**, Texas State University 2014
- **Student Representative** of Commencement Speech, Wuhan University 2008
- **Excellent Award for Graduation**, Wuhan University (*Top 10%*) 2008
- **Outstanding Students of Hubei Province**, Ministry of Education of Hubei (*Only 19 students in Wuhan University*) 2008
- **May-Fourth Medal**, Wuhan University (*Only 4 undergraduates*) 2007
- **The National Scholarship**, Ministry of Education of China (*Top 1%*) 2007
- **Annual First-class Scholarship**, Wuhan University (*Top 5%*) 2005, 2006, 2007
- **Outstanding Students**, Wuhan University (*Top 5%*) 2005, 2006, 2007
- The **Second Prize** in the 3rd ESRI GIS Development Contest for College Students in China (*Top 2-4 of 100 groups*). 2006
- **HP Excellent Student Scholarship** (*Only 5 students in Wuhan University*) 2006
- **The Citi Bank’s Financial Information Technology Scholarship** (*Only 10 students in Wuhan University/200 students in China*) 2006

CERTIFICATES

- **Health in Numbers: Quantitative Methods in Clinical & Public Health Research.**
An online course offered by Harvard University through edX. 2013
- **Protecting Human Research Participants.** NIH Web-based training course. 2012

EXTRACURRICULAR ROLES

- **Mentoring Student Advisory Council Representative**, Mentoring Program of Texas State University. 01/2012-present
- **Volunteer**, Cat Crew, Department of Housing & Residential Life Texas State University. 08/2012
- **Translator** (part time), ESRI China (Beijing) Ltd. 09/2009-06/2011
- **Volunteer and Interpreter Assistant**, ESRI China User Conference 2009. 09/2009
- **Ceremony Host**, University of Chinese Academy of Sciences. 09/2008-06/2009
- **Software Engineer** (Intern), ChinaSoft International Limited. 06/2007-08/2007

CURRICULUM VITAE

Constantine Hadjilambrinos

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Environmental Studies Program
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Education:

Ph.D. May 1993, Urban Affairs and Public Policy, University of Delaware.
Dissertation: *Energy Regimes and the Development of the European Community*.
Advisor: Daniel Rich, Ph.D.

M.S. June 1987, Mechanical Engineering, Oregon State University.
Thesis: *An Experimental Investigation of Plane Jets Issuing at Various Angles into a Cross-Flow*.
Advisor: J. R. Welty, Ph.D.

B.S. with High Honors and in the Honors Program, June 1984, Mechanical Engineering, Oregon State University.
Senior Thesis: *Design, Construction and Testing of a Testing Facility for Solar Batch Hot-Water Systems*.
Advisor: M. B. Larson, Ph.D.
Honors Thesis: *Design, Fabrication and Testing of an Amorphous Silicon Photovoltaic Cell*.
Advisor: A. M. Kanury, Ph.D.

Employment:

2011-Present Associate Professor, Geography and Environmental Studies, The University of New Mexico.

2009-2011 Director, Environmental Studies Program, Sewanee: The University of the South.

2004-2009 Associate Professor, School of Public Administration and Department of Political Science, The University of New Mexico.

2002-2004 Economist, Utilities Division and Head, Renewable Energy Group, New Mexico Public Regulation Commission.

2000-2002 Associate Professor, Department of Environmental Studies, Florida International University.
2001-2002, Sabbatical in Odessa, Ukraine. Affiliation, International Relations Program, Odessa National University.

1994-2000 Assistant Professor, Department of Environmental Studies, Florida International University.

1993-1994 Post-doctoral Research Fellow, joint appointment: Center for Energy and Environmental Policy and Center for the Study of Marine Policy, University of Delaware.

1992-1993 Adjunct Lecturer, Social Sciences Department, Delaware Technical and Community College.

1991 Intern, Directorate-General XVII–Energy, Commission of the European Community, Brussels, Belgium.

Courses taught:

Graduate

Energy Resources	Energy Policy
Governing the Global Environment	Environmental Management
Natural Resource Policy and Management	Comparative Energy Policy
International Organizations and Environmental Politics	Public Financial Administration
Analytical Methods for Public Managers	Computer Applications in Public Administration

Undergraduate

Energy, Environment and Society	Environmental Politics
Humans as Modifiers of the Earth	U.S. Environmental Policy
Human Geography	American Government
Introduction to Environmental Studies	Global Environment and Society

Research:

Present	<p>Conducting research on energy and environmental policy. Current research focus is on the following areas:</p> <ul style="list-style-type: none">Measures that can secure the long-term viability of renewable energy sources, with a focus on public-private sector partnerships in a competitive environment for electricity generation.Integrated assessment (including technological, policy, and economic factors) of the potential of electric vehicles for meeting transportation, environmental, and energy policy objectives.Exploration of factors enhancing social stability and sustainability. Particular focus on institutional, social and resource arrangements that can enhance the potential of communities for long-term management of “legacy” sites (DOE sites where environmental clean-up has been completed but which require on-going management for environmental protection).
2002-04	<p>Directed interdisciplinary group, composed of economists, attorneys, engineers, and accountants, in developing policy proposals for the implementation of the State of New Mexico’s legislative mandate for ten percent of the state’s electricity generation to be from renewable energy sources. Working with environmental and renewable energy groups, and with New Mexico’s utilities, we facilitated the completion of a 204 Megawatt wind facility (the second largest such facility in the U.S.) within 18 months. Three other large renewable generation projects moved to the construction phase.</p> <p>Conducted research and provided expert witness testimony on electricity, natural gas, and water resource management issues.</p>
2001-02	<p>Visiting researcher, International Relations Program, Odessa National University, Ukraine. Conducted research on energy and environmental policies of Ukraine, with focus on the restructuring of the energy sector and promotion of renewable energy sources. Evaluated the prospects for development of renewable energy sources with cooperation of industrialized countries through “Joint Implementation” projects under the auspices of international greenhouse gas reduction agreements.</p> <p>Research on the effect of the introduction of competition in the electricity markets of both industrialized and developing nations on technology choice. Specific emphasis on the effects of competition on renewable and energy efficiency technologies.</p> <p>Research on the development of electricity industries with particular focus on the institutional, political, and historical factors influencing technology choice and structural change in these industries.</p>
1994-01	<p>Policy Associate, Center for Renewable Energy Sources, Athens, Greece (On-going affiliation). Conducting research on renewable energy policy in Greece, and on the economic and technical potential for the use of renewable energy technologies in various segments of the electricity market.</p> <p>Research on the social implications and ethical issues attendant to the generation and disposal of high-level radioactive waste from the use of nuclear power for electricity generation.</p> <p>Research on the economic, social, political, and ethical implications of the various policy proposals for the control of greenhouse gas emissions.</p>
2000	<p>Visiting policy scientist, Center for Renewable Energy Sources, Athens, Greece. Conducted a review and evaluation of the policies promoting the development of renewable energy sources in Greece.</p> <p>Surveys of manufacturers and vendors of products with recycled plastics content and research on the effectiveness of federal and state plastics recycling policies.</p>

Survey of the preferences of prospective and recent home-buyers in South Florida. Particular emphasis on the importance attached to energy-efficiency features of houses.

Research on local government implementation of environmental regulations relating to water quality. Funded by the Broward County (FL) Department of Planning and Environmental Protection.

1993-94 **Post-doctoral Research Associate.** Joint appointment, Center for Energy and Environmental Policy and Center for the Study of Marine Policy, University of Delaware.

- Participated in the Center for Energy and Environmental Policy activities as advisors to Dr. Hoesung Lee, Co-Chair of Working Group III of the Intergovernmental Panel on Climate Change. Tasks included performing a critical review of the various models proposed for evaluating policy options which address global climate change.
- Participated in the evaluation of the regulatory environment for innovative demand-side management programs. The objective of this research was to determine the policies most appropriate for the promotion of photovoltaic (solar cell) technologies in applications which manage electric demand in commercial buildings. Contract funded by the National Renewable Energy Laboratory.

Fall 1991 **Visiting Scholar, Centre for Planning, Strathclyde University, Glasgow, Scotland.** Conducted research on the energy and environmental policies of the United Kingdom.

1991 Consultant, **Axess Corp.**, a Wilmington, Delaware Company developing innovative plastics manufacturing and recycling processes. Assembled and directed a research team to evaluate and project the regulatory environment and the economic and technical possibilities for plastics recycling in the United States.

Fall 1990 **In-service Trainee, Commission of the European Community.** Conducted research at the Directorate-General for Energy in Brussels, Belgium. Investigated the Community's energy policy through archival research and interviews with Commission staff.

Grants:

- 2010 ACS/Mellon Environmental Fellowship Program. Two-year support for Post-Doctoral Fellow in Environmental Studies at The University of the South. \$116,400, P.I.
- 2007-08 National Endowment for the Arts. Translation of Alexis Stamatis' *American Fugue* from the Greek. International Literature Award, \$20,000, Co-P.I.
- 2006-08 New Mexico Energy, Minerals and Natural Resources Department. *Evaluation of the Clean Energy Grants Program*, \$43,280, P.I.
- 2006 Center for Science, Technology, and Policy. *Interdisciplinary Course Development Grant*, \$5,000, Co-P.I.
- 2000-01 The Knapp Foundation. *Library Improvement Grant*, \$40,000, Co-P.I.
- 1999-00 Broward County Department of Environmental Planning. *Evaluation of Comprehensive Solid Waste Management Plan*, \$12,500, P.I.
- 1994-95 American Plastics Council. *Plastics Recycling in the U.S.A.: Policy Review and Survey of Manufacturers and Vendors of Recycled Plastic Products*, \$15,000, P.I.
- 1992-94 National Renewable Energy Laboratory. *Photovoltaics as a Demand-side Management Technology: Development of a Computer Model for the Evaluation of Prospects*, \$54,000, Co-P.I.

Selected Service Activities:

Professional

Board Member, Association for Environmental Studies and Sciences, 2010-2012.

Member, Council of Environmental Deans and Directors, 2009-2011.

Editor, *STS Today* (The Newsletter of the International Association for Science, Technology and Society, 2004-2006.

Member of the Executive Board, International Association for Science, Technology and Society, 2004-2006.
Selection Committee, Senior Scholar Competition, Fulbright Program, Kiev, Ukraine. December 2001.

Community

Governor’s Task Force on Distributed Solar Power, New Mexico, 2004-2006.
Governor’s Task Force on Concentrated Solar Power, New Mexico, 2004-2006.
Member of the Habitat for Humanity-Jordan Commons Education Committee. The Education Committee was responsible for planning, delivering, and finding funding sources for environmental, energy, and other education activities for the residents of Jordan Commons, a model ecologically sustainable community being built by Habitat for Humanity in Homestead, Florida, 1997-2000.
Member of the Energy Advisory Committee of the Governor’s Commission on Sustainable South Florida. May 1997-September 2000. The Energy Advisory Committee was responsible for drafting policy proposals for sustainable energy development and use in the State of Florida. Co-edited the Committee’s final report with Committee Chair, Carol Rist (Chairperson of the Miami chapter of the League of Women Voters).

University

Grants and Awards Committee, Latin American and Iberian Institute, University of New Mexico, 2014-present
Faculty Senate, University of New Mexico, 2012-present.
Mid-probationary Review Subcommittee, Tenure and Promotion Committee, College of Arts and Sciences, University of New Mexico, 2014-2015.
University Sustainability Council, Sewanee: The University of the South, 2009-2011.
Faculty Senate Budget Committee, University of New Mexico, 2007-2009.
Faculty Senate Operations Committee, University of New Mexico, 2005-2006.
Faculty Senate, University of New Mexico, 2004-2007.
Member of Steering Committee, European Studies Certificate, FIU. 1997-1999.
Member of GIS Advisory Committee, FIU. October 1997-August 1999. The GIS Advisory Committee was responsible for advising the library on GIS resource development, drafting policies and procedures for the operation of the university-wide GIS labs which are located in the library, and coordinating GIS course development and offerings university-wide.
Member of the Graduate Program in International Studies Advisory Committee, FIU. 1996-1997.

Honors and Awards:

Invited and Elected Societies and Offices

President, National Association for Science, Technology and Society (NASTS), 2001-2003. Ex-officio seat on the NASTS board.
Co-chair of Science, Technology, and Public Policy Assembly of the National Association for Science, Technology and Society (NASTS). Ex-officio seat on the NASTS board. 1998-2001.
Member of Epsilon Pi Tau, the international honorary society for professions in technology. 1999-present.
Member of National Research Committee of the Professional Association for Consumer Energy Education, 1995-1997.
Pi Tau Sigma Honorary Mechanical Engineering Society (1983).
Alpha Lambda Delta Honorary Society (1981).

Professional Honors and Awards

Excellence in Teaching Award—Teaching Incentive Program, Florida International University. Nominated by faculty committee, 2001.

Excellence in Teaching Award—Teaching Incentive Program, Florida International University. Nominated by faculty committee, 1999.

Student Fellowships, Honors and Awards

Marvin B. Sussman Prize for Outstanding Dissertation, College of Urban Affairs and Public Policy, University of Delaware, 1994.

Mark Haskell Award for Excellence, College of Urban Affairs and Public Policy, University of Delaware, 1992.

In-service Training Award, Commission of the European Communities, 1991.

University Fellowship, University of Delaware, 1990-1991 and 1991-1992.

Competitive Scholarship, University of Delaware, 1989-1990.

Chevron Fellowship, Oregon State University, 1984-1985.

Helen Horning Award for Excellence, Honors Program, Oregon State University, 1983.

International Student Scholarship, Oregon State University, 1981-1982, 1982-1983 and 1983-1984.

Professional Associations:

Association for Environmental Studies and Sciences

United States Association for Energy Economics/International Association for Energy Economics

International Association for Science, Technology and Society

Languages:

Greek (native), French (good), German (reading ability).

Publications

Books

Thiel, D. and Hadjilambrinos, C. (Translators) Alexis Stamatis, *American Fugue*, Wilkes Barre, PA: Etruscan Press, 2008.

Edited Journal Issues

Guest editor, Special Theme Issue on Global Climate Change, *Bulletin of Science, Technology and Society*, Vol. 19, No. 6, 1999.

Journal Articles

Hadjilambrinos, C. (Under review) "Reimagining the Future: Market and Marketing Considerations for the Promotion of Electric Vehicles" *Athens Journal of Business and Economics*.

Hadjilambrinos, C. and Rockwell, E. (Under review) "Implementation of Public-Private Partnership Initiatives for Transportation Demand Management: A Study of South Florida Commuter Services" *International Journal of Sustainable Transportation*.

Hadjilambrinos, C. (2006) "The High-Level Radioactive Waste Policy Dilemma: Prospects for a Realistic Management Policy" *Journal of Technology Studies*, Vol. 32, No. 2, pp. 95-103.

Hadjilambrinos, C. (2005) "Electricity Industry Restructuring: Lessons from the British and Norwegian Experience." *IEEE Technology and Society Magazine*, Vol. 24, No. 4, pp. 27-35.

Hadjilambrinos, C. (2000) "Understanding Technology Choice in Electricity Industries: A Comparative Study of France and Denmark." *Energy Policy*, Vol. 28, No. 15, pp. 1111-1126.

Hadjilambrinos, C. (2000) "An Egalitarian Response to Utilitarian Analysis of Long-Lived Pollution: The Case of High-Level Radioactive Waste." *Environmental Ethics*, Vol. 22, No. 2, pp. 43-62.

Hadjilambrinos, C. (1999) "For Richer or for Poorer? The Role of Science, Politics and Ethics in the Global Climate Change Policy Debate." *Bulletin of Science, Technology and Society*, Vol. 19, No. 6, pp. 521-531.

Hadjilambrinos, C. (1999) "The USA Plastics Recycling Industry: A Survey of Manufacturers and Vendors of Recycled Plastic Products." *Environmental Conservation*, Vol. 26, No. 2, pp. 125-135.

Hadjilambrinos, C. (1999) "Toward a Rational Policy for the Management of High-Level Radioactive Waste: Integrating Science and Ethics." *The Bulletin of Science, Technology and Society*, Vol. 19, No. 3, pp. 179-189.

Hadjilambrinos, C. (1998) "Technological Regimes: An Analytical Framework for the Evaluation of Technological Systems." *Technology In Society*, Vol. 20, No. 2, pp. 179-194.

Hadjilambrinos, C. and Junco, M. (1997) "A Study of the Extent and Effectiveness of Incorporating Environmental Topics in the Science Curriculum of Secondary Schools in Dade County." *The Bulletin of Science, Technology and Society*, Vol. 17, No. 5&6, pp. 331-338.

Hadjilambrinos, C. (1996) "A Review of Plastics Recycling in the US With Policy Recommendations." *Environmental Conservation*, Vol. 23, No. 4, pp. 298-306.

Hadjilambrinos, C. (1996) "Renewable Energy Policy in Greece: Environmental Imperatives and Systemic Constraints." *Energy Policy*, Vol. 24, No. 6, pp. 563-573.

Byrne, J., Hadjilambrinos, C., and Wagle, S. (1994) "Distributing Costs of Global Climate Change," *IEEE Technology and Society Magazine*, Vol. 13, No. 1, pp. 17-24, 32.

Hadjilambrinos, C. (1990) "Nuclear Power as an Ethical Issue: Utilitarian Ethics and Egalitarian Responses." *The Bulletin of Science, Technology and Society*, Vol. 10, No. 5/6, pp. 282-289.

Rich, D., Baron, B. N., McDonnel, C., and Hadjilambrinos, C. (1990) "Photovoltaics and Electric Utilities: An Evaluation of Utility Attitudes and Expectations," *Solar Cells*, Vol. 28, No. 3, pp. 25-37.

Invited Articles

Hadjilambrinos, C. (2004) "Scientific Research and Technical Expertise in Policymaking: What Should the Standards Be?" *STS Today*, Vol. 19, No. 1, pp. 1-3.

Hadjilambrinos, C. (2002) "Risky Business: If LIPA (Long Island Power Authority) has to pay for the cost of new power plants, it should own them too. *Newsday*, December 15, *Currents*.

Hadjilambrinos, C. (2002) "The Importance of Interdisciplinary Discourse" *STS Today*, Vol. 17, No. 2, p. 1.

Hadjilambrinos, C. (1999) "STS and Global Climate Change Discourse" Introduction to Special Theme Issue on Global Climate Change, *Bulletin of Science, Technology and Society*, Vol. 19, No. 6, pp. 465-467.

Hadjilambrinos, C. (1998) "The STS Approach in the Context of an Environmental Studies Program: Environmental Studies at Florida International University." *The Bulletin of Science, Technology and Society*, Vol. 18, No. 6, pp. 460-462.

Hadjilambrinos, C. (1997) "Technological Determinism or Public Neglect?" *The Bulletin of Science, Technology and Society*, Vol. 17, No. 4, p. 156.

Book Chapters

Byrne, J., and Hadjilambrinos, C. (1994) "Photovoltaics for Demand-Side Management." *Progress in Solar Energy Technologies and Applications: An Authoritative Review*. Boulder CO: American Solar Energy Society, pp. 22-23.

Hadjilambrinos, C. (1992) "Energy, Sustainable Development and the Ideology of International Economic Competition," in H. Hurkhardt and W. E. Vanderburg (editors), *Preparing for a Sustainable Society*, Institute for Electrical and Electronics Engineers, Toronto, Ontario, pp. 158-164.

Hadjilambrinos, C. (1991) "Environmental Protection and Energy Policy in Greece: Constraints and Possibilities for the Development of an Effective Conservation and Renewable Energy Policy," in Eino

Kainlauri, Alan Johansson, Ilmari Kurki-Suonio, Mildred Geshwiler (editors), *Energy and Environment 1991*. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, Georgia, pp. 346-352.

Hadjilambrinos, C. (1991) "Utility Sector," in John Byrne and Young-Doo Wang, *Institutional Strategies for Sustainable Energy, Environment and Development: Case Studies of Indonesia, South Korea, Malaysia and Thailand*. Center for Energy and Urban Policy Research, University of Delaware. ESMAP/WORLD BANK, Project Title: **Alternative Energy Paths**, pp. 137-142.

Conference Proceedings

Hadjilambrinos, C. (1999) "Electricity Restructuring: Lessons for the US from the British and Norwegian Experience," *The Structure of the Energy Industries: The Only Constant is Change*, Conference Proceedings, 20th Annual North American Conference, International Association for Energy Economics and U.S. Association for Energy Economics, Aug. 29-Sept. 1, 1999, pp. 56-63.

Byrne, J., Hadjilambrinos, C., Nigro, R. M., Eiffert, P., Agbemabiese, L., and Kliesch, J. (1999) "Environmental Impacts of Building Integrated PV Applications in the State Public Buildings Sector," *Proceedings, SOLAR 99*, American Solar Energy Society.

Hadjilambrinos, C., Byrne, J., and Wagle, S. (1993) "Dealing with Global Climate Change: Whose Costs, Whose Benefits?" *Technology: Whose Costs?... Whose Benefits?* Institute for Electrical and Electronics Engineers, Washington DC, pp. 55-60.

Byrne, J., Wang, Y., Nigro, R. M. and Hadjilambrinos, C. (1993) "Valuing Photovoltaic Technology as a Utility Demand-Side Management Application: Regulatory Issues," *Proceedings, NARUC National Conference on Renewable Energy*. National Association of Regulatory Utility Commissioners, pp. 258-269.

Hadjilambrinos, C. (1993) "Energy, Sustainable Development and Transnational Equity." *Proceedings, Second International Conference on Environmentally and Culturally Sustainable Development*. Society for Ecological Sensibility, New York, N.Y.

Byrne, J., Hadjilambrinos, C., and Wang, Y. D. (1992) "The Role of Photovoltaics in Demand-Side Management: Policy and Industry Challenges," *Proceedings, NREL 11th Photovoltaic Advanced Research and Development Project Review Meeting*. American Institute of Physics.

Byrne, J., Hadjilambrinos, C., Wang, Y. and Nigro, R. (1992) "An Evaluation of Photovoltaics as a Utility Demand-Side Management Option in the U.S. Buildings Sector." *Proceedings, 1992 ASHRAE Annual Meeting*. American Society of Heating, Refrigeration, and Air-conditioning Engineers.

Byrne, J., Hadjilambrinos, C., and Hoffman, S. (1991) "Energy and Planning: Certainties in an Uncertain World." *Proceedings, 6th Annual Conference of the National Association of Science, Technology and Society*. NASTS, Washington, DC.

Baron, W. N., Rich, D., McDonnell, C., and Hadjilambrinos, C. (1989) "Photovoltaics and Electric Utilities." *Proceedings, 9th European PV Solar Energy Conference*. Freiburg, Federal Republic of Germany.

Dissertations, Theses, and Research Monographs

Hadjilambrinos, C. (1993) *Energy Regimes and the Development of the European Community*. Ph.D. Dissertation, University of Delaware.

Byrne, J., Gershman, M., Hadjilambrinos, C., Nigro, R., and Wang, Y. (1993) *Development of Spreadsheet Analysis Tools for Utility Evaluation of PV-DSM*. Technical report prepared for the National Renewable Energy Laboratory in cooperation with Delmarva Power.

Byrne, J., Wang, Y., Nigro, R. M. and Hadjilambrinos, C. (1993) *Evaluation of Potential Applications of Photovoltaics in the Utility DSM Market: Results from the Solar One House Field Tests*. Technical report prepared for the National Renewable Energy Laboratory in cooperation with Delmarva Power.

Hadjilambrinos, C. and Hughes, M. (1992) *Plastics Disposal and Recycling: Policies, Practices, and State of Technology*. Report prepared for Axess Corp. of Wilmington, Delaware.

Byrne, J., Hadjilambrinos, C. and Ham, K. (1989) *Estimate of Delaware Residential Energy Consumption and Costs: 1983-1987*. Technical report prepared for the Division of Community Services, Department of Community Affairs, State of Delaware, July 1989.

Rich, D., Baron, W. N., McDonnel, C. and Hadjilambrinos C. (1989) *Photovoltaics and Electric Utilities*. Project completion report for the Electric Power Partners Program, January 1989.

Byrne, J., Wang, Y. and Hadjilambrinos, C. *Economic Analysis of Peak Load Reduction Strategies for Water Heaters: Direct Load Control vs. Increased Efficiency*. Center for Energy and Urban Policy Research, University of Delaware, January 1989.

Hadjilambrinos, C. (1987) *An Experimental Investigation of Plane Jets Issuing at Various Angles into a Cross-Flow*. M.S. Thesis, Oregon State University.

Hadjilambrinos, C. (1984) *Design, Construction and Testing of a Testing Facility for Solar Batch Hot-Water Systems*. B.S. Thesis, Department of Mechanical Engineering, Oregon State University.

Hadjilambrinos, C. (1984) *Design, Fabrication and Testing of an Amorphous Silicon Photovoltaic Cell*. Honors Thesis. University Honors Program, Oregon State University.

Book Reviews

Hadjilambrinos, C. (1999) "Historical Perspectives on Climate Change." James Rodger Fleming, *Bulletin of Science, Technology and Society*, Vol. 19, No. 6, pp. 553-555.

Hadjilambrinos, C. (1988) "Exploring Ecology and its Applications: Readings from American Scientist." Peter Kareiva (ed.), *Bulletin of Science, Technology and Society*, Vol. 18, No. 6, p. 468.

Conference Presentations

Hadjilambrinos, C. and Thiel, D. (2015) "The Geography of Translation: Literary Translation as Cultural Representation" 36th Annual Southwest Popular and American Culture Studies Association Conference, Albuquerque, NM, February 11-14, 2015.

Hadjilambrinos, C. and Thiel, D. (2014) "Translation and Sense of Place." Joint Meeting of the Southwest and Great Plains-Rocky Mountain Divisions of the Association of American Geographers, Albuquerque, NM, October 23-25, 2014.

Hadjilambrinos, C. and Thiel, D. (2014) "Shifting Gears as Well as Stepping on the Brake: An Integrated Approach to GHG Emission Reduction from Transportation" 2nd Annual International Conference on Ecology, Ecosystems and Climate Change, Athens, Greece, July 14-17, 2014.

Hadjilambrinos, C. (2013) "Re-imagining the Future: Electric Vehicles as a Socially Transformative Technology" 7th Annual International Conference on Business and Society in a Global Economy, Athens, Greece, December 19-22, 2013.

Hadjilambrinos, C. (2013) "Exiled to the Homeland: The Changing Cultural Geography of Greek Diaspora" Cultures of Exile: Conversations on Language and the Arts, International Conference, Albuquerque, NM, October 23-25, 2013.

Hadjilambrinos, C. (2013) "Energy Efficiency and the Residential Sector: A Survey of Homebuyer Preferences for Housing Characteristics" Annual Meeting of the Association for Environmental Studies and Sciences, Pittsburgh, PA, June 19-22 2013.

Hadjilambrinos, C. and Rockwell, E. (2012) "Implementation of Public-Private Partnership Initiatives for Transportation Demand Management: A Study of South Florida Commuter Services" Annual meeting of the Southwest division of the Association of American Geographers, Las Cruces, NM, October 25-27, 2012.

Hadjilambrinos, C. (2012) "Batteries Not Included: Policy framework for the rapid introduction of electric vehicles in the marketplace" Annual Meeting of the Association for Environmental Studies and Sciences, Santa Clara, CA, June 21-24, 2012.

Hadjilambrinos, C. and Thiel, D. (2012) "Writing the Land: An Interdisciplinary Experiential Approach" 39th Annual ABSEL Conference, San Diego, CA, April 5-8, 2012.

Hadjilambrinos, C. (2011) "An Experiential Response to Environmental Crisis: Roles in the Deep Horizon Oil Disaster" 38th Annual ABSEL Conference, Pensacola, FL, March 17-20, 2011.

Hadjilambrinos, C. (2010) "The Arts, Writing, and Environmental Studies" 67th Conference of the Florida College English Association, Winter Park, FL, October 14-16, 2010.

Hadjilambrinos, C. and Thiel, D. (2009) "Communication of Technical Information and the Mass Media" Association for Environmental Studies and Sciences, 1st Annual Conference, Madison, WI, October 8-11, 2009.

Hadjilambrinos, C. (2008) "Conditions for Social Acceptability of Pulsed Power-driven Fusion Energy Technology" American Association for the Advancement of Science, South West Regional Association Meeting (AAAS-SWARM), Albuquerque, NM, April 9-12 2008.

Hadjilambrinos, C. (2008) "Political Control of Science and Technology: Lessons from the George W. Bush Administration" 23rd Annual Conference of the International Association for Science, Technology and Society, Baltimore, MD, February 2008.

Hadjilambrinos, C. (2004) "Electricity Restructuring in the UK and Norway: Impacts on Technology Choice" 19th Annual Conference of the National Association for Science, Technology and Society, Baltimore, MD, February 2004.

Hadjilambrinos, C. and Thiel, D. (2003) "The Importance of the Arts in the Study of the Environment" 9th Annual Robinson Jeffers Association Conference, Flagstaff, AZ, April 2003.

Hadjilambrinos, C. (2003) "Environmental Organizations in Ukraine: Implications for the Emergence of Civil Society" 18th Annual Conference of the National Association for Science, Technology and Society, Baltimore, MD, February 2003.

Hadjilambrinos, C. (2002) "National Energy Policy of Ukraine: Chaotic Change or Pragmatic Reform?" 17th Annual Conference of the National Association for Science, Technology and Society, Baltimore, MD, February 2002.

Hadjilambrinos, C. (2001) "The 2000 Presidential Election in Florida: Voting Technology at the Heart of Political Conflict" 16th Annual Conference of the National Association for Science, Technology and Society, Baltimore, MD, March 2001.

Hadjilambrinos, C. (2000) "Plowshares, Chariots, Gasbuggies and other Atomic Earth Blasters: History and Social Implications of the U.S. Program for Peaceful Applications of Nuclear Explosives." 15th Annual Conference of the National Association for Science, Technology and Society, Baltimore, MD, March 2000.

Hadjilambrinos, C. (1999) "For Richer or for Poorer? Ethical Criteria for Realistic and Equitable Greenhouse Gas Reduction Policy." 14th Annual Conference of the National Association for Science, Technology and Society, Baltimore, MD, March 1999.

Hadjilambrinos, C. (1998) "A Hundred Centuries of Solitude: Social and Ethical Implications of High-Level Radioactive Waste Disposal." 13th Annual Conference of the National Association for Science, Technology and Society, Chicago, IL, March 1998.

Hadjilambrinos, C. (1996) "Technological Choice and Community Development: Small-Scale Technologies and Community Empowerment." 11th Annual Conference of the National Association for Science, Technology and Society, Washington, DC, March 1996.

Hadjilambrinos, C., Byrne, J., and Wagle, S. (1993) "Dealing with Global Climate Change: Whose Costs, Whose Benefits?" Technology and Society Conference, Institute for Electrical and Electronics Engineers, Washington, DC, April 1993.

Byrne, J., Wang, Y., Nigro, R. M. and Hadjilambrinos, C. (1993) "Valuing Photovoltaic Technology as a Utility Demand-Side Management Application: Regulatory Issues," National Association of Regulatory Utility Commissioners, National Conference on Renewable Energy, Washington, DC, January 1993.

Hadjilambrinos, C. (1993) "Energy, Sustainable Development and Transnational Equity." Second International Conference on Environmentally and Culturally Sustainable Development of the Society for Ecological Sensibility, Spetses, Greece, June 1993.

Byrne, J., Hadjilambrinos, C., and Wang, Y. D. (1992) "The Role of Photovoltaics in Demand-Side Management: Policy and Industry Challenges," National Renewable Energy Laboratory, 11th Photovoltaic Advanced Research and Development Project Review Meeting, Denver, CO, May 1992.

Byrne, J., Hadjilambrinos, C., Wang, Y. and Nigro, R. (1992) "An Evaluation of Photovoltaics as a Utility Demand-Side Management Option in the U.S. Buildings Sector." 63rd Annual Meeting of the American Society for Heating, Refrigeration, and Air-conditioning Engineers, Philadelphia, PA, March 1992.

Byrne, J., Hadjilambrinos, C., and Hoffman, S. (1991) "Energy and Planning: Certainties in an Uncertain World." 6th Annual Conference of the National Association for Science, Technology and Society, Washington, DC, February 1991.

Baron, W. N., Rich, D., McDonnell, C., and Hadjilambrinos, C. (1989) "Photovoltaics and Electric Utilities." 9th European PV Solar Energy Conference. Freiburg, Federal Republic of Germany, September 1989.

Byrne, J, Hadjilambrinos, C., and Hoffman S., "Energy and Planning: Certainties in an Uncertain World." 6th General Assembly of the World Future Society, New York, NY, July 1989.

List of References

Dr. Anita Obermeier, Director
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Additional references can be made available upon request

K. MARIA D. LANE**January 2016**

Department of Geography and Environmental Studies
University of New Mexico, mdlane@unm.edu

Educational History

Ph.D. Geography, 2006, University of Texas at Austin

Dissertation: "Imaginative geographies of Mars: the science and significance of the red planet, 1877-1910," Ian R. Manners, Adviser

M.S. Community and Regional Planning, 2000, University of Texas at Austin

Thesis: "What motivates individual water conservation behavior? A case study of gardeners in Austin, Texas," Robert Mugerauer, Adviser

B.A. Latin-American Studies (with Highest Distinction), 1995, University of Virginia

Thesis: "Democratic weapons for protectionist times: the United States in Latin America's 20th century elections," Herbert Braun, Adviser

Employment History

University of New Mexico

2014-present, Chair, Department of Geography & Environmental Studies

2013-present, Associate Professor, Department of Geography & Environmental Studies

2007-2013, Assistant Professor, Department of Geography & Environmental Studies

2006-2007, Adjunct Assistant Professor, Department of Geography

University of Texas at Austin

2005-2006, Assistant Instructor, Department of Geography and the Environment

2001-2006, Teaching Assistant, Department of Geography and the Environment

1998-2001, Research Assistant, Community and Regional Planning Program

Concurrent Consultantships

2000-2005, Cartographer, Academic Cartography Services, Austin, TX

1999, Property Tax Researcher, Robert Mugerauer Ecological Design, Austin, TX

Non-Academic Employment

2000, Intern, Texas Parks and Wildlife Department, Austin, TX

1998-1999, Research Assistant, National Parks Service, Austin, TX

1997-1998, Marketing Director, Agnoli, Barber and Brundage, Inc., Naples, FL

1996, Marketing Coordinator, Weihe Partnership / Weihe Interiors, Washington, DC

1995, Project Assistant, Natural Hazards Project, Department of Regional Development and Environment, Organization of American States, Washington, DC

Academic Recognition and Honors

2016, Distinguished Visiting Scholar, Queen's University Belfast

2010, Outstanding New Teacher of the Year Award, University of New Mexico

2006, Price/Webster Prize, for best *Isis* article, History of Science Society

2005, Graduate Leadership Award, Dept. of Geography, University of Texas at Austin

2004, Clark Award, for best student paper, AAG Historical Geography Specialty Group

2003-2004, CLIR-Mellon Fellowship for Dissertation Research in the Humanities

2003, Chair's Teaching Award, Dept. of Geography, University of Texas at Austin

2000-2001, A.D. Hutchison Fellowship, University of Texas at Austin

1999-2000, Livingston Fellowship, University of Texas at Austin

1998-1999, Pre-emptive Fellowship, University of Texas at Austin

1991-1995, Echols Scholar, University of Virginia

Authored Books

Lane, K. Maria D. (2011) *Geographies of Mars: Seeing and Knowing the Red Planet* (Chicago: University of Chicago Press) ISBN: 9780226470788. Licensed to Human Science and Technology Press for Chinese-language translation.
[Reviewed in: *The Guardian*, *Times Literary Supplement*, *Nature*, *American Scientist*, *Imago Mundi*, *Isis*, *Journal for the History of Astronomy*, *Journal of Historical Geography*, *Geographical Review*, and *Cultural Geographies*]

Articles in Refereed Journals

Rebecca Lave, Matthew W. Wilson, Elizabeth S. Barron, Christine Biermann, Mark A. Carey, Chris S. Duvall, Leigh Johnson, **K. Maria Lane**, Nathan McClintock, Darla Munroe, Rachel Pain, James Proctor, Bruce L. Rhoads, Morgan M. Robertson, Jairus Rossi, Nathan F. Sayre, Gregory Simon, Marc Tadaki and Christopher Van Dyke (2014) “Intervention: Critical physical geography.” *Canadian Geographer* 58(1): 1-10.

Lane, K. Maria D. (2013) “Reading Boulder Dam: landscape alteration as national transformation in 1930s America.” *Aether: The Journal of Media Geography*, 11: 102-126. (Special issue on “Landscape, history, and media,” eds. Christina Dando and Eric Olmansen.)

Lane, K. Maria D. (2011) “Water, technology, and the courtroom: Negotiating reclamation policy in territorial New Mexico.” *Journal of Historical Geography*, 37: 300-311.

Lane, K. Maria D. (2006) “Mapping the Mars canal mania: cartographic projection and the creation of a popular icon.” *Imago Mundi: The International Journal for the History of Cartography*, 58: 198-211.

Lane, K. Maria D. (2005) “Geographers of Mars: cartographic inscription and exploration narrative in late Victorian representations of the red planet,” *Isis: An International Review Devoted to the History of Science and its Cultural Influences*, 96: 477-506. (Winner: 2006 Price/Webster Prize for best *Isis* article over the previous three years, awarded by the History of Science Society.)

Handy, Susan, Lisa Weston, Jumin Song, and **K. Maria D. Lane** (2002) “Education of transportation planning professionals,” *Transportation Research Record* 1812: 151-160.

Lane, Maria. (2000) “Environmentally responsible behavior: does it really matter what we believe?” *Planning Forum*, 6: 33-39.

Articles Appearing as Book Chapters in Edited Volumes

Lane, K. Maria D. (forthcoming) “Pros and cons of a cosmopolitan classroom,” in *Going Inward: the Role of Cultural Introspection in College Teaching*, eds. S. D. Longerbeam and A. F. Chávez (New York: Peter Lang Publishing).

Perramond, Eric P. and K. Maria D. Lane (2014) “Territory to state: law, power, and water in New Mexico,” in *Negotiating Territoriality: Spatial Dialogues between State and Tradition*, eds. Allan Charles Dawson, Laura Zanotti, and Ismael Vaccaro (New York: Routledge), 142-162.

Lane, K. Maria D. (2014) “An odyssey among deserts,” in *North American Odyssey: Historical Geographies for the 21st Century*, eds. Craig Colten and Geoff Buckley (Rowman & Littlefield).

Lane, K. Maria D. (2008) “Astronomers at altitude: mountain geography and the cultivation of scientific legitimacy,” in *High Places: Cultural Geographies of Mountains, Ice, and Science*, eds. Denis Cosgrove and Veronica della Dora (London: I.B. Tauris), 126-144.

Book Reviews and Non-Refereed Articles

- Lane, K. Maria D. (forthcoming 2016) Review of Kenna Lang Archer, *Unruly Waters: A Social and Environmental History of the Brazos River* (University of New Mexico Press, 2015) in *Journal of American History*.
- Lane, K. Maria D. (forthcoming 2016) Review of Siobhan Carroll, *An Empire of Air and Water: Uncolonizable Space in the British Imagination, 1750-1850* (University of Pennsylvania Press, 2015) in *AAG Review of Books* 42(2).
- Lane, Maria (2015) "Editorial update." *Historical Geography*, 43: 1.
- Lane, K. Maria D. (2014) Review of Philip J. Stooke, *The International Atlas of Mars Exploration: The First Five Decades* (Cambridge, 2012) in *Quest: The Quarterly of Spaceflight History* 21(3):57-58.
- Lane, K. Maria D. (2014) Review of Elinore Barrett, *The Spanish colonial settlement landscapes of New Mexico, 1598-1680* (University of New Mexico Press, 2012) in *Journal of Latin American Geography* 13(1) 233-234.
- Lane, Maria (2013) "Editorial update." *Historical Geography*, 41: 1.
- Lane, Maria (2012) "Editorial update." *Historical Geography*, 40: 1-2.
- Lane, K. Maria D. (2012) "Maps, images, and icons: creating the geography of Mars." *Rheinsprung*, 11: 50-65.
- Lane, K. Maria D. (2011) Review of Karen M. Morin, *Frontiers of Femininity: A New Historical Geography of the Nineteenth-Century American West* (Syracuse: Syracuse University Press, 2008) in *Cultural Geographies* 18:258-259.
- Lane, K. Maria D. (2010) Review of Douglas R. Littlefield, *Conflict on the Rio Grande: Water and the Law, 1879-1939* (Norman: University of Oklahoma, 2008) in *Journal of Historical Geography*, 36: 496-497.
- Lane, K. Maria D. (2010) Review of Joseph P. Sánchez, *Between Two Rivers: The Atrisco Land Grant in Albuquerque History, 1692-1968* (Albuquerque: University of New Mexico Press, 2008) in *Journal of Historical Geography* 36: 114-115.
- Lane, K. Maria D. (2009) Review of Michael P. Conzen and Diane Dillon, *Mapping Manifest Destiny: Chicago and the American West* (Chicago: Newberry Library, 2007), *H-HistGeog, H-Net Reviews*, 3 pgs.
- Lane, K. Maria D. (2008) Review of Derek Hayes, *Historical Atlas of the United States* (Berkeley: University of California Press, 2007), *H-HistGeog, H-Net Reviews*, 4 pgs.
- Lane, K. Maria D. (2007) Review of Robert Markley, *Dying Planet: Mars in Science and the Imagination*. (Durham: Duke University Press, 2005), *Isis*, 97: 772-773.

Works in Preparation

Book monograph in preparation

- Lane, K. Maria D. *Fluid geographies: settling New Mexico during the Reclamation Era*. Under contract with University of Chicago Press, slated for publication in 2017.

Book chapter in preparation

- Lane, K. Maria D. "Re-imagining the islands: environmental change in the Florida Keys." Solicited for an edited volume provisionally titled *American Environment Revisited*, eds. Geoff Buckley and Yolanda Youngs (Rowman & Littlefield).

Projects in data collection

- Article project: Qualitative-quantitative investigation of land cover change and management paradigms on New Mexico's Ladder and Armendaris Ranches, focusing on the unique impacts and perspectives that emerge from managing private lands simultaneously for profit and for endangered-species conservation. Collaboration with remote sensing

scientist Chris Lippitt, University of New Mexico; funded by UNM’s Turner Ranches Initiative.

Projects in conceptual design

Book project: Historical-geographic investigation of the changing settlement patterns and political-ecological geographies of the Florida Keys in the 19th and early 20th centuries, focusing on the region’s transformation – from a liminal point of imperial connection within the Caribbean basin into a fixed part of the American mainland – through engineering projects with enduring environmental impacts.

Editorships

2011-2017, Co-Editor, *Historical Geography*
volume 44 (2016): Feminist Historical Geographies
volume 43 (2015): Historical Geographies of Sexualities
volume 42 (2014): Irish Historical Geographies II
volume 41 (2013): Irish Historical Geographies
volume 40 (2012): Digital Historical Geography
volume 39 (2011): Geographies of Slavery
2000-2002, Senior Editor, *Planning Forum*

Conferences Organized

2014, Co-organizer (with Shawn Hutchinson of Kansas State University) for joint meeting of the Southwest and Great Plains / Rocky Mountains Divisions of the Association of American Geographers, Albuquerque, NM: October 23-25.

Invited Lectures, External

2013, “Natural resources and the production of urban possibilities in the Southwestern borderlands.” Symposium presentation at the Center for Urban and Global Studies, Trinity College, Hartford, CT, April 20.
2011, “Cartographic treasures of the Harry Ransom Center.” Southwest Division of the Association of American Geographers, University of Texas at Austin, November 11.
2011, “Geographies of Mars: science, image and spectacle.” National Center for Competence in Research on Iconic Criticism, University of Basel, Switzerland, October 4.
2011, “Geographies of Mars.” Keynote Science Speaker at New Mexico Science Fiction Conference, Albuquerque, NM, August 26.
2011, “Water, society, and the courtroom: understanding resource management transitions in Reclamation-era New Mexico”

- Department of History, Idaho State University, March 14.
- Department of Geography, University of Delaware, February 28.
- Department of Geography, University of Maryland Baltimore County, February 7.

2010, “Placing science: Mars and the geography of water resource management.” Department of Global and Sociocultural Studies, Florida International University, February 25.
2009, “Geographies of Mars.” International Workshop on One Century of Mars Observations, Paris Observatory, France, September 18.
2008, “Regional Studies Workshop.” Department of Regional Studies in Humanities and Social Sciences, National Hsinchu University, Taiwan, May 28.
2008, “Urban-rural relationships in the American Southwest.” Department of Regional Studies in Humanities and Social Sciences, National Hsinchu University, Taiwan, May 23.

- 2008, "The historical geography of water management in the Rio Grande Valley, New Mexico." Department of Regional Studies in Humanities and Social Sciences, National Hsinchu University, Taiwan, May 22.
- 2006, "Mars in the image of the Earth: historical geographies of the red planet." Department of Geography and Program in Planning, University of Toronto, January 17.

Invited Lectures and Colloquia, Internal

- 2015, "Geographies of science." Academic and Student Affairs Committee, Board of Regents, University of New Mexico: September 3.
- 2015, "Geographies of science or, how are we supposed to manage the environment with all those people in the way." Lightning Lounge, Office of the Provost, University of New Mexico: March 19.
- 2013, "Faculty Author Roundtable." Department of Communication & Journalism, Colloquium Series, University of New Mexico: February 27.
- 2012, "From courts to cartographers: Water disputes in Territorial-era New Mexico." Student Organization for Latin American Studies, University of New Mexico, March 28.
- 2010, "Water, technology, and the courtroom: New Mexicans resist the Reclamation Era." Department of History Colloquium. University of New Mexico, April 30.
- 2009, "Quest for Mars: origins, crosscurrents, and the early role of earth sciences." Department of Earth and Planetary Science Seminar Series, University of New Mexico, March 6.
- 2007, "Reading Boulder Dam: perceptions of western resource management in 1930s America." Department of Geography, University of New Mexico, April 16.
- 2007, "Knowing Mars: how the red planet became arid, irrigated, and inhabited in the late nineteenth century." Department of Geography Speaker Series, University of New Mexico, April 6.
- 2007, "Knowing Mars: how the red planet became arid, irrigated, and inhabited in the late nineteenth century." Honors Program, University of New Mexico, February 21.
- 2005, "Geographies of Mars: bringing the red planet to life in the late nineteenth century." Colloquium, Department of Geography and the Environment, University of Texas at Austin: November 18.

Sessions Organized at Professional Meetings

- 2016, "The Role of Small and Independent Journals in a Dynamic Publication Landscape." Session organized for the Annual Meeting of the Association of American Geographers. San Francisco, CA: March 29-April 2.
- 2012, "Historical Geographies of the Environment: Water." Session organized for the Annual Meeting of the Association of American Geographers. New York, NY: February 24-28.
- 2009, "Focus on New Mexico: Understanding the Land of Enchantment." Session organized for the Annual Meeting of the Association of American Geographers. Las Vegas, NV: March 22-27.
- 2005, "American Maps, American Places." Session organized for the Annual Meeting of the American Studies Association. Washington, DC.: November 3-6.
- 2005, "Visual Narratives in the Production of Geography (1 & 2)." Two-session series for the Annual Meeting of the Association of American Geographers. Denver, CO.: April 5-9.

Contributed Presentations at Professional Meetings (* if refereed)

2016, Session Chair for the Distinguished Historical Geography Lecture, featuring Bill Wyckoff. Annual Meeting of the Association of American Geographers. San Francisco, CA: March 29-April 2.

2016, Panelist, “The Role of Small and Independent Journals in a Dynamic Publication Landscape.” Annual Meeting of the Association of American Geographers. San Francisco, CA: March 29-April 2.

2015, Panelist, “Toward a Sustainable Future for Geography.” Annual Meeting, Southwest Division, Association of American Geographers, San Antonio, TX, November 4-8.

2015, Panelist, “Rethinking the PhD in Geography.” Annual Meeting of the Southwest Division of the Association of American Geographers, San Antonio, TX, November 4-8.

*2015, “Re-imagining the islands: environmental change in the Florida Keys.” International Conference of Historical Geographers, London, July 5-10.

2015, “Environmental Governance as a Foundation for Settler Colonialism: A New View of New Mexico’s Rivers.” Annual Meeting of the Association of American Geographers. Chicago, IL, April.

2014, “Methodological Mistakes in Legal Geography.” Joint Regional Meeting of the Southwest and Great Plains/Rocky Mountains Divisions of the Association of American Geographers, Albuquerque, NM, October 24.

2014, Panelist, “Academic Publishing.” Joint Regional Meeting of the Southwest and Great Plains/Rocky Mountains Divisions of the Association of American Geographers, Albuquerque, NM, October 24.

2014, “Envisioning an expert agency: legislating water control in territorial New Mexico.” Annual Meeting of the Association of American Geographers. Tampa, FL, April.

2013, “Land Managers’ Perceptions of Landscape Change in Southern New Mexico.” Presented at the Annual Meeting of the Southwest Association of American Geographers. Nacogdoches, TX, October 25 (with Christopher D. Lippitt).

2013, “Making geography relevant to students.” Presented at the Joint UNM-NAU Faculty Workshop on Culture, Teaching, and Learning. Albuquerque, NM, May 13.

2013, “Science, settlement, and the New Mexico Territory's irrigation-based development.” Annual Meeting of the Association of American Geographers. Los Angeles, CA, March.

2013, “Writing for Deep Learning: Creating Assignments that Make Students Explore, Think, and Change.” Success in the Classroom Conference, University of New Mexico, February 20.

2012, “Fluid courts: the cultural-legal geography of water conflicts in Territorial New Mexico.” Annual Meeting of the Southwest Association of American Geographers. Las Cruces, NM, October.

2012, “From courts to cartographers: Water disputes in Territorial-era New Mexico.” Annual Meeting of the Association of American Geographers. New York, NY, February.

*2010, “Mapping the waters: cartographic complications and water management in Reclamation-era New Mexico.” ICA International Symposium of the History of Cartography Commission and Maps & Society Commission. Arlington, TX: October 12.

2010, “Water technology, discourse, and the courtroom: New Mexicans resist the Reclamation Era.” Annual Meeting of the Association of American Geographers. Washington, DC. April 16.

2009, “Water engineers in the field: from New Mexico to the wider West.” Annual Meeting of the Association of American Geographers. Las Vegas, NV: March (with Molly Blumhoefer).

- 2008, "Geochemistry and potential playa sources of the January 7, 2008 Southwestern New Mexico 'milky rain.'" International Conference on Salt Lake Research. Salt Lake City, UT: May 11-16 (with Gilbert, J., Gill, T.E., Borrok, D., Frey, B., Hertel, T., Bleiweiss, M., Lehmann, C., and Gay, D.).
- 2008, "Explorations and uncertainties: science, law and New Mexico's Rio Grande Valley." Annual Meeting of the Association of American Geographers. Boston, MA: April.
- 2008, "Geochemistry and potential playa sources of the January 7, 2008 Southwestern New Mexico 'milky rain.'" Annual Meeting of the New Mexico Geological Society. Socorro, NM: April (with Gilbert, J., Gill, T.E., Borrok, D., Frey, B., Hertel, T., Bleiweiss, M., Lehmann, C., and Gay, D.).
- 2008, "Writing their way around the world: student essays and geographic literacy." University of New Mexico Success in the Classroom Conference. Albuquerque, NM: February 21.
- 2007, "Intersections of authority: science, law and the management of water resources in New Mexico's Rio Grande Valley." Annual Meeting of the Southwestern Division, Association of American Geographers. Bryan, TX: November 3.
- *2007, "The cartography of uncertainty in New Mexico's Rio Grande Valley: land use, water rights, and identity conflict, 1907-1917." Annual Meeting of the American Studies Association. Philadelphia, PA: October 11.
- 2007, "High science: men, mountains, and the mapping of Mars." Annual Meeting of the Association of American Geographers. San Francisco, CA: April.
- *2007, "Creating landscape, contesting national identity: popular narrations of Boulder Dam in 1930s America." Annual Meeting of the Southwest / Texas Popular Culture and American Culture Associations. Albuquerque, NM: February 14.
- 2006, "High science: mountain geography in astronomical debates." Annual Meeting of the Southwestern Division, Association of American Geographers. Norman, OK: October 27.
- 2006, "Natural alteration as national transformation: the Boulder Dam landscape story." Annual Meeting of the Association of American Geographers. Chicago, IL: March 9.
- *2005, "Cartography, photography, and areography: visual negotiations over the planet Mars, 1899-1910." Annual Meeting of the History of Science Society. Minneapolis, MN: November 5.
- *2005, "Mapping life onto Mars: early views of the red planet." Annual Meeting of the American Studies Association. Washington, DC: November 4.
- *2005, "The lost planet: maps of the planet Mars, 1877-1910." International Conference on the History of Cartography. Budapest, Hungary: July 17.
- 2005, "Areographical narratives: images and imaginations of the planet Mars, 1867-1916." Association of American Geographers Annual Meeting. Denver, Colorado: April 5.
- *2004, "Familiar aliens: geographical representations of the planet Mars, 1894-1916." Annual Meeting of the History of Science Society. Austin, Texas: November 19.
- 2004, "To the red planet and back: American imaginations of the journey to Mars, 1898-1916." Annual Meeting of the American Studies Association. Atlanta, Georgia: November 11.
- *2004, "Geographic representations of the planet Mars, 1867-1907." European Social Science History Association meeting. Berlin, Germany: March 26.
- 2004, "Lessons from the red planet: American visions of Mars and the United States, 1894-1916." Annual Meeting of the Association of American Geographers. Philadelphia, PA: March 17. (Winner: Andrew Hill Clark Award for best student paper, awarded by the AAG Historical Geography Specialty Group.)

Research Funding (* if funded)

- Creation of a Graduate Research Commons
PIs: K. Maria D. Lane, Chris Lippitt; Students: Alissa Healy, Will Brewer, Sagert Sheets
GPSA Graduate Laboratory Competition
December 2015 (\$100,450)
- *Re-Imagining the Islands: Environmental Change in the Florida Keys
Principal Investigator: K. Maria D. Lane
UNM Research Allocation Committee
December 2015 – May 2017 (\$8,382)
- *GA Funding: Student Experience in National Trails GIS Development Activities
Principal Investigator: K. Maria D. Lane
U.S. Department of Interior, National Park Service
Task Agreement No. P15AC01641, 9/2015-9/2016 (\$25,098)
- Equipment Funding Request: Cooling and Backup Systems for Server Facility
Principal Investigator: K. Maria D. Lane
University of New Mexico, Research Office
OVPR Equipment Funding Competition
2014 (\$34,222)
- *Evolving Priorities in Land Management: A Pilot Study Assessing Historical Intersections and Interactions between Management Practice and Land Cover in Large-Tract Landholdings throughout New Mexico’s Rio Grande Valley
Principal Investigator: Chris D. Lippitt, PI, with K. Maria D. Lane, Co-PI
University of New Mexico, Research Office
Research Allocations Committee
2013-2014 (\$10,000)
- *Proposal for Development of a Study-Abroad Course in Barbados
Principal Investigator: K. Maria D. Lane, PI, with John N. Carr, Co-PI
University of New Mexico
Study-Abroad Allocations Committee
Summer 2013 (\$4,000)
- *Emerging Landscapes, Evolving Priorities: Assessing the Intersections between Land Cover Change and the Management of Introduced Species and Habitats on the Turner Ranches in Southern New Mexico
Principal Investigator: K. Maria D. Lane, PI, with Chris D. Lippitt, Co-PI
University of New Mexico, College of Arts & Sciences
Seed Grant Program, Turner Ranches Initiative
July 2012 – June 2013 (\$10,000)
- *Research Experience for Undergraduates: Creation of a Historical GIS to supplement the Intersections of Authority project
Principal Investigator: K. Maria D. Lane
National Science Foundation, REU Supplemental Grant
Funded jointly by Science & Technology Studies, Geography & Spatial Science
Award No. 1052903, September 2010 – May 2011 (\$7,090)
- *Intersections of Authority: Science, Law and the Management of Water Resources in New Mexico's Rio Grande Valley
Principal Investigator: K. Maria D. Lane
National Science Foundation, Science and Society Program, Standard Research Grant
Award No. 0750115, June 2008 – May2011 (\$132,412)

*Imaginative Geographies of Mars

Principal Investigator: K. Maria D. Lane

UNM Research Allocation Committee, Small Grant-in-Aid for Research (Travel)

December 2007-September 2008 (\$2,491)

Science, Law and the Management of Water Resources in New Mexico's Rio Grande Valley

Principal Investigator: K. Maria D. Lane

National Endowment for the Humanities, Summer Stipend

Submitted September 2007 (\$6,000, not funded)

Intersections of Authority: Science, Law and the Management of Water Resources in New Mexico's Rio Grande Valley

Principal Investigator: K. Maria D. Lane

National Science Foundation, Science and Society Program, Postdoctoral Fellowship

Submitted February 2007 (\$83,968, not funded)

*Geographies of Mars: Science, Site and Sensation

Principal Investigator: K. Maria D. Lane

AAUW Educational Foundation, American Fellowship for Short-Term Publication

July 2007-August 2007 (\$6,000)

*Appropriating Space: Geographical Representations of the Planet Mars, 1877-1910

Principal Investigator: K. Maria D. Lane

American Historical Association, Beveridge Research Grant for Dissertation Travel

July 2005 (\$600)

Appropriating Space: Geographic Representations of the Planet Mars, 1867-1916

Principal Investigator: K. Maria D. Lane

Society of Women Geographers, Pruitt National Fellowship for Dissertation Research

Submitted December 2003 (\$14,750, not funded)

*Geographic Representations of the Planet Mars, 1867-1907

Principal Investigator: K. Maria D. Lane

Council on Library and Information Resources, Mellon Fellowship for Dissertation

Research in the Humanities in Original Sources

August 2003 – July 2004 (\$20,000)

*Geographic Representations of the Planet Mars, 1867-1907

Principal Investigator: K. Maria D. Lane

University of Texas at Austin, Bruton Fellowship for dissertation research

August 2003 – July 2004, (\$1,000 plus full graduate tuition)

*Geographic Representations of the Planet Mars, 1867-1907

Principal Investigator: K. Maria D. Lane

University Co-op Society (Austin, TX), Mitchell Fellowship for dissertation research

August 2003 – July 2004 (\$1,000)

*Geographic Representations of the Planet Mars, 1867-1907

Principal Investigator: K. Maria D. Lane

University of Texas Department of Geography, Veselka Endowed Fellowship for travel

July 2003 (\$3,000)

Geographic Representations of the Planet Mars, 1867-1907

Principal Investigator: K. Maria D. Lane

NASA/American Historical Association, Fellowship in Aerospace History

Submitted March 2003 (\$20,000, not funded)

Appropriating Space: Geographical Representations of the Planet Mars, 1867-1907

Principal Investigator: K. Maria D. Lane

National Science Foundation, Doctoral Dissertation Research Improvement Grant

Submitted January 2003 (\$11,967 not funded)
Geographic Representations of the Planet Mars, 1867-1907
Principal Investigator: K. Maria D. Lane
American Association of University Women – Austin Branch Fellowship
Submitted March 2003 (\$2,000, not funded)
Geographic Representations of the Planet Mars, 1867-1907
Principal Investigator: K. Maria D. Lane
AAG Historical Geography Specialty Group, Student Research Awards
Submitted November 2002 (\$3,295, not funded)

Ph.D. Committee Advisement

- Ayala, Neil Michael Ayala (Latin American Studies with primary concentration in Geography & Environmental Studies, in progress since spring 2015): efficacy of environmental education techniques as a means of increasing stakeholder participation in a watershed or catchment area

Ph.D. Committee Service

- Ursula Freire Castro (Latin American Studies with secondary concentration in Geography & Environmental Studies, in progress since spring 2015): historical conceptions of the relationship between climate and humans, focusing on the built environment
- Sandra Arazi-Coombs (Anthropology, in progress): SW community access to fuel resources
- Morgan, Brandon (History, 2013): violence and settlement in U.S./Mexico borderlands

M.S. Geography Advisement

- Diller, Susanna (in progress since fall 2015): GIScience and environmental management
- Wolff, Jacob (in progress since fall 2015): urban geography and planning
- Faris, Tina (in progress since fall 2014): gender and environmental management
- Healy, Alissa (in progress since fall 2014): environmental management
- Maynard, Greg (in progress since fall 2014): applied GIS
- Callahan, Peter (2015): energy resource management
- Chavez, Veronica (2015): community development in New Mexico
- Haft, Sarah (2014): blue carbon conservation analysis for mangrove forests in Madagascar
- Keyes, George (2012): historical GIS of Civil War campaigns in New Mexico
- Allison, Peggy (2010): cartographic construction of the Mt. Taylor Traditional Cultural Property

M.S. Geography Committee Service

- Kilko Paz (2013-2015): remote sensing
- Jordy Hicks (in progress since fall 2013): recreational impacts on Albuquerque’s urban riparian corridor
- Thommy Thompson (in progress): fire hazard vulnerability of salamander habitat
- Tatro, Linda (on leave): resilience of housing developments
- Valdez, Roberto (2015): culture and toponymy in northern New Mexico
- Ainsworth, Imogen (2013): water conservation behavior in Albuquerque, NM
- Lawler, Mark (2013): resilience-based management approaches in NM
- Maxwell, William (2013): agriculture in peasant settlements in northeastern Brazil
- Blumhoefer, Molly (Water Resources, 2012): stormwater management in Albuquerque, NM
- Byszewski, Berenika (American Studies, 2011): colonial mapping of Southwestern antiquity

- Mitchell, Destiny (2010): settlement history of Sierra County, New Mexico
- Yepa, Byron (2009): landscape change in the Jemez River Basin, NM
- Tribby, Calvin (2009): transportation equity and rapid bus transit in Albuquerque, NM
- Carlsen, Eric (2008): network analysis of Albuquerque transportation systems
- Snyder, Jason (2008): network analysis of food deserts in Albuquerque, NM
- Havens, Joanna Dey (2008): land use / land cover change in the Middle Rio Grande Valley
- Jones, Troy (2008): land use / land cover effects on mosquito production in California
- Edelen, Mary Tessa (2007): relationship of food labels to consumer choice
- Hawkos, Kathleen (2007): political geography of management area boundaries

Graduate Assistantships Supervised

- 2015-16, Akashia Allen, Research Assistant, funded by National Park Service
- 2015-16, Jordan Stone, Research Assistant, funded by UNM College of Arts & Sciences
- 2015-16, Jeremy Work, Teaching Assistant, funded by UNM College of Arts & Sciences
- 2015-16, Tina Faris, Editorial Assistant, funded by *Historical Geography* journal
- 2014-15, Willard Hunter, Research Assistant, funded by UNM College of Arts & Sciences
- 2014-15, Tina Faris, Editorial Assistant, funded by *Historical Geography* journal
- 2013-14, Imogen Ainsworth, Editorial Assistant, funded by *Historical Geography* journal
- 2009-10, Molly Padgett, Research Assistant, funded by National Science Foundation
- 2008-09, Brandon Morgan, Research Assistant, funded by National Science Foundation

Bachelor’s Honors Committees in Geography

- Isaiah Nixon (B.A. 2014): Geography education in the college prep setting
- Summer Wood (B.A. 2009): sense of place and community-based mapping in northern NM

Undergraduate Student Mentoring

- Tim Shaw (B.A. Geography 2010): historical-geographical analysis of forest management practices and priorities in central New Mexico’s near-urban forests
- Molly Blumhoefer (B.A. Planning 2010): research on the history of irrigation engineering in northern New Mexico
- Jennifer McCabe (B.A. University Studies 2009): legal analysis of historical water-related statutes in New Mexico

Undergraduate Assistantships Supervised

- 2010-11, John Schwarting, Research Assistant, funded by National Science Foundation
- 2010-11, Jared Masegee, Research Assistant, funded by National Science Foundation
- 2009-10, Jennifer McCabe, Research Assistant, funded by National Science Foundation
- 2008-09, Molly Blumhoefer, Research Assistant, funded by National Science Foundation

Classroom Courses Taught at University of New Mexico, by semester

2016 Spring	Approaches to Geographic Research	GEOG 502	11 students
2015 Fall	World Regional Geography	GEOG 140	120 students
2015 Spring	Approaches to Geographic Research	GEOG 502	9 students
2014 Spring	World Regional Geography	GEOG 140	72 students
2014 Spring	Approaches to Geographic Research	GEOG 502	9 students
2013 Spring	World Regional Geography	GEOG 140	52 students
2013 Spring	Approaches to Geographic Research	GEOG 502	8 students
2012 Fall	World Regional Geography	GEOG 140	39 students

2012 Fall	Geography of New Mexico and the Southwest	GEOG 445	17 students
2012 Spring	World Regional Geography	GEOG 140	52 students
2012 Spring	Approaches to Geographic Research	GEOG 502	15 students
2011 Spring	World Regional Geography (modified schedule)	GEOG 140	17 students
2011 Spring	Approaches to Geographic Research	GEOG 502	4 students
2010 Spring	Approaches to Geographic Research	GEOG 502	3 students
2010 Spring	Geography of New Mexico and the Southwest	GEOG 445	25 students
2009 Spring	Environmental Issues Seminar	GEOG 504	7 students
2009 Spring	Geography of the Southwest	GEOG 345	24 students
2008 Fall	Seminar: Geography of the Southwest	GEOG 545	11 students
2008 Fall	World Regional Geography	GEOG 140	40 students
2008 Spring	Geography of the Southwest	GEOG 345	20 students
2008 Spring	Geography of New Mexico and the Southwest	GEOG 499	2 students
2008 Spring	Physical Geography	GEOG 101	130 students
2007 Fall	World Regional Geography	GEOG 140	45 students
2007 Spring	World Regional Geography	GEOG 140	18 students
2007 Spring	Physical Geography	GEOG 101	130 students
2006 Fall	World Regional Geography	GEOG 140	18 students
2006 Fall	Physical Geography	GEOG 101	45 students

Arranged Courses Taught at University of New Mexico, by semester

2016 Spring	Problems (Readings in Space and Place)	GEOG 591	3 students
2016 Spring	Thesis	GEOG 599	2 students
2015 Fall	Internship (GIS & trails planning)	GEOG 593	1 student
2015 Fall	Master’s Project	GEOG 597	1 student
2015 Fall	Thesis	GEOG 599	2 students
2014 Fall	Master’s Project (Renewable Energy Incentives)	GEOG 597	1 student
2014 Spring	Internship	GEOG 593	1 student
2013 Spring	Internship (Conservation GIS in Nepal)	GEOG 593	1 student
2012 Spring	Problems (Project in Historical GIS)	GEOG 591	1 student
2011 Summer	Thesis	GEOG 599	1 student
2011 Spring	Thesis	GEOG 599	2 students
2010 Fall	Thesis	GEOG 599	2 students
2010 Summer	Problems (Project in Historical Geography)	GEOG 491	1 student
2010 Summer	Thesis	GEOG 599	1 student
2010 Spring	Problems (Readings in Critical Cartography)	GEOG 591	1 student
2010 Spring	Thesis	GEOG 599	2 students
2009 Fall	Thesis	GEOG 599	3 students
2009 Summer	Internship (Teaching Geography)	GEOG 494	1 student
2009 Summer	Problems (Research in Legal Geography)	GEOG 491	1 student
2009 Spring	Internship	GEOG 594	1 student
2009 Spring	Problems (Readings in Place Identity)	GEOG 591	1 student
2008 Fall	Problems (Project in Environmental Geography)	GEOG 591	1 student

Curriculum Development or Teaching Administrative Positions

2012, Primary author for successful proposal to develop a study-abroad course (GEOG302: Regional Geography)

2011, Primary author for successful proposal to add GEOG140 (World Regional Geography) to the UNM General Education core curriculum

2010-2011, Departmental committee to revise capstone course for B.A. and B.S. programs
2008-2009, Departmental committee for curriculum and lab manual revision for GEOG105L
2007-2008, Departmental committee for revision of B.A. curriculum and program
2007-2008, Departmental committee for revision of M.S. curriculum and program

Professional Development

2/2015, Faculty Workshop, "Communication Under Stress," One-hour workshop hosted by the Office of Ombuds/Dispute Resolution Services for Faculty, UNM.
2014-15, Participant, "Academic Leadership Workshops" series. Year-long leadership development initiative hosted by the University of New Mexico Office of the Provost / EVP for Academic Affairs.
10/2014, Faculty Workshop: "Difficult Conversations." One-hour workshop hosted by the Office of Ombuds/Dispute Resolution Services for Faculty, UNM.
3/2014, Faculty Workshop: "Facilitation for Results." Two-hour workshop hosted by the Office of Ombuds/Dispute Resolution Services for Faculty, UNM.
2014, Participant, "Learning Studio Community of Practice." Semester-long participation in classroom observations and peer meetings with other faculty members who teach in the learning studio classroom environments at UNM.
11/2013, Faculty Workshop: "What does 'professionalism' mean? And how to make sense of 'unprofessionalism'?" Two-hour workshop hosted by the Office of Ombuds/Dispute Resolution Services for Faculty, UNM.
6/2013, Leadership Workshop: "Innovations in Master's Programs: Changes, Challenges, and Strategies for the Future." Two-day residential workshop hosted by the Association of American Geographers' Healthy Departments Initiative (Boulder, CO).
2012-13, Faculty Institute: "Intersections of Culture, Teaching, and Learning." Year-long faculty development initiative jointly hosted by the University of New Mexico and Northern Arizona University.
2/2013, Faculty Workshop: "Getting Students to Focus on Learning Instead of Grades." Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.
9/2012, Faculty Workshop: "Pulling it all Together and Getting Students to Really Discuss." Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.
8/2012, Faculty Institute, "Integration of Culture and Learning." Two-day institute hosted by the UNM Office of Support for Effective Teaching.
3/2012, Faculty Workshop: "Let's Go International." Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.
11/2011, Faculty Workshop: "Effective Classroom Teaching and Learning with Student Groups." Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.
9/2011, Faculty Workshop: "Teaching and Learning Across Cultures in College." Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.
3/2011, Faculty Workshop: "Active Learning and Critical Thinking: Methods for Any Classroom." Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.
2/2011, Faculty Workshop: "Designing Deep Learning Experiences for Fractal Brains." Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.
11/2010, Faculty Workshop: "Classroom Presentations with Prezi.™" Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.

2/2010, Faculty Workshop: “Guaranteed Thinking: Strategies for Writing to Learn in All Disciplines.” Two-hour workshop hosted by UNM Office of Support for Effective Teaching.

9/2009, Faculty Workshop: “Calibrated Peer Review.” Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.

4/2009, Faculty Workshop: “Teaching with Wikis.” Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.

2/2009, Faculty Workshop: “Scholarly Teaching: What Does it Look Like?” Three-hour workshop hosted by the UNM Office of Support for Effective Teaching.

4/2008, Faculty Workshop: “Looking Beyond the Lecture: Promoting Significant Learning in Large Classes.” Three-hour workshop hosted by the American Association of Geographers: Geography Faculty Development Alliance (Boston, MA).

4/2008, Faculty Workshop: “Writing Measurable Program Learning Outcomes.” Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.

3/2008, Faculty Workshop: “Strategies for Enhancing Your Course Using WebCT Vista.” Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.

1/2008, Faculty and Instructors Institute: “Designing Courses for Effective Student Learning.” Two-day institute hosted by the UNM Office of Support for Effective Teaching.

11/2007, Faculty Workshop: “Responding to Diversity.” Three-hour workshop hosted by the UNM Office of Support for Effective Teaching.

10/2007, Faculty Workshop: “Assessing Student Work with Rubrics.” Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.

9/2007, New Faculty Discussion Group: “What the Best College Teachers Do.” Six-week discussion group hosted by the UNM Office of Support for Effective Teaching.

3/2007, Faculty Workshop: “Writing Measurable Learning Outcomes.” Two-hour workshop hosted by the UNM Office of Support for Effective Teaching.

7/2006, Faculty Institute: “NSF Workshop for Early Career Geography Faculty.” One-week residential workshop hosted by the Association of American Geographers’ Geography Faculty Development Alliance (Boulder, CO).

Peer Reviewing for Journals and Academic Presses

2016 *Journal of Historical Geography* (1)

2015 University of Chicago Press (1), *Geographical Research* (1) *Journal of Historical Geography* (1)

2014 *Environmental History* (1), *Journal of Historical Geography* (1), University of Chicago Press (1)

2013 *Journal of Historical Geography* (3), *The Geographical Journal* (1), Oxford University Press (1), *cultural geographies* (1)

2011 University of Chicago Press (1), *Journal of Historical Geography* (2), *Historical Geography* (1), *Transactions of the Institute of British Geographers* (1)

2010 *Geographical Review* (1), *Historical Geography* (1)

2009 Springer Press (1), *Historical Geography* (1)

2008 *Geographical Review* (1), *Journal of Policy History* (1)

Reviewing for Funding Agencies

2015 National Endowment for the Humanities (1)

2013 Guggenheim Foundation (1)

Other Service to Profession

2014-present, Editorial Board, *Southwestern Geographer*
2015-2016, Chair, Nominating Committee (elected), American Association of Geographers
2009-2012, Board of Directors, Historical Geography Specialty Group of the Association of American Geographers (Student Paper Competition Chair)
2011, Judge, Student Poster Competition, Southwest Division of the AAG
2009-2011, Editorial Board, *Historical Geography*
2003-2006, Board of Directors, Historical Geography Specialty Group of the Association of American Geographers (Student Representative)
2005, Presenter, Mellon Dissertation Fellowship Workshop, Library of Congress

Service to College and University

2015-2016, project team for NEH Next Generation Humanities PhD Implementation Grant
2015-present, Spatial Humanities Working Group
2015-2019, Member, Criterion Five Committee, UNM HLC Accreditation 2018-2019
2015, Member, Sexual Assault Policy working group for field-related incidents
2015, Member, National Security Studies Committee, Office of the Provost
2014-present, Member, Science Chair's Council, College of Arts & Sciences
2014, Guest lecture, "How do Geographers Know What They Know?" to students of Prof. Daniel Sanford's University Studies course.
2013-2014, Promotion and Tenure Committee, College of Arts & Sciences, UNM
2014, Planning team for NEH Challenge Grant submission
2013-present, Faculty mentor to new assistant professor in Earth & Planetary Sciences
2014, Guest lecture on research design to students of ARCH 551 (Prof. Jorge Colon)
2013, Guest lecture on research design to students of ARCH 551 (Prof. Jorge Colon)
2011-2012, Assessment Review Committee, College of Arts & Sciences, University of New Mexico
2011, Facilitator, two-day "Course Design Institute" hosted by the Office of Support for Effective Teaching, University of New Mexico
2010, Facilitator, two-day "Course Design Institute" hosted by the Office of Support for Effective Teaching, University of New Mexico
2009-2010, Participant, feedback panel for ADVANCE-PAID Mentoring Program
2008-2010, Participant, STEM Faculty Discussion Group, University of New Mexico
2009, Contributing author, UNM statement of priority areas for NSF outreach in STEM disciplines, Hispanic-Serving Institutions Outreach Forum
2009, Presenter, "Designing Assessment Measures," workshop hosted by the Office of Support for Effective Teaching, University of New Mexico
2008, Presenter, "Teaching for Learning" workshop, New Faculty Orientation, University of New Mexico

Service to Department

2016 (spring semester), interim Director of Graduate Program
2015-16, Outreach Coordinator
2015-16, faculty adviser, Student Association of Geography & Environmental Studies
2014-15, contributor, proposal development for Ph.D. program in Geography
2013, preliminary course design for international program in the Caribbean
2012-13, Member, Executive Committee
2012-2014, Director of Graduate Program
2012-2015, Faculty Mentor to new assistant professor in Geography
2012-2013, Member, Hiring Committee for part-time faculty appointments

2011-2013, Convocation Ceremony Coordinator
2007-present, Peer Evaluation of Classroom Teaching (7 written evaluations)
2008-2011, Learning Outcomes Assessment Coordinator
2009-2010, Departmental Chair Search Committee
2008-2009, Departmental Chair Search Committee
2007-2008, Primary Author, Department-Wide Plan for Learning Outcomes Assessment
2007-2008, Contributing Author, Departmental Self-Study for Academic Program Review
2007-2008, Member, Faculty Search Committee
2006-2007, Primary Author, Learning Outcomes Assessment Pilot and Plan for GEOG 101

Service to Community

2013, guest speaker, Zia Elementary School, Albuquerque, NM
2012, guest speaker, Esther Bone Memorial Library, Rio Rancho, NM
2011, guest speaker, Albuquerque Science Fiction Society
2011, guest speaker, Ghost Ranch “Service Learning in the Southwest” program, Abiquiu, NM
2011, guest speaker, Zia Elementary School, Albuquerque, NM
2009-present, member, U.Va. Club of Albuquerque
2007-2008, Judge, New Mexico State Geographic Bee
1997-1998, Chairman, Naples Bay Project Committee Task Force, Naples, FL
1996-present, Executive Board, Gene Doyle Adventure Scholarships, Naples, FL

Affiliations

American Association of Geographers, 2000-present
National Council of Geographic Education, 2015-present
New Mexico Geographic Alliance, 2015-present

Yan Lin

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Geography Department, Wecota Annex 414
Brookings, SD 57006

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(605)-688-5509

yan.lin@sdstate.edu

EDUCATION

Ph.D., 05/2014, Texas State University, San Marcos, TX, USA, Major: Geographic Information Science, Dissertation: *Cervical Cancer Disparities in Texas* (Major advisor: F. Benjamin Zhan).

M.S., 06/2009, Central South University, Changsha, China, Major: Cartography and Geographic Information Science, Thesis: *Geostatistic and GIS methods for Assessing Heavy Metal Contamination in Soils*.

B.S., 06/2006, Hunan Normal University, Changsha, China, Major: Geography Information Science, Thesis: *Spatial distribution change of migrants' habitat in Eastern Dongting Lake, China*.

RESEARCH INTERESTS

Geographic Information Science (GIS); Spatial data analysis; Health and Medical Geography; Spatial Epidemiology; Health Disparities; Cancer; Population, Environment, and Health

UNIVERSITY PROFESSIONAL EXPERIENCE

<i>Position</i>	<i>University</i>	<i>Dates</i>
Assistant Professor	South Dakota State University Department of Geography	2014-present
Research Associate	Texas State University, Department of Geography	2013-2014
Instructor (Teacher of record)	Texas State University, Department of Geography	Spring 2013
Lab Instructor	Texas State University, Department of Geography	2010-2012

Research Assistant	Texas State University, Department of Geography	2009-2012
Research Assistant	Central South University	2007-2008

TEACHING

Courses Taught:

- GEOG 472 Introduction to GIS, South Dakota State University
- GEOG 474/574 GIS Vector and Raster Modeling, South Dakota State University
- GEOG 473/573 GIS Data Creation/Integration, South Dakota State University
- GEO 2426 Fundamentals of GIS, Texas State University

PUBLICATIONS

Refereed Articles

- Lin, Y.**, Wimberly, M., and Hungerford, H. 2015. Geographic Variations of Colorectal and Breast Cancer Late-Stage Diagnosis and the Effect of Neighborhood-Level Factors. *Journal of Rural Health*. (Accepted)
- Zhan, F.B. and **Lin, Y.** 2015. Data Structure, Vector. *The International Encyclopedia of Geography: People, the Earth, Environment, and Technology*. (In press)
- Lin, Y.** and Gong, X. 2015. Risk Assessment of Water Pollution Exposure to Hazardous Waste Sites: A case study in Bexar County, Texas. *Papers in Applied Geography*. (In Press)
- Lin, Y.**, Schootman, M., and Zhan, F. B. 2015. Racial/Ethnic, Area Socioeconomic, and Geographic Disparities of Cervical Cancer Survival in Texas. *Applied Geography* 56: 21-28.
- Zhan, F. B*. and **Lin, Y***. 2014. Racial/Ethnic, Socioeconomic, and Geographic Disparities of Cervical Cancer Late-Stage Diagnosis in Texas. *Women's Health Issues* 24 (5): 519-527. [*First authorship shared]
- Lin, Y.** and Zhan, F. B. 2014. Geographic Variations of Racial/Ethnic Disparities of Cervical Cancer Mortality in Texas. *Southern Medical Journal* 107(5):281-288

Chow, T. E., **Lin, Y.**, Huynh, N. T., and Davis, J. 2012. Using Web Demographics to Model Population Change of Vietnamese-Americans in Texas Between 2000-2009. *GeoJournal* 77(1): 119-134.

Chow, T. E., **Lin, Y.**, and Chan, W. D. 2011. The Development of a Web-based Demographic Data Extraction Tool for Population Monitoring. *Transactions in GIS* 15(4): 479-494.

Lin, Y. and Zhu, J. 2009. Research on a Large Amount of Image Visualization Based on Semantic Similarity. *Science of Surveying and Mapping* 34(6): 150-152. (In Chinese)

In Revise or Under Review

Lin, Y., Wan, N., and Zhan, F. B. Colorectal cancer disparities among racial/ethnic minorities – where to intervene? *Journal of Health Care for the Poor and Underserved* (Under Review)

Gong, X., Brender, J. D., Langlois, P. H., **Lin, Y.**, and Zhan, F. B. 2015. Validity of the Emission Weighted Proximity Model in estimating air pollution exposure intensities in large geographic areas. *Science of the Total Environment*. (In Revise)

Gong, X., Zhan, F. B., **Lin, Y.** An Examination of Associations between Maternal Residential Proximity to Nuclear Facilities and Low Birth Weight in Offspring in Texas. *Radiation and Environmental Biophysics*. (Under review)

In preparation

Lin, Y. and Ngorsuraches, S. Geographic Proximity to Radiation Therapy Facilities and Disparities of Breast Cancer Treatment for Early-Stage Breast Cancer Patients. Planned submission to *Health & Place*

Lin, Y. Wimberly, M., Gong, X., and Ngorsuraches, S. The Role of Neighborhood-Level Factors in Survival Disparities of Colorectal and Breast Cancer. Planned submission to *American Journal of Public Health*

Refereed Conference Proceedings

Elliott, M., Elliott, L., and **Lin, Y.** 2015. Corn and Soybean Marketing Contract Adoption and Site-Specificity. In: *Proceedings of 2015 Agricultural & Applied Economics Association and Western Agricultural Economics Association Joint Annual Meeting*. San Francisco, CA, July 26- 28.

Chow, T. E., Ngu, A. H. H., **Lin, Y.**, Phillips, C., and Thornhill, S. 2012. Record linkage of web demographics as a GeoComputation challenge, *Invited position paper in*

GIScience 2012 Workshop on Role of Volunteered Geographic Information: Quality and Credibility.
<http://web.ornl.gov/sci/gist/workshops/2012/documents/Chow,%20Tze%20Kiu%20-%20Paper.pdf>.

Lin, Y. 2011. Risk Assessment of Exposure to Hazardous Waste Sites. In: *Proceedings of International Symposium on Remote Sensing and GIS Methods for Change Detection and Spatio-temporal Modelling (CDSM 2011)*. Hong Kong, China. December, 15-16.

Abstracts

Lin, Y., and Gong, X. 2015. Measuring Access to Primary Care Physicians among American Indian Population in South Dakota – Integrating Spatial and Aspatial Factors. The 38th Applied Geography Conference. San Antonio, Texas.

Gong, X., Zhan, FB., and **Lin, Y.** 2015. An Examination of Associations between Maternal Residential Proximity to Nuclear Facilities and Low Birth Weight in Offspring in Texas. The 38th Applied Geography Conference. San Antonio, Texas.

Lin, Y., Hungerford, H., Gong, X., and Mousseau, R. 2015. Geographic Access to Healthcare among American Indian (AI) Population – A New Approach to Understand Cancer Disparity Burdens among AIs. Proceedings of 23rd International Conference on Geoinformatics. Wuhan, China.

Lin, Y. and Hungerford, H. 2014. A multilevel approach to understand and reduce cancer disparities in South Dakota. *Annual Meeting of the Association of American Geographers (AAG)*. Chicago, IL, USA.

Lin, Y. and Hungerford, H. 2014. A Geographically Targeted Approach for Cancer Disparity Reduction. *2nd Annual Sanford Health – SDSU Biomedical Research Symposium*. Brookings, SD, USA.

Lin, Y. and Gong, X. 2014. A GIS-based Risk Assessment of Water Pollution Exposure to Hazardous Waste Sites. *Southwest and Great Plains-Rocky Mountain Divisions of the Association of American Geographers Joint Regional Meeting*. Albuquerque, NM, USA.

Gong, X., Lu Y., **Lin, Y.**, and Zhan, F. 2014. K-Vec: A Global and Cross-Scale Analysis Method of Vector Autocorrelation. *Southwest and Great Plains-Rocky Mountain Divisions of the Association of American Geographers Joint Regional Meeting*. Albuquerque, NM, USA.

Lin, Y. and Zhan, F. B. 2014. GIS and Health: Cervical Cancer Disparities. *Annual Meeting of the Association of American Geographers (AAG)*. Tampa, FL, USA.

- Lin, Y.** 2013. Cervical Cancer Disparities: Where are Underserved Minorities? *Women in Science and Engineering (WISE) Conference*. San Marcos, TX, USA.
- Lin, Y.** and Zhan, F. B. 2013. Geographic Variations of Racial Disparities of Cervical Cancer Late-stage Diagnosis in Texas. *Annual Conference of the North American Association of Central Cancer Registries (NAACCR)*. Austin, TX, USA.
- Lin, Y.** and Zhan, F. B. 2013. Geographic Variations of Racial Disparities of Cervical Cancer mortality in Texas. *Annual Meeting of the Association of American Geographers (AAG)*. Los Angeles, CA, USA.
- Lin, Y.** and Zhan, F. B. 2012. Geographic Disparities in Cervical Cancer Mortality in the United States. *Annual Meeting of the Association of American Geographers (AAG)*. New York, NY, USA.
- Lin, Y.** 2011. Risk Assessment of Exposure to Hazardous Waste Sites. In: *Proceedings of International Symposium on Remote Sensing and GIS Methods for Change Detection and Spatio-temporal Modelling (CDSM 2011)*. Hong Kong, China.
- Lin, Y.**, Chow, T. E., and Zhan, F. B. 2011. An Exploratory Study of Vietnamese Americans in Texas Using Web Demographic Data. *Annual Meeting of the Association of American Geographers (AAG)*. Seattle, WA, USA.
- Lin, Y.**, Zhan, F. B., and Zhu, J. J. 2010. Assessment of Mercury Pollution in Soil. *Annual Meeting of the Association of American Geographers*. Washington, DC, USA.

LECTURES OR CONFERENCE PRESENTATIONS

Invited Seminars/Lectures

- Lin, Y.** “GIS and Health: Cervical Cancer Disparities in Texas,” South Dakota State University, Brookings, SD, 2013.
- Chow, T. E., Ngu, A. H. H., **Lin, Y.**, Phillips, C., and Thornhill, S. 2012. Record linkage of web demographics as a GeoComputation challenge, *Invited position paper in GIScience 2012 Workshop on Role of Volunteered Geographic Information: Quality and Credibility*.
- Lin, Y.** “Cervical Cancer Disparities in Texas,” Chapman University, Orange, CA, 2012.

Conference Presentations

- Lin, Y.** 2015. Geographic access to radiation therapy facilities and disparities of early-stage breast cancer treatment. *The 3rd Annual Sanford Health – SDSU Biomedical Research Symposium*. Sioux Falls, SD, USA. November 10, 2015.
- Lin, Y.**, and Gong, X. 2015. Measuring Access to Primary Care Physicians among American Indian Population in South Dakota – Integrating Spatial and Aspatial Factors. The 38th Applied Geography Conference. San Antonio, Texas. November 4-7, 2015.
- Gong, X., Zhan, FB., and **Lin, Y.** 2015. An Examination of Associations between Maternal Residential Proximity to Nuclear Facilities and Low Birth Weight in Offspring in Texas. The 38th Applied Geography Conference. San Antonio, Texas. November 4-7, 2015.
- Lin, Y.**, Hungerford, H., Gong, X., and Mousseau, R. 2015. Geographic Access to Healthcare among American Indian (AI) Population – A New Approach to Understand Cancer Disparity Burdens among AIs. *Proceedings of 23rd International Conference on Geoinformatics*. Wuhan, China. June 19-21, 2015.
- Lin, Y.**, and Hungerford, H. 2015. A multilevel approach to understand and reduce cancer disparities in South Dakota. *Annual Meeting of the Association of American Geographers (AAG)*. Chicago, IL, USA. April 21-25.
- Lin, Y.**, and Hungerford, H. 2014. A Geographically Targeted Approach for Cancer Disparity Reduction. *The 2nd Annual Sanford Health – SDSU Biomedical Research Symposium*. Brookings, SD, USA. November 13, 2014.
- Gong, X., Lu Y., **Lin, Y.**, and Zhan, F. 2014. K-Vec: A Global and Cross-Scale Analysis Method of Vector Autocorrelation. *Southwest and Great Plains-Rocky Mountain Divisions of the Association of American Geographers Joint Regional Meeting*. Albuquerque, NM, USA. October 23-25.
- Lin, Y.**, and Gong, X. 2014. A GIS-based Risk Assessment of Water Pollution Exposure to Hazardous Waste Sites. *Southwest and Great Plains-Rocky Mountain Divisions of the Association of American Geographers Joint Regional Meeting*. Albuquerque, NM, USA. October 23-25.
- Lin, Y.** 2014. GIS and Health: Cervical Cancer Disparities. *Annual Meeting of the Association of American Geographers (AAG)*. Tampa, FL, USA. April 8-12.
- Lin, Y.** 2013. Cervical Cancer Disparities: Where are Underserved Minorities? *Women in Science and Engineering (WISE) Conference*. San Marcos, TX. November 21-22.
- Lin, Y.** 2013. Geographic Variations of Racial Disparities of Cervical Cancer Late-stage Diagnosis in Texas. *Annual Conference of the North American Association of Central Cancer Registries (NAACCR)*. Austin, TX. June 10-13.

- Lin, Y.** and Zhan, F. B. 2013. Geographic Variations of Racial Disparities of Cervical Cancer mortality in Texas. *Annual Meeting of the Association of American Geographers*. Los Angeles, CA. April 13.
- Lin, Y.** and Zhan, F. B. 2013. Spatially Informed Prevention Strategies for Cervical Cancer Disparity Reduction in Minorities. *The 9th Annual Texas State Geography Student Research Symposium*. San Marcos, TX. March 22.
- Lin, Y.** and Zhan, F. B. 2012. Geographic Disparities in Cervical Cancer Mortality in the United States. *Annual Meeting of the Association of American Geographers*. New York, NY. February 24.
- Lin, Y.** and Zhan, F. B. 2012. Cervical Cancer Mortality in the United States – Where to Intervene? *The 8th Annual Texas State Geography Student Research Symposium*. San Marcos, TX. February 17.
- Lin, Y.** 2011. Risk Assessment of Exposure to Hazardous Waste Sites. *International Symposium on Remote Sensing and GIS Methods for Change Detection and Spatio-temporal Modelling (CDSM 2011)*. Hong Kong, China. December, 15-16.
- Lin, Y.**, Chow, T. E., and Zhan, F. B. 2011. An Exploratory Study of Vietnamese Americans in Texas Using Web Demographic Data. *Annual Meeting of the Association of American Geographers*. Seattle, WA. April 16.
- Lin, Y.**, Chow, T. E., and Zhan, F. B. 2011. WebGIS: A New Perspective in Census Population Counting. *The 7th Annual Texas State Geography Student Research Symposium*. San Marcos, TX. April 1.
- Lin, Y.**, Zhan, F. B., and Zhu, J. J. 2010. Assessment of Mercury Pollution in Soil. *Annual Meeting of the Association of American Geographers*. Washington, DC. April 15.

EXTERNAL AND INTERNAL FUNDING

- Principle Investigator (PI), **Lin, Y.**, “A Geographically Targeted and Personalized Approach for Cancer Disparity Reduction”, Scholarly Excellence Funds, South Dakota State University, with Co-PIs: Hilary Hungerford, and Richard Mousseau, \$12,300, 11/01/2014-08/01/2016.
- Principle Investigator (PI), **Lin, Y.**, “A GIS-based Risk Assessment of Water Pollution Exposure to Hazardous Waste Sites”, Scholarly Excellence Funds, South Dakota State University, \$600, 11/01/2014-08/01/2015.

- Senior Personnel, **Lin, Y.**, “Air Pollution-Exposure-Health Effect Indicators: Mining Massive Geographically-Referenced Environmental Health Data to Identify Risk Factors for Birth Defects”, USEPA Science to Achieve Results (STAR) Program, with PI: F. Benjamin Zhan and Co-PIs: Jean D. Brender, Jing Yang, and Peter H. Langlois, \$499,987, 2011-2014.
- Principle Investigator (PI), **Lin, Y.**, “Cervical Cancer Disparities in Texas”, Doctoral Research Stipend Award, Texas State University, \$1,820, 01/01/2013-12/31/2013.
- Travel Funding, Texas State University, \$650, Tampa, FL. April 8-12, 2014.
- Travel Funding, Texas State University, \$600, Austin, TX. June 10-13, 2013.
- Travel Funding, Texas State University, \$650, Los Angeles, CA. April 9-13, 2013.
- Travel Funding, Texas State University, \$650, New York City, NY. February 24-28, 2012.
- Travel Funding, Texas State University, \$650, Seattle, WA, April 12-16, 2011.
- Travel Funding, Texas State University, \$650, Washington, DC, April 14-18, 2010.

SUBMITTED AND PENDING SUPPORT

- PI, **Lin, Y.**, “Real-Time Tracking of Lifestyle Behaviors Based on Ecological Momentary Assessment and GPS: A New Approach to Reduce Risk Factors for Diabetes”, NIH/ NIDDK (R15), with Co-PIs: Surachat Ngorsuraches, and Nancy Fahrenwald, and Patricia Eagle Bull. (Under Review)
- PI, **Lin, Y.**, “A Geographically Targeted Approach for Cancer Disparity Reduction in South Dakota”, Bush Foundation Community innovation grant, with Co-PI: Guangqing Chi. (Not funded)
- Co-I, **Lin, Y.**, “Transforming Graduate Earth Observation Education for Diverse Data-Enabled Science and Engineering Career Pathways”, National Science Foundation Research Traineeship, with PI: Niall Hanan and Co-Is: Lara Prihodko, Sharon Vestal, et al. (Not funded)
- Senior Personnel, **Lin, Y.**, “Geographically Targeted and Personalized Dissemination of Educational Materials for Cervical Cancer Prevention and Intervention”, NIH/ NIMHD Social, Behavioral, Health Services, and Policy Research on Minority Health and Health Disparities (R01), with PI: F. Benjamin Zhan and Co-PIs: Theresa L Byrd, and Lucy Lu. (Not funded)

FELLOWSHIPS, AWARDS, HONORS

11 / 2013	Women in Science and Engineering (WISE) Annual Conference Student Poster Competition, Second Place
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06 / 2013	North American Association of Central Cancer Registries (NAACCR) Annual Conference Student Poster Competition, First Place
04 / 2013	ESRI Graduate Award for Excellence in GIS
2013-2014	Texas State Associated Student Government Scholarship, Texas State University (\$2000)
2013-2014	Texas State College of Liberal Arts Graduate Scholarship, Texas State University (\$3000)
2012-2013	Texas State Associated Student Government Scholarship, Texas State University (\$2000)
2012-2013	Texas State College of Liberal Arts Graduate Scholarship, Texas State University (\$3000)
2011-2012	Texas State Associated Student Government Scholarship, Texas State University (\$2000)
2011-2012	Texas State College of Liberal Arts Graduate Scholarship, Texas State University (\$2000)
2010-2011	Texas State College of Liberal Arts Graduate Scholarship, Texas State University (\$1500)

SERVICE

University

- 2014-present, Member, Minor in Informatics Program Planning committee, South Dakota State University
- 2014-present, Member, Ethel Austin Martin Nutrition Committee, South Dakota State University
- 2014-present, Coordinator, ESRI software licensing, South Dakota State University
- 2014, Member, South Dakota Geographic Alliance Coordinate Search Committee, South Dakota State University
- 2015-2016, member, Holtry Speaker Committee, South Dakota State University

Departmental

- 2015-2016, Member, Urban Geography Assistant Professor Search Committee, Department of Geography, South Dakota State University
- 2015-2016, Co-Chair, Undergraduate Assessment Committee, Department of Geography, South Dakota State University

Professional

Reviewer in Peer-Reviewed Journal

Computers, Environment and Urban Systems 2015
Pure and Applied Geophysics 2015
Aims Public Health 2015
BioMed Central 2015
Applied Geography 2014, 2015
International Journal of Health Geographics 2013, 2014
BMC Cancer 2014 (2)
Journal of Immigrant and Minority Health 2014
Journal of Health Care for the Poor and Underserved 2014
Annals of GIS 2014 (2)
Transaction in GIS 2011, 2012

Professional Organizations

At Large Board Member, AAG Health and Medical Geography specialty group, 2015-2017
Member, Association of American Geographers (AAG)
Member, Association for Women in Science (AWIS)
Member, North American Association of Central Cancer Registries (NAACCR)
Member, Chinese Professional in Geographic Information Systems (CPGIS)

Graduate Students

Doctoral Students (as a committee member)

Sushant Mehan (2014-), Department of Plant Science

Master’s students (as major advisor)

Jeffrey Irwin (2015-)
Aljehani Layla (2014-)
Murat Kececi (2014-)

Master’s students (a committee member)

Shailendra Singh (2015-), Department of Agricultural Engineering

Brad Richardson (2015)
Duanyang Li (2015), Department of Civil and Environmental Engineering
Byron Will-Noel (2015-)
Austin Brynjulson (2014-)

Christopher D. Lippitt, PhD, CMS-RS

University of New Mexico Dept. Geography and Environmental Studies

1 University of New Mexico, Albuquerque NM, 87131, USA

Phone: +1 (508) 769-4980 Email: clippitt@unm.edu

<http://www.linkedin.com/in/clippitt>

https://www.researchgate.net/profile/Christopher_Lippitt2

Education

PhD, May 2012, Geography

Joint Doctoral Program in Geography between San Diego State University and

University of California Santa Barbara

University of California Santa Barbara

Santa Barbara, CA 93106

Dissertation: Time Sensitive Remote Sensing

Committee: Dr. Douglas Stow (SDSU, Chair), Dr. Micheal Goodchild (UCSB), Dr. Keith Clarke (UCSB), Dr. Dar Roberts (UCSB), and Dr Ming Tsou (SDSU).

M.A., May 2006, Geographic Information Science

Clark University Graduate School of Geography

Clark University, 950 Main St, Worcester, MA 01610

Thesis: Incorporating Anthropogenic Variables into a Species Distribution Model to Estimate the Risk of Gypsy Moth Establishment in Uninfested Portions of the United States

Committee: Dr. John Rogan (Chair) and Dr. Ronald Eastman

B.A., May 2005, Geography (Magna Cum Laude w/ High Honors)

Clark University, 950 Main St, Worcester, MA 01610

Honors Thesis: Machine Learning for Subtle Forest Change Mapping – Coping with Available Reference Data

Committee: Dr. John Rogan and Dr. R. Gill Pontius

Employment History Part I

Assistant Professor: August 2012-Present

University of New Mexico Department of Geography and Environmental Studies

1 University of New Mexico, Albuquerque, NM 87131

Research Associate: Post-doc: July 2011-June 2012

San Diego State University Department of Geography

5500 Campanile Dr., San Diego, CA 92182

Responsibilities: Demonstrate imaging system for real-time assessment of earthquake damage; imaging hardware development, image processing software development; proposal development; report generation, flight operations management and coordination.

Graduate Research Assistant: August 2006-August 2011

San Diego State University Department of Geography

5500 Campanile Dr., San Diego, CA 92182

Responsibilities: Manager, Sensor Development Laboratory; Grant Author; Lecturer on remote sensing topics; Sensor development and operation; Research, including: Real-time Remote Sensing, Volunteered Geographic Information, Object Based Image Analysis.

Research Associate: June 2010-Sept 2010
San Diego State University Research Foundation, US Forest Service Wildfire Monitoring
5250 Campanile Dr., San Diego, CA 92182
Responsibilities: Airborne sensor integration, Automated image processing routine
development, Publication

Research Associate: June 2009-Sept 2009 & June 2010-Sept 2010
San Diego State University Research Foundation, National Institute of Health, Health
Poverty, and Place in Accra Ghana
5250 Campanile Dr., San Diego, CA 92182
Responsibilities: Neighborhood modeling, Object Based Image Analysis, Land Cover
Classification, Publication

Research Associate: June 2007-Sept 2007 & June 2008-Sept 2008
San Diego State University Research Foundation, NASA REASON GIScience for border
security
5250 Campanile Dr., San Diego, CA 92182
Responsibilities: Accessibility Modeling, Image Processing, Sensor Development, Air
photo interpretation, Publication

Research Associate: February 2005- August 2006
Clark Labs
950 Main St. Worcester, MA, 01610
Responsibilities: Modeling United States gypsy moth infestation risk for the USDA
APHIS, Proposal and Report Author

Idrisi Kilimanjaro Technical Support Specialist: July 2004-August 2006
Clark Labs
950 Main St. Worcester, MA, 01610
Responsibilities: Customer Support, Support Literature Development, Software Testing

Employment History Part II

Board Member: November 2007-2015
TerraPan Labs LLC.
330 A St., Suite 29, San Diego, CA 92101
Responsibilities: Business Development, Proposal development, Project Architecture,
Report Review.

Technology Officer: January 2005-August 2006
Central Massachusetts Regional Environmental Council
9 Castle St., Worcester, MA 01610
Responsibilities: Hardware/Software/Network Support and Purchasing

Professional Recognition and Honors

Hexagon Geospatial Education Award (With Student Su Zhang), 2015, Hexagon Geospatial Inc.
Robert N. Colwell Memorial Fellowship, 2011, American Society for Photogrammetry and
Remote Sensing
Graduate Student Travel Award, 2011, San Diego State University Graduate Division
Student Travel Award, 2011, American Society for Photogrammetry and Remote Sensing
Southwest Region

Certified Mapping Scientist - Remote Sensing, 2010, American Society for Photogrammetry and Remote Sensing
 Inducted to Scholars without Borders Honor Society, 2010, San Diego State University
 Award for Excellence in GIS and Remote Sensing, 2010, American Society for Photogrammetry and Remote Sensing Southwest Region
 Inamori Fellowship, 2009-2010, Awarded by the Inamori Foundation at San Diego State University
 Doctoral Student Scholarship Award, 2009, Awarded by United States Geospatial Intelligence Foundation
 McFarland Geography Scholarship, 2009, Awarded by the San Diego State Department of Geography
 Student Travel Award, 2008, Awarded by the Association of Pacific Coast Geographers
 Doctoral Student Scholarship Award, 2008, Awarded by United States Geospatial Intelligence Foundation
 Finch Award for Excellence in Remote Sensing, 2008, Awarded by the San Diego State Department of Geography
 Dangermond Travel Scholarship, 2008, Awarded by the Jack and Laura Dangermond Scholarship Fund, UC Santa Barbara
 Student Travel Award, 2008, Awarded by the Southwest Chapter of the American Society for Photogrammetry and Remote Sensing
 GeoEye Foundation Image Grant, 2007, Awarded by GeoEye Foundation
 Doctoral Student Scholarship Award, 2007, Awarded by United States Geospatial Intelligence Foundation
 NASA-MSU Professional Enhancement Award, 2007, Awarded by NASA and Michigan State University
 First Place- AAG 2006 Geographic Information Systems and Science Specialty Group Honors Student Paper Competition, 2006, Awarded by Geographic Information Systems and Science Specialty Group
 University Scholarship Award, 2005, Awarded by United States Geospatial Intelligence Foundation
 First Place- New England-St. Lawrence Valley Geographical Society (NESTVAL) Graduate Student Poster Competition, 2005, Awarded by NESTVAL
 AAG Remote Sensing Specialty Group Honors Student Paper Competition Undergraduate Award, 2004, Awarded by Remote Sensing Specialty Group of the Association of American Geographers
 IDRISI Excellence in Geographic Information Science Award, 2005, Awarded by Clark Labs
 Human Environment Regional Observatory Fellowship, 2005, Awarded by George Perkins Marsh Institute
 Peter J. Condakes Summer Research Fellowship Award, 2004, Awarded by the Clark University Graduate School of Geography
 AAG Remote Sensing Specialty Group Honors Student Paper Competition Undergraduate Award, 2004, Awarded by Remote Sensing Specialty Group of the Association of American Geographers
 Hank Emery Award, 2004, Awarded by Geospatial Information Technology Association
 Human Environment Regional Observatory Fellowship, 2004, Awarded by George Perkins Marsh Institute

John O'Connor Award for Excellence in Environmental Studies; Awarded by Clark University,
2004
Inducted to Gamma Theta Upsilon, International Geographical Honor Society, 2004.
Human Environment Regional Observatory Fellowship, 2003, Awarded by George Perkins
Marsh Institute

Research, Teaching and Service Interests

My research, teaching, and service interests are largely synergistic and focus on advancing remote sensing theory, methods, and practice to foster the use of geospatial technology to better understand and respond to environmental pressures on humanity. This necessarily includes collaboration with government and private industry and training the next generation of remote sensing scientists as integrative thinkers with a sound foundation in both theory and practice through coursework, research, and professional societies. Subsequently, research, research training, and teaching activities are focused on theory and methods to apply remote sensing to a broad range of application domains.

Current research activities employ and improve remote sensing approaches spanning a range of disciplines including Biology, Civil Engineering, and Geography; all of which focus on expanding our ability to leverage the unique synoptic monitoring capabilities of remote sensing for societal benefit. Collaborations with Biology focus on developing remote sensing based techniques to scale climate and land cover change measurements to regional and global scales with the aim of enabling prediction of carbon flux under anticipated land cover change scenarios in arid and semi-arid ecosystems. Collaborations with Civil Engineering, which also includes private and government partners, focus on improving the use of remote sensing to monitor critical infrastructure, particularly for hazard preparation and response. Research within Geography is focused on the integration of remote sensing based measurements of ecosystem disturbance with qualitative methods to understand the resilience of various large tract land management approaches to adapt to climate pressures. All of these research activities include substantial student research activity, manifested as research assistantships, theses, and dissertations.

It is my strong belief that education, whether of research scientists or professionals, is best achieved through practice. This belief guides my approach to research, teaching, and service. My research is conducted with students of all levels (undergraduate-doctoral), provides practical examples and exercises to curriculums, and facilitates the development of students' professional networks. My service activities seek to expand opportunities for student experience and scholarship through a vibrant colloquium series, mentoring student chapters of professional societies (e.g., ASPRS), organizing and promoting training opportunities by practicing professionals, creating shared facilities to promote organic scholarship and collaboration, and serving on national and regional professional society boards.

My research, teaching, and service goals, achieved through a variety of means, are the same: advancing humanity's ability to monitor, and thus understand and respond to, its environment.

Scholarly Achievements

*Indicates a student mentee

Books Edited or Co-edited

Lippitt, C.D., D.A. Stow, and L.L. Coulter. 2015. Time-Sensitive Remote Sensing. Springer Press

Articles in Refereed Journals

Total Citations: 523 H-Index: 8 G-Index: 22 Cites/Year: 58.11 As of: 03/24/2015

*Ferlando, J. and C.D. Lippitt. *In Press*. Spatially Explicit Estimation of Forest Values Using GIS. Forestry Policy and Economics.

Bensen, M.H., C.D. Lippitt, R. Morrison, B. Cosens, J. Boll, B. Chaffin, A.K. Fremier, R. Heinse, D. Kauneckis, T.E. Link, C. Scruggs, M. Stone, V. Valentin. *In Press*. Five Ways to Support Interdisciplinary Work Before Tenure. Journal of Applied Environmental Science.

*Zhang, S., S.M. Bogus, C.D. Lippitt, P.R.H. Neville. G. Zhang, Cong Chen, and V. Valentin. 2015. Extracting Pavement Distress Condition Based on High Spatial Resolution Multispectral Digital Aerial Photography, Photogrammetric Engineering and Remote Sensing Vol. 18, No. 9; pp. 709-720.

Lippitt, C.D., D.A. Stow and K. Clarke. 2014. On the Nature of Models for Time-Sensitive Remote Sensing. International Journal of Remote Sensing 35 (18): 6815-6841.

Stow, D.A., Y. Tsai, L.L. Coulter, and C.D. Lippitt. 2014. Detecting and Measuring Moving Objects with Airborne Repeat Station Imaging in Rapid Succession Mode. Remote Sensing Letters 5 (3), 213-220.

Stow, D.A., J.R. Weeks, S. Toure, L. Coulter, and C.D. Lippitt. 2013. Urban vegetation cover and change in Accra, Ghana: Connection to Housing Quality. Professional Geographer 65(3).

Stow, D.A., S. Toure, C.D. Lippitt, C.L. Lippitt, and C. Lee. 2012. Frequency distribution signatures and classification of within-object pixels. International Journal of Applied Earth Observation and Geoinformation 15, p. 49-56.

Weeks, J.R., A. Getis, D.A. Stow, D. Rain, R. Engstrom, J. Stoler, C.D. Lippitt, and M. Jankowska. 2012. Connecting the Dots between Health, Poverty and Place in Accra, Ghana. Annals of the Association of American Geographers 102(5).

Lippitt, C.D., L.L. Coulter, M. Freeman, J. Lamantia*, W. Pang*, and D.A. Stow. 2012. The Effect of Input Data Transformations on Object Based Image Classification. Remote Sensing Letters, 3(1): 21-29.

Coulter, L.L., A.S. Hope, D.A. Stow, C.D. Lippitt, and S.J. Lathrop. 2011. Time-Space Radiometric Normalization of TM/ETM Scenes for Land-Cover Change Detection. International Journal of Remote Sensing, 1-18.

Stow, D., C.D. Lippitt, J. Weeks. 2010. Delineation of Neighborhoods of Accra, Ghana Based on Quickbird Satellite Data. Photogrammetric Engineering and Remote Sensing, 76, 907-914.

- Lippitt, C. D., J. Rogan, Z. Li, R. J. Eastman, T. G. Jones. 2008. Mapping Selective Logging in Mixed Deciduous Forest: A Comparison of Machine Learning Algorithms. *Photogrammetric Engineering and Remote Sensing*, 74, 1201-1212.
- Stow, D., A. Lopez, C. D. Lippitt, S. Hinton, and J. Weeks. 2007. Object-based classification of residential land use objects within Accra, Ghana based on QuickBird satellite data. *International Journal of Remote Sensing*, 26: 3867-3873.
- Lippitt, C. D., J. Rogan, J. Toledano, F. Sangermano, J. R. Eastman, V. Mastro, and A. Sawyer. 2008. Incorporating Anthropogenic Variables into a Species Distribution Model to Estimate the Risk of Gypsy Moth Establishment in Uninfested Portions of the United States. *Ecological Modelling* 210/3: 339-350.
- Pontius Jr, Robert Gilmore, Wideke Boersma, Jean-Christophe Castella, Keith Clarke, Ton de Nijs, Charles Dietzel, Duan Zengqiang, Eric Fotsing, Noah Goldstein, Kasper Kok, Eric Koomen, Christopher D. Lippitt, William McConnell, Bryan Pijanowski, Snehal Pithadia, Alias Mohd Sood, Sean Sweeney, Tran Ngoc Trung, A. Tom Veldkamp, and Peter H. Verburg. 2008. Comparing the input, output, and validation maps for several models of land change. *Annals of Regional Science*, 42(1): 11-47.
- Pontius Jr, R. G. and C. D. Lippitt. 2006. Can error explain map differences over time?. *Cartography and Geographic Information Science* 33(2): 159-171.
- Holden, M.T., C. Lippitt, R. G. Pontius, Jr., and C. Williams, 2003. Building a Database of Historical Land Cover to Detect Landscape Change. *Biological Bulletin* 205: 257-258.

Articles Appearing in Peer-reviewed Proceedings

- *Zhang, S. S.M. Bogus, and C.D. Lippitt. 2015. "Infrastructure Condition Assessment Based on Low-cost Hyper-Spatial Resolution Multispectral Digital Aerial Photography". Proceedings of the 2015 International Construction Specialty Conference, CSCE, Vancouver, Canada.
- *Zhang, S., Bogus, S.M., and Lippitt, C.D. 2015. "Pavement surface permanent deformation detection and assessment based on digital aerial triangulation." Proceedings of the 2015 International Workshop on Computing in Civil Engineering, ASCE, Austin, TX.
- Coulter, L.L., D.A. Stow, Y.H. Tsai, C.M. Chavis, R.W. McCreight, C.D. Lippitt, and G.W. Fraley. 2012. A New Paradigm for Persistent Wide Area Surveillance. Proceedings of the IEEE International Conference on Technologies for Homeland Security. Waltham, MA.
- Coulter, L.L., D.A. Stow, S. Kumar, S. Dua, B. Loveless, G. Fraley, C. Lippitt, V. Shrivastava. 2012. Automated Co-registration of Multitemporal Airborne Frame Images for Near Real-time Change Detection. Proceedings of the Annual Meeting of the American Society for Photogrammetry and Remote Sensing. Sacramento, CA.
- Coulter, L.L., D.A. Stow, Y.H. Tsai, C.M. Chavis, C.D. Lippitt, G.W. Fraley, R.W. McCreight. 2012. Automated Detection of People and Vehicles in Natural Environments Using High Temporal Resolution Airborne Remote Sensing. Proceedings of the Annual Meeting of the American Society for Photogrammetry and Remote Sensing. Sacramento, CA.
- Coulter, L.L., C.D. Lippitt, and D.A. Stow. 2011. Near Real-Time Change Detection for Border Monitoring. Conference Proceedings of the Annual Meeting of the American Society for Photogrammetry and Remote Sensing. Milwaukee, WI.
- Pontius Jr, Robert Gilmore, Jean-Christophe Castella, Ton de Nijs, Zengqiang Duan, Eric Fotsing, Noah Goldstein, Kasper Kok, Eric Koomen, Christopher D. Lippitt, William McConnell, Bryan Pijanowski, Alias Mohd Sood, A. Tom Veldkamp, and Peter H. Verburg. 2007. Lessons and challenges in land change modeling as revealed by map comparisons.

Proceedings of the conference on the science and education of land use. Washington DC, USA 37 pages.

Pontius Jr, R. G. and C. D. Lippitt. 2004. A method to distinguish real landscape change from map error during map comparison. Conference Proceedings of the joint meeting of The Fifteenth Annual Conference of The International Environmetrics Society and The Sixth Annual Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences. Portland ME.

Articles Appearing in Chapters in Edited Volumes

Lippitt, C.D. and D.A. Stow. 2015. Remote Sensing Theory and Time-Sensitive Information. In: Lippitt, Stow, and Coulter (eds), Time-Sensitive Remote Sensing, Springer Press

Coulter, L.L., D.A. Stow. C.D. Lippitt, and G.W. Fraley. 2015. Rapid change detection and improved pre-processing efficiency using precisely co-registered airborne images collected from matched imaging stations. In: Lippitt, Stow, and Coulter (eds), Time-Sensitive Remote Sensing, Springer Press.

Stow, D.A., C.D. Lippitt, L.L. Coulter, and B. Davis. 2015. Time Sensitive Airborne Remote Sensing Systems for Post-Hazard Damage Assessment. In: Lippitt, Stow, and Coulter (eds), Time-Sensitive Remote Sensing, Springer Press

Lippitt, C.D., D.A. Stow, S.I. Toure, M. Vejraska. 2013. Mapping neighborhoods from high spatial resolution satellite imagery. In: Spatial Inequalities: Health, Poverty, and Place in Accra Ghana (Eds. John R. Weeks, Allan G. Hill, and Justin Stoler).

Pontius Jr, Robert Gilmore, Jean-Christophe Castella, Ton de Nijs, Zengqiang Duan, Eric Fotsing, Noah Goldstein, Kasper Kok, Eric Koomen, Christopher D. Lippitt, William McConnell, Alias Mohd Sood, Bryan Pijanowski, A. Tom Veldkamp, and Peter H. Verburg. 2009. Advances from comparative land change modeling approaches, In: The dynamics of land use and ecosystem services; a transatlantic, multidisciplinary and comparative approach (Eds. Floor Brouwer and Stephan Goetz)

Other Scholarly Works

Lippitt, C.D. 2015. Remote Sensing from Small Unmanned Systems; a paradigm shift. Environmental Practice.

Lippitt, C.D. 2014. Remote Sensing: a critical disaster response technology. Enduring Questions: To what extent will remote sensing data mitigate hazards of natural disasters in the future? ABC-CLIO Press, Santa Barbara, CA.

Lippitt, C.D. 2012. Time-Sensitive Remote Sensing. Dissertation, University of California Santa Barbara, CA.

Lippitt, C.D. 2010. J. Ronald Eastman, In: Encyclopedia of Geography (Ed. Barney Warf)

Works in Progress

Articles in Refereed Journals

Lippitt, C.D., D.A. Stow, and P.J. Riggan. *Submitted 10/02/2015*. An Application of the Remote Sensing Communication Model: A time-sensitive wildfire remote sensing system. International Journal of Remote Sensing.

Zhang, S., C.D. Lippitt, S.M. Bogus, A. Loerch, and J. Sturm*. *Submitted 7/9/2015*. The

Accuracy of Aerial Triangulation Products Automatically Generated From Hyper-spatial Resolution Digital Aerial Photography. Remote Sensing Letters.

*Krofcheck, D.J., M.E. Litvack, C.D. Lippitt, and A. Neuenschwander. *Submitted 5/12/2015*.

Woody biomass estimation in a Southwestern US juniper savanna using clumped tree segmentation and existing allometries. Remote Sensing of Environment.

*Zhang, S. C.D. Lippitt, S. Bogus, G. Zhang, *Submitted 07/31/2015*. Quantifying the Impact of Road Lighting Conditions on Nighttime Vehicle Crash Rates Using Nighttime Light Satellite Imagery. Transportation Research Record.

*Zhang, S., S.M. Bogus, C.D. Lippitt, Giovanni C. Migliaccio, *Submitted 10/2014*. Empirical Assessment of Nighttime Light Image-based Interpolation Method for Adjusting Construction Cost Estimates by Project Location. Journal of Construction Engineering and Management.

*Zhang, S., C.D. Lippitt, S. Bogus. *In Prep*. A review of remote sensing techniques for transportation infrastructure monitoring. International Journal of Remote Sensing.

*Krofcheck, D.J., J.U.H. Eitel, C.D. Lippitt, L.A. Vierling, U. Schulthess, and M.E. Litvack. *In Prep*. Remotely sensed canopy wetness and red edge leveraging indices constrain the uncertainty of GPP predictions in semi-arid woodlands. Remote Sensing of Environment.

*Krofcheck, D.J., C.D. Lippitt, M.E. Litvak, and W. Pockman. *In Prep*. Characterizing a deep freeze event in a creosote shrubland in central New Mexico using a combination of remote sensing and in-situ carbon flux measurements. Oecologia.

Lippitt, C.D. *In Prep*. The impact of UAS on earth science remote sensing; a conceptual perspective. International Journal of Remote Sensing.

*Zhang, S., Lippitt, C.D., Bogus, S. M. *In Prep*. Review of Remote Sensing Techniques in Transportation Infrastructure Condition Assessment. International Journal of Remote Sensing.

Pontius Jr., R.G., J.C. Castella, T. Nijs, Z. Duan, E. Fotsing, N. Goldstein, K. Kok, E. Koomen, C.D. Lippitt, W. McConnell, A.M. Sood, B. Pijanowski, A.T. Veldkamp, and P.H. Verburg. *In Prep*. Lessons and challenges in land change modeling as revealed by map comparisons and panel discussions. Journal of Land Use Science.

*Krofcheck, D.J., C.D. Lippitt, M.E. Litvak. *In Prep*. Impacts of drought on regional carbon uptake dynamics in the Southwestern US, using the New Mexico Elevation Gradient of flux towers and the Temperature-Greenness model. Nature Climate Change.

Lippitt, C.L., C.D. Lippitt, P. Hardwick, G. Fraley, S. Rea, and D. Stow. *In Prep*. The Volunteer Hazard Mapping Corp: A Student Based GIS Support Group. Photogrammetric Engineering and Remote Sensing.

Invited or Refereed Abstracts and/or Presentations at Professional Meetings

2015 – *Thompson, Nicholas, Christopher D. Lippitt. Land Cover Change in the Vias Caldera: assessing the impact of changes in management. 8th Annual Phenology Research and Observations of Southwest Ecosystems Symposium, Tuscon, AZ.

2015 – Bogus, Susan, Christopher D. Lippitt, Su Zhang*. Development of a Remote Sensing Network for Time-sensitive Detection of Fine Scale Damage to Transportation Infrastructure. ASCE New Mexico and APA New Mexico Joint Fall Conference, Las Cruces, NM.

2015 – Pockman, Will, Scott Collins, Marcy Litvak, *Jenn Rudgers*, Kristin Vanderbilt, David Gutzler, Dave Lightfoot, Caitlin Lippitt, Chris Lippitt, Doug Moore, Don Natvig, Seth

- Newsome, Bob Sinsabaugh, Amaris Swann, Ken Whitney, Blair Wolf, Anny Chung, Sydney Jones, Jenny Noble, Matt Petrie. The Sevilleta (SEV) LTER Program: Drivers of Variations in Drylands. 2015 LTER All Scientists Meeting, Estes Park, CO.
- 2015 - Coulter, L.L., C.D. Lippitt, D. Stow, S. Walker, H.Lan, and R. McCreight. Development of a Remote Sensing System for Rapid Post Hazard Assessment of Transportation Infrastructure. Annual Meeting of the American Society for Photogrammetry and Remote Sensing, Tampa, FL.
- 2015 – *Krofcheck, D. J., Lippitt, C., *Loerch, A., Schmiede, S., and Litvak, M. E. Passive optical imagery for the rapid determination of above ground biomass and vegetation status in pinon-juniper woodlands. Environmental System Science (ESS) PI Meeting 2015, Potomac, MD.
- 2015 – Lippitt, C.D. “The Impact of UAS on Remote Sensing; a conceptual perspective”. Invited special session “Unmanned Aircraft System (UAS) Applications to Land and Natural Resource Monitoring” at annual meeting of the Association of American Geographers 2015, Chicago, IL.
- 2015 – Lippitt, C.D. “Low Altitude Aerial Triangulation for Detailed 3D Surface Reconstruction”. 2015 Meeting of the New Mexico Floodplain Managers Association, Albuquerque, NM.
- 2015 – *Zhang, S. S.M. Bogus, and C.D. Lippitt. “Infrastructure Condition Assessment Based on Low-cost Hyper-Spatial Resolution Multispectral Digital Aerial Photography”. 2015 International Construction Specialty Conference, CSCE, Vancouver, Canada
- 2015 – *Zhang, S., S.M. Bogus, and C.D. Lippitt. “Pavement surface permanent deformation detection and assessment based on digital aerial triangulation.” 2015 International Workshop on Computing in Civil Engineering, ASCE, Austin, TX.
- 2015 – *Zhang, S., S.M. Bogus, and C.D. Lippitt. Pavement Distress Condition Assessment Using Aerial Photographs at Differing Spatial Resolutions. Annual Meeting of the Transportation Research Board, Washington DC.
- 2014 – The impact of UAS on remote sensing for earth science – UAS/Land and Natural Resources Monitoring Workshop, Argonne National Laboratory Environmental Science Division, Argonne IL
- 2013- A Preliminary Review of Time-Sensitive Remote Sensing Methods – Annual Meeting of the American Society for Photogrammetry and Remote Sensing, Baltimore, MD.
- 2013- A Workflow for Automated Change Detection with High Spatial Resolution Imagery for Post-disaster Damage Assessment (Co-presenter with Douglas Stow, Lloyd Coulter, Grant Fraley, and Richard McCreight) – Annual Meeting of the American Society for Photogrammetry and Remote Sensing, Baltimore, MD.
- 2013- Large Area, Slow Frame Rate Video using Nadir Viewing Frame Images Collected on a Single Moving Aircraft – Annual Meeting of the American Society for Photogrammetry and Remote Sensing, Baltimore, MD.
- 2013- Detection of Moving Objects through Rapid Succession Airborne Imaging (Co-presenter with Douglas Stow, Lloyd Coulter, Yu Hsin Tsai, and Grant Fraley) – Annual Meeting of the American Society for Photogrammetry and Remote Sensing, Baltimore, MD.
- 2012- Detection of Earthquake Damage to Critical Infrastructure with Flexible, Repeat-pass Imaging (Co-presenter with Douglas Stow, Lloyd Coulter, Grant Fraley, and Sunil Kumar) - Annual meeting of the American Society for Photogrammetry and Remote Sensing, Sacramento, CA.

- 2012- Automated Co-registration of Multi-temporal Airborne Frame Image for Rapid Change Detection (Co-presenter with Lloyd Coulter, Douglas Stow, Grant Fraley, Sunil Kumar, Swati Dua, Bernard Loveless, and Vipul Shrivastava) - Annual meeting of the American Society for Photogrammetry and Remote Sensing, Sacramento, CA.
- 2012- Time-sensitive Remote Sensing - Annual meeting of the American Society for Photogrammetry and Remote Sensing, Sacramento, CA.
- 2011- Object-based Delineation of Urban Neighborhoods of Accra, Ghana from QuickBird Imagery (co-presenter with Douglas Stow, Sory Toure, Lloyd Coulter, and John Weeks) - Annual meeting of the American Society for Photogrammetry and Remote Sensing, Milwaukee, WI.
- 2011- Reducing the cost of remote sensing based land use updating – Monthly meeting of San Diego Regional GIS Council
- 2011- On the utility of time-sensitive models in remote sensing- Annual meeting of the American Society for Photogrammetry and Remote Sensing, Milwaukee, WI.
- 2011- Time-Sensitive Remote Sensing: changing expectations – Invited Lecture, Virginia State Polytechnic University Department of Geography.
- 2010- A Low-cost Unmanned Imaging System; imaging from unmanned aerial systems - Annual meeting of the American Society for Photogrammetry and Remote Sensing, San Diego, CA.
- 2010- Volunteer Hazard Mapping Corps: A student Based GIS Support Group - Annual meeting of the California Geographic Information Society, Huntington Beach, CA.
- 2009- The Volunteer Hazard Mapping Corp: A Student Based GIS Support Group - Annual meeting of the American Society for Photogrammetry and Remote Sensing, Baltimore, MD.
- 2008 - OpenAerialMap.org: A democratization of remotely sensed imagery - Annual meeting of the American Society for Photogrammetry and Remote Sensing, Portland, OR.
- 2008 – A Low Cost Imaging System for Autonomous Data Collection – Meeting of the Southwest Region American Society of Photogrammetry and Remote Sensing and the Arizona Nevada Academy of Science, Tempe, AZ.
- 2007 - Gypsy Moth Risk in the United States – Annual Meeting of the United States Regional Association of the International Association for Landscape Ecology, Tucson, AZ.
- 2006 - Incorporating human interaction variables into a nonparametric DSS to predict gypsy moth outbreak. – Annual Meeting of the American Society of Photogrammetry and Remote Sensing, Reno, NV.
- 2006 - A model of Gypsy most infestation risk for the conterminous United States. – Annual Meeting of the Entomological Society of America, Eastern Branch, Charlottesville, VA.
- 2006 - A framework for modeling invasive species risk – Annual Meeting of the Association of American Geographers GIScience Specialty Group Student Paper Competition. Chicago, IL.
- 2005 - Incorporating human interaction variables into a non-parametric decision support system – Annual Gypsy Moth Review. Philadelphia, PA.
- 2005 - Subtle change detection using machine learning- Annual meeting of the American Society for Photogrammetry and Remote Sensing, Baltimore, MD.
- 2005 - Subtle change detection using machine learning- Annual meeting of the Association of American Geographers Remote Sensing Specialty Group Student Paper Competition. Denver, CO.

- 2004 - Distinguishing true change from map error during map comparison- the joint meeting of The Fifteenth Annual Conference of The International Environmetrics Society and The Sixth Annual Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences. Portland, ME.
- 2004 - Distinguishing true change from map error during map comparison- Association of American Geographers centennial meeting Remote Sensing Specialty Group Student Paper Competition. Philadelphia, PA.
- 2004- Land-change model comparison- Integrated assessment of the land system: the future of land use. *co-presenter w/ Dr. Gil Pontius. Amsterdam, The Netherlands.

Contributed (un-refereed) Abstracts and/or Oral Presentations at Professional Meetings

- 2015 - Lippitt, C.D. Panelist: “Supporting Women in Remote Sensing and GIS” at the Annual Meeting of the Association of American Geographers 2015, Chicago IL.
- 2015 – Lippitt, C.D. The Impact of Small-Unmanned Airborne Systems on Remote Sensing; a conceptual perspective. American Society for Photogrammetry and Remote Sensing Rio Grande Chapter Spring Meeting, Los Cruces, NM.
- 2015 – Lippitt, C.D. The Impact of Small-Unmanned Airborne Systems on Remote Sensing; a conceptual perspective. Data 2 Knowledge Conference, University of New Mexico, Albuquerque, NM.
- 2014 – Best Practices for Balloon Mapping (Co-presenter with Su Zhang* and Andrew Loerch*) - Annual Meeting of the Southwest Region of the Association of American Geographers, Albuquerque, NM.
- 2012- A Remote Sensing Communication Model - Annual meeting of the Association of American Geographers, New York, NY.
- 2011- Vegetation and Building Change in Accra Ghana Based on Multitemporal Quickbird Satellite Data (co-presenter with Douglas Stow, John Weeks, Sory Toure, Yu-Hsin Tsai, and Lloyd Coulter) – Annual meeting of the Association of American Geographers, Seattle, WA.
- 2009- Flexible and Inexpensive Airborne Color Infrared Imaging System - Annual meeting of the American Pacific Coast Geographers, San Diego, CA. (co-presenter with Douglas Stow, Grant Fraley, and Richard McCreight)
- 2009- The Effect of Input Data Transformations On Object Based Image Classification - Annual meeting of the American Pacific Coast Geographers, San Diego, CA.
- 2009- President’s Plenary Session: Neogeographies: Just another Spin of the Globe - Annual meeting of the American Pacific Coast Geographers, San Diego, CA. (Student Panel Coordinator, Panel participants John Paul Jones III, Keith Clarke, Sarah Elwood, Andre Skupin, Stuart Aitken, Sean Crotty, and Giorgio Curti)
- 2009- Volunteer Hazard Mapping Corps: A student Based GIS Support Group - Annual meeting of the American Pacific Coast Geographers, San Diego, CA. (co-presenter with Caitlin L. Chason and Grant Fraley)
- 2009- The effect of input data transformations on Object-based Land Cover Classification - Annual meeting of the Association of American Geographers, Las Vegas, NV.
- 2008 - The democratization of remote sensing - Annual meeting of the American Pacific Coast Geographers, Anchorage, AK.

- 2008 - OpenAerialMap.org – A democratization of remotely sensed imagery - Annual meeting of the Association of American Geographers, Boston, MA.
- 2007 - Machine Learning for Subtle Forest Change Mapping – Coping with Available Reference Data - Annual meeting of the Association of American Geographers, San Francisco, CA.
- 2005- The Massachusetts Forest monitoring Program, *co-presenter w/ Mr. Trevor Jones, NESTVAL 2005, Keene, NH.
- 2005- The State of the Art of Land-use Change Modeling, co-presenter with Dr. Gil Pontius, Worcester Consortium Symposium. Worcester, MA.
- 2005- Timber Harvest Detection Using Change Vectors- Clark University's Academic Spree Day. Worcester, MA.
- 2005- The Massachusetts Forest Monitoring Program, co-presenter with Dr. John Rogan, Worcester Consortium 2005 Symposium. Worcester, MA.
- 2004- The Massachusetts Forest Monitoring Program, *co-presenter w/ Dr. John Rogan and Mr. Trevor Jones, Clark University's Fall Fest. Worcester, MA.
- 2004- Land-change model comparison, *co-presenter w/ Dr. Gil Pontius, Clark University's Fall Fest. Worcester, MA.
- 2003- Distinguishing true change from map error during map comparison, *Co-presenter w/ Dr. Gil Pontius, Clark University's Academic Spree Day. Worcester, MA.
- 2003- Building a historical database of land cover/use, co-presenter with Dr. Gil Pontius, Carissa Williams, and Mathew Holden, Clark University's Fall Fest. Worcester, MA.

Research

Research Funding

Monitoring Post Wildfire Climate Change and Floodplain Impacts in Peralta Canyon

Christopher D. Lippitt

Bureau of Land Management Rio Puerco Field Office

July 2015 – September 2017, \$34,031.00 Direct Cost, \$5,957.00 Indirect Costs

Sevilleta Long Term Ecological Research V: Long term ecological research in a biome transition zone

Pockman, William, Scott Collins, Marcy Litvack, Kristen Vanderbilt, Jennifer Rudgers

National Science Foundation

April 1, 2015 – March 31 2018, \$1,385,930.00 Direct Costs, \$584,070.00 Indirect Costs

Request for equipment funding: real-time kinematic global positioning system

Christopher D. Lippitt and Wirt Wills

UNM Office of the Vice President of Research

Direct Cost \$59,335.26

Collaborative Proposal: Optimization of Remote Sensing Networks for Time-sensitive Detection of Fine Scale Damage to Critical Infrastructure

Lippitt, Christopher D.

National Science Foundation

August 1 2014 – July 31 2016, \$118,068.00 Direct Costs, \$54,164 Indirect Costs

Development of a Remote Sensing Network for Time-sensitive Detection of Fine Scale Damage to Transportation Infrastructure

Lippitt, Christopher D. and Susan Bogus-Halter

Department of Transportation – Research and Innovative Technologies

September 1 2014 – December 30 2016, \$ 1,217,397 Direct Costs and \$71,103.00 Indirect Costs

Infrastructure Condition Assessment Using Low-Cost Remote Sensing Techniques

Bogus-Halter, Susan and Christopher D. Lippitt

Research Allocations Committee, University of New Mexico

May 21 2013 – November 20 2014, \$9,040.00 Direct Cost

Evolving Priorities in Land Management: A Pilot Study Assessing Historical Intersections and Interactions between Management Practice and Land Cover in Large-Tract Landholdings

throughout New Mexico's Rio Grande Valley

Lippitt, Christopher D. and K. Maria Lane

Research Allocations Committee, University of New Mexico.

January 17 2013 – July 16 2014, \$10,000.00 Direct Cost

Emerging Landscapes, Evolving Priorities: Assessing the Intersections between Land Cover Change and the Management of Introduced Species and Habitats on the Turner Ranches in Southern New Mexico

Lane, K. Maria, and Christopher D. Lippitt.

University of New Mexico College of Arts and Sciences and Turner Enterprises Inc.
August 1 2012 – January 31 2014, \$10,000.00 Direct Cost

Pending Research Funding

Individual-Level Interpretation of Remote Sensing Imagery for the Production of Time-sensitive Information.

Christopher D. Lippitt and Danqing Xiao
Research Allocations Committee, University of New Mexico
01/15/2016 – 07/15/2017, \$6,000.00 Direct Cost

Proposals Declined For Funding

Collaborative Research: Partnership for Geoscience Education and Research, Watershed Science, and Climate Change in the Southwestern United States (Submitted 3/16/2015)

Mark Stone, Ricardo Gonzalez-Pinon, Christopher D. Lippitt, and Laura Crossey
National Science Foundation
10/01/2015 – 9/30/2020, \$563,810.00 Direct Cost, \$250,940.00 Indirect Cost

Water to farm: enhancing water use efficiency in the Rio Grande/Pecos River watersheds through 2050 (submitted 8/12/2014).

David Hanson
New Mexico Consortium Inc. – United States Department of Agriculture
July 1 2015 – June 30 2019, \$349,611 Direct Costs and \$149,825 Indirect Costs

Sevilleta Long Term Ecological Research V: Long term ecological research in a biome transition zone (submitted 03/04/2014).

Pockman, William, Scott Collins, Marcy Litvack, Kristen Vanderbilt, Jennifer Rudgers.
National Science Foundation
October 1 2014 – September 30 2018, \$2,743,720.00 Direct Costs and \$1,176,280.00 Indirect Costs

Research Demonstration of Innovative Approach to Decrease System-Wide Vulnerability to Flooding (Submitted 11/26/2013)

Bogus-Halter, Susan, Christopher D. Lippitt, Mark Stone, Gregory Rowangould, and Guohui Zhang
Department of Transportation – Federal Transit Authority
07/01/2014 – 12/31/2016, \$565,003 Direct Costs and \$247,630.00 Indirect Costs

Linking Surface Hydrology, Landscape Structure, and Phenology to Resolve Soil Moisture Information Derived from Remote Sensing (Submitted w/ Argon National Laboratory on 07/15/2013)

Lippitt, Christopher D.
National Aeronautics and Space Administration
January 1 2014 – December 31 2016, \$117,820.00 Direct Costs and \$53,267.00 Indirect Costs

Collaborative Proposal: Optimization of Remote Sensing Networks for Time-sensitive Detection of Fine Scale Damage to Critical (Submitted 2/14/2013)
Lippitt, Christopher D.
National Science Foundation
June 1 2013 – May 31 2015, \$118,068.00 Direct Costs, \$54,164 Indirect Costs

Teaching

Doctoral Advisement

Completed (2)

Daniel Krofcheck (UNM Biology); October 2014; Bridging structure and function in semi-arid ecosystems by integrating remote sensing and eddy-covariance data sets
Jeff Ferlando (UNM Economics); May 2013; Temporal and Spatial Analysis of Forest Management: a case study of Kam Cha I, Thailand

In Progress (7)

Adam Byrd (UNM Anthropology); Expected Completion May 2015; Settlement Patterns During the Gallina Phase
Su Zhang (UNM Civil Engineering); Expected Completion December 2015; Pavement Surface Distress Detection, Assessment, and Modeling Using Geospatial Techniques
Jennifer Sturm (UNM Anthropology); Expected Completion May 2016; Remote Sensing of agricultural infrastructure in Chaco Canyon
Scott Kirk (UNM Anthropology); Expected Completion May 2017; Dissertation title undefined
Michael Chang (UNM Biology); Expected Completion May 2017; Dissertation title undefined
Alesia Hallmark (UNM Biology); Expected Completion May 2018; Tracking vegetation Biomass using low-cost Phenocams
Brittany Hopkins Coe (UNM Biology); Expected Completion May 2018; Dissertation Title Undefined

Masters Advisement

Completed as Chair (2)

Willard Hunter (Chair); May 2015; Examining a Natural Experiment: U.S. House Redistricting in Texas Preceding the 2002 and 2004 U.S. House Elections based on the 2000 Federal Census
Sandra Daras (Chair); May 2014; Crime And Immigration In Albuquerque, NM: Real Or Misperception?

Completed as Committee Member (4)

Brian Kinworthy; August 2015; New Mexico Rock Glacier Inventory: Geomorphology and Paleogeography Analysis.
Micheal Campanovo; May 2013; Assessing Uncertainty in Volunteered Geographic Information for Emergency Response
Kristopher Lingren; May 2013; Humate Potential in the San Juan Basin of New Mexico: An Assessment of Digital Terrain Analysis and Multispectral Analysis Techniques as Applied to Exploration Targeting (Project)
Choongman Oh; December 2013; Evacuation Vulnerability Mapping Using GIS Network Analysis (Project)

In Progress as Chair (8)

Samuel Thompson; expected completion December 2016; The proximity effect of crime on housing prices: a hedonic pricing analysis of inner-loop Houston, TX

Kilko Paz; expected completion May 2016; Ready for school in New Mexico?
Socioeconomic and geographic related factors influencing elementary school proficiency in children

Su Zhang; Expected Completion May of 2016; Nighttime lights satellite Imagery for Improved Estimation of the City Cost Index.

Thommy Thompson; expected completion May 2015; Land cover change in the Vias Caldara

Marshall Grebe; expected completion May 2016; Designing a Broadband Radio Transmission System for Time-sensitive Remote Sensing

Andrew Loerch; expected completion May 2016; Estimating the timeliness of remote sensing information delivery.

Pankaj Bajracharya; expected completion May 2016; Predicting Land Use Change in Albuquerque, NM using Sleuth.

Bruce Lockett; expected completion May 2016; Project title undetermined.

In Progress as Committee Member (5)

Akashia Allen; Expected Completion May 2016; Thesis Title undefined

Brian Kinworthy; Expected completion December 2015; Rock Glacier Response to Climate Forcing in the Sangre de Cristo Mountains, New Mexico

William Brewer; Expected Completion May 2016; Mapping Regional Pinon-Juniper Dynamics using Multiple Endmember Spectral Mixture Analysis.

Alissa Healy; Expected Completion May 2016; Comparing Remote Sensing Models Ability to Accurately Identify Prehistoric Agricultural Fields in New Mexico

Steven Sutton; Expected completion May 2016; Thesis title undefined

Bachelor's Honors Advisement

Andrew Loerch; May 2014; B.S. in Geography; An Analysis of the Effects of Near-infrared Wavelengths on the Bayer Mosaic Filter of a Consumer Digital Camera

Classroom Teaching

2015; Spring; Introduction to Geographic Information Systems; UNM GEOG 381L; 54 students

2015; Spring; Applications of Remote Sensing; UNM GEOG 484L/584L; 19 students

2014; Fall; Fundamentals of Remote Sensing; UNM GEOG 483L/583L; 28 students

2014; Fall; Advanced Topics in Land Remote Sensing; UNM GEOG 499; 4 students

2014; Spring; GIScience Capstone; UNM GEOG 525; 9 students

2014; Spring; Applications of Remote Sensing; UNM GEOG 484L/584L; 11 students

2013; Spring; Applications of Remote Sensing; UNM GEOG 484L/584L; 19 students

2013; Spring; Introduction to Geographic Information Systems; UNM GEOG 381L; 45 students

2012; Fall; Fundamentals of Remote Sensing; UNM GEOG483L/583L; 20 students

2011; Introduction to Digital Image Processing; SDSU GEOG588; ~25 students

2009; Remote Sensing of Environment; SDSU GEOG587; ~25 students

2009; Remote Sensing of Environment Laboratory; SDSU GEOG587L ; ~25 students

Other Teaching

2015; Spring; Problems; UNM GEOG 599; 5 students

2015; Spring; Problems; UNM GEOG 591; 3 students

2014; Fall; Master's Thesis; UNM GEOG 599; 3 students

2014; Fall; Applied Geography Internship; UNM GEOG 593; 1student

2014; Spring; Master's Thesis; UNM GEOG 599; 3 students
2014; Spring; Problems; UNM GEOG 591; 1 student
2013; Fall; Problems; UNM GEOG 591; 2 students
2013; Summer; Applied Geography Internship; UNM GEOG 593; 1 student
2013; Spring; Problems; UNM GEOG 591; 2 students
2010; Remote Sensing of Environment Laboratory; SDSU GEOG587L; ~25
2010; Digital Image Processing Laboratory; SDSU GEOG 588L TA; ~25
2009; Advanced Topics in Remote Sensing Laboratory; SDSU GEOG688 TA
2006; Idrisi Andes 3-day training series, Denver CO, San Jose CA, Worcester MA

Service

Journal Reviews

2015; Spring; International Journal of Remote Sensing (2)
2014; Spring; Transactions in GIS
2014; Spring; International Journal of Applied Earth Observation and Geoinformation
2014; Spring; ISPRS Journal of Photogrammetry and Remote Sensing
2014; Spring; International Journal of Remote Sensing
2013; Spring; Computers, Environment and Urban Systems
2012; Fall; ISPRS Journal of Photogrammetry and Remote Sensing
2011; Spring; International Journal of Digital Earth
2011; Spring; Remote Sensing Letters
2011; Spring; Crop Protection
2011; Fall; International Journal of Remote Sensing
2009; Fall; Community Ecology

Administrative work with professional societies, elect offices held

2015-present; President; American Society for Photogrammetry and Remote Sensing Rio Grande Chapter
2015-present; Regional Director; American Society for Photogrammetry and Remote Sensing Rocky Mountain Region
2014-2015; Faculty Advisor; UNM-ASPRS Student Chapter
2014; Chair; Organizing Committee; American Society for Photogrammetry and Remote Sensing Rio Grande Chapter Annual Spring Meeting
2013-2015; Vice President; American Society for Photogrammetry and Remote Sensing Rio Grande Chapter
2012-2013; Board Member; American Society for Photogrammetry and Remote Sensing Rio Grande Chapter
2013; Organized and Chaired two special sessions entitled “Time-Sensitive Remote Sensing 1 & 2” at Annual Meeting of the American Society for Photogrammetry and Remote Sensing.
2009- 2010; Student Representative to the Board; Geographic Information Science Specialty Group of the Association of American Geographers (GIS-SG).
2007 – 2010; Founding President of the SDSU Student Chapter of ASPRS
2004 – 2005; President of the Clark University Chapter of Gamma Theta Upsilon, International Geographical Honor Society

Administrative work in Department, College, University committees

2014 – present; Computing Coordinator; UNM Geography and Environmental Studies
2014 – present; Budget Committee Member; UNM Geography and Environmental Studies
2014 – 2015; Personnel Committee Member; UNM Geography and Environmental Studies
2013 – 2014; Member, Executive Committee; UNM Geography and Environmental Studies
2013; Member; Hiring Committee for Visiting GIScience position; UNM Geography and Environmental Studies
2012 – present; Colloquium Coordinator; UNM Geography and Environmental Studies
2009 – 2010; Doctoral Student Representative to the Faculty; San Diego State University Department of Geography.

Community Service/Outreach

- 2014; Invited presentation to Advanced Remote Sensing (GEOG 688) class at San Diego State University on “The impact of UAS on remote sensing for earth science”, November.
- 2014; Exhibitor Coordinator, Joint Annual Meeting of the Southwest and Great Plains Regions of the Association of American Geographers, Albuquerque, NM.
- 2014; Coordination and facilitation of workshop on ‘R’ for spatial analysis through UNM ASPRS Student Chapter (15 attendees).
- 2011; Presentation on UAS for GIScience, San Diego State University Department of Geography.
- 2011; Demonstration of remote sensing from unmanned platforms, San Diego State University chapter of the American Society for Photogrammetric Engineering and Remote Sensing.
- 2010; Demonstration of remote sensing from unmanned platforms, Association of Environmental Professionals and San Diego State University chapter of the American Society for Photogrammetric Engineering and Remote Sensing.
- 2009; Presentation for Career Day at Patrick Henry High School, San Diego, CA.
- 2008; Founded and manage Volunteer Hazard Mapping Corp at San Diego State University – The VMHC supports local GIS managers during hazards by training and organizing GIS/Remote Sensing capable graduate students to support processing tasks. Training includes 3 workshops and 1-2 training scenarios annually.
- 2008; Presentation on GIScience and Remote Sensing to disadvantaged youth at Hoover High School, San Diego, CA.
- 2007; Organized and Directed 3-day workshop series on field methods in Remote Sensing in response to student survey’s citing it as a deficiency in their education (through SDSU-ASPRS).
- 2007; Volunteer (Geospatial) response to 2007 San Diego Wildfires; producing maps of fire perimeter and home damage and publishing them to the web for public viewing, San Diego, CA
- 2004 – 2006; Volunteer Technology consultant to Regional Environmental Council, Worcester, MA.
- 2004; Presentation on Geography to Elementary School Science Class, Worcester, MA

October 2015

Caitlin L. Lippitt, Ph.D

Department of Geography & Environmental Studies, University of New Mexico
Albuquerque, NM 87031-1091
E-mail caitlippitt@unm.edu

Educational History

Ph.D. Geography 2013, San Diego State University/University of California, Santa Barbara
Dissertation: *Remote-sensing based characterization of herbaceous vegetation in California shrublands.* Douglas A. Stow, Adviser
M.S., Geography, 2007, San Diego State University
Thesis: *Examining the influence of short-interval fire occurrence on post-fire recovery of chamise chaparral.* Douglas A. Stow, Adviser
B.A., Geography, 2002, University of California, Santa Barbara

Employment History

2013-present Assistant Professor, Department of Geography & Environmental Studies, University of New Mexico
2013 Adjunct Professor, Department of Geography, San Diego Mesa College
2010-2013 Research Assistant, Department of Geography, San Diego State University
2006-2010 Teaching Assistant, Department of Geography, San Diego State University
2005-2006 Research Assistant, Department of Geography, San Diego State University

Professional Recognition and Honors

2010, William and Vivian Finch Remote Sensing Scholarship, San Diego State University
2009, American Society of Photogrammetry and Remote Sensing Southwest Region Travel Award
2009, 1st place World Geography Bowl, team member, Association of American Geographers (AAG)
2009, Association of Pacific Coast Geographers (APCG) Travel Award
2008 American Society of Photogrammetry and Remote Sensing (ASPRS) Student Assistant Program
2008, American Society of Photogrammetry and Remote Sensing (ASPRS) Southwest Region Academic Achievement Award in Geographic Information Science
2008, APCG Travel Award
2008, Harry and Shirley Bailey Award for Outstanding Paper in Physical Geography, APCG
2005, 1st place "Best Instructional Presentation Map" ESRI User's Conference (UC)
2005 "Most Educational About GIS" award San Diego Geography Map Showcase, ESRI UC

Scholarly Achievements

Articles in Refereed Journals

- Lippitt, C.L., Stow, D., O’Leary, J.O., Franklin, J. 2013. The influence of short-interval fire occurrence on post-fire recovery of fire-prone shrublands in California, USA. *International Journal of Wildland Fire* 22, 184-193.
- Stow, D., Toure, S. Lippitt, C.L., Lippitt, C.D., Lee, C. 2012. Frequency distribution signatures and classification of within-object pixels, *International Journal of Applied Earth Observation and Geoinformation* 15, 49-56.

Published Reports

- 2014, San Diego Association of Governments: Contract 5001033. Lead PI, Dr. Douglas Deutschman,, San Diego State University (SDSU) Department of Biology, with Co-PIs Spring Strahm, SDSU Department of Biology, and Dr. Doug Stow, Dr. Caitlin Lippitt, and Lloyd Coulter of the SDSU Department of Geography. “Vegetation monitoring for the San Diego Multiple Species Conservation Program: comparison of vegetation community mapping, sensing using MESMA, and field data, 2013 final report.

Works in Progress

In preparation

- Lippitt, C.L., Stow, D.S., Roberts, D.A., Fraley, G., O’Leary, J.O., Still, C. In progress. Signature variability of native and nonnative herbaceous vegetation in California sage scrub based on spectral reflectance time series Target: *Photogrammetric Engineering and Remote Sensing*.
- Lippitt, C.L., Stow, D.S., Roberts, D.A. In progress. Spectral-temporal mixture analysis of moderate resolution imagery for herbaceous cover mapping in shrubland habitats *Remote Sensing of Environment*.
- Lippitt, C.L., Stow, D.S., Roberts, D.A. In progress. Multitemporal MESMA for monitoring herbaceous and other vegetation growth forms in southern California shrublands. *Journal of Environmental Management*

Refereed Presentations at Professional Meetings

- 2010, Stow, D., Toure S., Lee, C., Chason, C. and Lippitt, C. Frequency Distribution Signatures and Classification of Within-Object Pixels, GEOBIA 2010, Ghent, Belgium, June.
- 2010, Chason, C.L. “Signature separability of native and nonnative herbaceous vegetation in coastal sage scrub using spectral time series”, American Society of Remote Sensing and Photogrammetry Annual Meeting, San Diego, California, April.
- 2009, Chason, C.L., Lippitt, C.D., Fraley, G. “Volunteer Hazard Mapping Corps: A Student-based Hazard GIS Support Group,” American Society of Remote Sensing and Photogrammetry Annual Meeting, Baltimore, Maryland, March.
- 2008, Chason, C.L “Examining the influence of short-interval fire occurrence on post-fire recovery patterns in chamise chaparral,” US-International Association of Landscape Ecologists Symposium, Madison, Wisconsin, April.

Contributed Oral Presentations at Professional Meetings

- 2015, Lippitt, C.L. "Object-based image analysis of tree mortality in a piñon-juniper woodland", Southwest American Association of Geographers (SWAAG) Annual Meeting, San Antonio, Texas, November 4, 2015.
- 2015, Brewer, W., Lippitt, C.L. Multiple endmember spectral mixture analysis applied to a piñon-juniper woodland. Southwest American Association of Geographers (SWAAG) Annual Meeting, San Antonio, Texas, November 6, 2015.
- 2015, Lippitt, C.L., Gallaher, C., Martin, D.J. "Active Pedagogy in Introductory Physical Geography Classes", Association of American Geographers Annual Meeting, Chicago, Illinois, April 24, 2015.
- 2015, Lippitt, C.L. "Mapping and monitoring fractional vegetation cover in California shrublands using Multiple Endmember Spectral Mixture Analysis (MESMA)", Association of American Geographers Annual Meeting, Chicago, Illinois, April 21, 2015.
- 2014, Lippitt, C.L. "Multitemporal MESMA for monitoring herbaceous and other vegetation growth forms in Southern California shrublands", American Society for Photogrammetry and Remote Sensing (ASPRS) Rio Grande Chapter Spring Meeting. April 5, 2014.
- 2012, Lippitt, C.L., Stow, D.S. "Mapping nonnative herbaceous cover in shrubland habitats: a spectral-temporal mixture analysis approach" Association of American Geographers Annual Meeting, New York, New York, February.
- 2011, Lippitt, C.L., Stow, D.S. "San Diego Association of Governments (SANDAG) Vegetation Monitoring: Lifeform-Level Vegetation Composition and Structure" Southern California Regional Monitoring Workshop: Monitoring Practices for Vegetation: from Pilot Studies to Power Analysis. San Diego, CA, December 12.
- 2011, Lippitt, C.L., Stow, D.S. "Spectral-temporal analysis of field-derived spectra for herbaceous cover mapping in shrubland habitats" Association of American Geographers Annual Meeting, Seattle, Washington, April.
- 2009, Chason, C.L., Lippitt, C.D., Fraley, G. "Volunteer Hazard Mapping Corps: A Student-based Hazard GIS Support Group," Association of Pacific Coast Geographers Annual Meeting, San Diego, California, October.
- 2009, Stow, D., Chason, C., and Lee, C. Multiple-pixel Classification Strategies in Support of Object-based Image Analyses, Annual Meeting of the Association of American Geographers, Las Vegas, Nevada, March.
- 2009, Chason, C.L. "Monitoring the Impact of Short Interval Fire Frequency on the Post-fire Recovery of Coastal Sage Scrub, San Diego County, California", Association of American Geographers Annual Meeting, Las Vegas, Nevada, March.

Research

Research Funding

Office of the Vice President for Research, Equipment Funding Request. Lead PI with Co-PI Dr. Marcy Litvak of UNM Biology, Co-PIs Dr. Christopher Lippitt of UNM Geography & Environmental Studies, Dr. David Hanson, and Dr. William Pockman of UNM Biology, and Susan Bogus Halter of Civil Engineering. Submitted March 31, 2014, accepted April 22, 2014. \$47,520.00.

Sevilleta Long Term Ecological Research V: Long term ecological research in a biome transition zone Pockman, William, Scott Collins, Marcy Litvack, Kristen Vanderbilt, Jennifer Rudgers. National Science Foundation. April 1, 2015 – March 31 2018, \$1,385,930.00 Direct Costs, \$584,070.00 Indirect Costs.

Proposals Declined for Funding

Sevilleta Long Term Ecological Research V: Long term ecological research in a biome transition zone (submitted 03/04/2014). Pockman, William, Scott Collins, Marcy Litvack, Kristen Vanderbilt, Jennifer Rudgers. National Science Foundation. October 1 2014 – September 30 2018, \$2,743,720.00 Direct Costs and \$1,176,280.00 Indirect Costs

Tribal Colleges and Universities Program (TCUP): PArtnerships for Geoscience Education (PAGE). “Collaborative Research: Partnership for Geoscience Education and Research, Watershed Science and Climate Change in the Southwestern United States.” Senior personnel. Lead PI, Dr. Mark Stone, UNM Civil Engineering, with Co-PIs: Dr. Laura Crossey, UNM Earth and Planetary Science, Dr. Chris Lippitt, UNM Geography, and Dr. Ricardo Gonzalez of UNM Civil Engineering. Submitted March 16, 2015. \$823,608

University of New Mexico Research Allocation Committee Grant. Lead PI. “Remotely-sensed fractional cover mapping of plant communities in Central New Mexico”. Submitted February 15, 2015. \$10,000.

NSF Pre-proposal. Hydrological tipping points and desertification of semi-arid woodlands. Senior personnel. Lead PI Dr. Marcy Litvak of UNM Biology, with Co-PIs Dr. William Pockman of UNM Biology and Susan Schwinning, Associate Professor, Department of Biology, Texas State University. Submitted January 23, 2015.

Teaching

Masters Advisement

Brewer, William (expected 2016): mapping fractional cover change related to drought in pinon-juniper communities at Deer Creek Plateau, New Mexico using MESMA applied to a Landsat timeseries.

Allen, Akashia (expected 2016): assessment of recent drought impact on ecotones in the arid Southwest using Landsat imagery.

Hawk, Anjanette (expected 2017): An evaluation of sand dune formation in response to overgrazing of livestock in the Navajo Nation.

Masters Committee

Kinworthy, Bryan (graduated 2015)

Chris Sanderson (graduated 2015)

Andrew Loerch (expected 2016)

Marshall Grebe (expected 2016)

Thommy Thompson (expected 2016)

Pankaj Bajracharya (expected 2016)

Undergraduate Student Mentoring

Taylor, Tammira. Fall 2014. Geography & Environmental Studies. Center for Academic Program Support (CAPS) Peer Learning Facilitators (PLF) program.

Classroom Teaching

2015 Fall	Environmental Hazards	GEOG 499	13 students
2015 Fall	Remote Sensing Fundamentals	GEOG 483/583	33 students
2015 Spring	Environmental Hazards	GEOG 499	8 students
2015 Spring	Physical Landscapes	GEOG 350	23 students
2014 Fall	Intro to Maps & Geospatial Info	GEOG 281	21 students
2014 Fall	Physical Geography	GEOG 101	118 students
2014 Spring	Environmental Hazards	GEOG 499	8 students
2014 Spring	Physical Landscapes	GEOG 350	21 students
2013 Fall	Remote Sensing Fundamentals	GEOG 483/583	13 students

Curriculum Development

2014, (Fall) GEOG 101: Physical Geography included in pilot STEM program, Center for Academic Program Support (CAPS) Peer Learning Facilitators (PLF) program. Developed new GEOG 101 course design focused on Active Learning techniques.

2014, (Spring) Developed new course for Department of Geography & Environmental Studies: GEOG 450: Environmental Hazards.

Professional Development

2014, Attended professional development workshop hosted by Center for Teaching Excellence, "Start Where You Are, Moving from Lecture to Active Learning." University of New Mexico, February 20, 2014.

2014, Geography Faculty Development Alliance Workshop for Early Career Faculty & Graduate Students, Organized by Association of American Geographers, June 22-28, 2014.

2014, Attended professional development workshop hosted by Center for Teaching Excellence, "Teaching with iClickers". University of New Mexico, August 28, 2014.

2014, Attended professional development workshop hosted by the Office for the Vice President of Research (OVPR), “Grants and Grant Writing for Junior Faculty”, led by Dr. Kathie Olsen of ScienceWorks. University of New Mexico, September 23, 2014.

2014, Attended Workshop hosted by the College of Arts & Sciences, “Corporate and Foundation Opportunities for Early Career Faculty in Arts & Sciences.” University of New Mexico, November 10, 2014.

Service

Reviewing for Journals

2014 *Journal of Arid Environments*
2013 *International Journal of Remote Sensing*

Administrative work with professional societies

2015, Treasurer, Rio Grande Chapter, American Society of Photogrammetry and Remote Sensing (ASPRS)

2015, Faculty Advisor, UNM Student Chapter of ASPRS

2014, Chapter Director, Rio Grande Chapter ASPRS

Administrative work in Department

2015, Colloquium Series Coordinator

2015, Physical Geography Lab Coordinator

TEMA MILSTEIN

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MSCO3 2240, University of New Mexico, Albuquerque, NM 87131-0001

Presidential Teaching Fellow

University of New Mexico

Associate Professor

Department of Communication & Journalism

University of New Mexico

Affiliated Faculty

Geography & Environmental Studies Department

Sustainability Studies Program

Water Resources Program

University of New Mexico

AREAS OF EXPERTISE:

Ecoculture and Environmental discourses: Environmental and ecocultural meaning systems and relations, transformative discourses, ecotourism, activism, ecopedagogy

Culture and Discourse: Cultural discourses and ideologies, constraints and cultivations, acculturation, inter/cultural communication

EDUCATION:

2007 PhD, Communication – University of Washington

Dissertation: “Communication as environmental resource: An ethnographic exploration of endangered whale watching and human-nature relations.”

Adviser: Gerry Philipsen

2001 MA, Communication – University of New Mexico

Thesis: “Transformative travel: Self-efficacy via sojourning.”

Adviser: Everett M. Rogers

1992 BA with Honors, Journalism with minor in Asian Studies – University of New Mexico

EMPLOYMENT HISTORY:

2013-present Associate Professor, Communication & Journalism Department,
University of New Mexico

- PhD program director, 2013-2015

	<ul style="list-style-type: none">▪ Visiting Professor, John Cabot University, Rome, Italy, summer term, 2015
2007-2013	Assistant Professor, Communication & Journalism Department, University of New Mexico <ul style="list-style-type: none">▪ Graduate program associate director, 2012-2013▪ Visiting Professor, Portland State University, Portland, OR, fall term, 2009
1998-2007	Predoctoral Instructor <ul style="list-style-type: none">▪ University of Washington, 2003-2007▪ University of Colorado at Denver’s International College of Beijing, China, 2001-2002▪ University of New Mexico, 1998-2001
1990-2002	Journalist <ul style="list-style-type: none">▪ Newspaper editor-in-chief, 1996-2002▪ Public radio call-in show host, 1998-2000▪ Newspaper senior editor, 1998-1999▪ Newspaper assistant editor, 1995-1996▪ Freelance print journalist, 1994-1996▪ Magazine associate editor, 1993▪ Newspaper reporter and features and arts editor, 1990-1993

RESEARCH HONORS & AWARDS:

Visiting Fellow. University of Tasmania. Hobart, Australia. 2016.

Visiting Scholar. University of Hawai’i at Manoa. Honolulu, HI. 2015.

US Fulbright Scholar/Fulbright New Zealand Senior Scholar. Study: “New Zealand Ecotourism and Sustainability.” Kaikoura and Auckland, New Zealand. 2012.

Journal Article Award

- Christine L. Oravec Award for Outstanding Scholarship in Environmental Communication. *National Communication Association*. 2009. Sole author.

Book Awards

- Christine L. Oravec Award for Outstanding Scholarship in Environmental Communication, *National Communication Association*. 2013. Chapter author.
- Critics Choice *American Educational Studies Association*. 2013. Chapter author.
- Christine L. Oravec Award for Outstanding Scholarship in Environmental Communication, *National Communication Association*. 2010. Chapter author.

Top Papers

- *International Communication Association*. Environmental Communication Division. San Diego, CA. 2017.

- *International Communication Association*. Environmental Communication Division. Phoenix, AZ. 2012.
- *National Communication Association*. Environmental Communication Division. San Francisco, CA. 2010.
- *National Communication Association*. Environmental Communication Division. San Antonio, TX. 2006.
- *Western States Communication Association*. Environmental Communication Division. Monterey, CA. 2011.

TEACHING/MENTORING HONORS & AWARDS:

UNIVERSITY LEVEL:

UNM Presidential Teaching Fellow. Highest teaching honor at University of New Mexico. Lifetime achievement award & permanent title. Active, 2015-2017.

Outstanding New Teacher of the Year. Highest pre-tenure teaching honor at University of New Mexico. 2011.

DEPARTMENT LEVEL:

Student Advocate of the Year. 2014.

Top Faculty Service to Students Award. 2008.

GRANTS & FUNDING:

Mandela Washington Fellowship Academic and Leadership Institute (flagship program of President Obama's Young African Leaders Initiative) (\$250,000). Faculty co-investigator/instructor. University of New Mexico selected to bring 25 young African leaders for six-week institute. International Research and Exchanges Board (IREX) and United States Department of State. Granted 2017.

McCune Foundation grant (\$30,000). Faculty collaborator, MediaDesk NM: Communications Capacity Building for Non-Profit Sector. Pilot cooperative supporting local organizations in sustainability innovation. Granted 2013-2014.

University of New Mexico Office of Graduate Studies Recruitment Grant. (\$4,690). Grant Writer, Granted to department 2014.

United States Department of Agriculture (USDA) grant (\$290,000). Co-Investigator, Collaborative for Sustainable Foodshed Development. Granted 2010-2013.

Conservation Voters of New Mexico, The Wilderness Society, UNM Resource Center for Raza Planning in the School of Architecture and Planning (\$8,250). Principal Investigator. Connecting Community Voices research project. Granted 2008.

GRANT PROPOSALS UNDER REVIEW

University of New Mexico Women in STEM Faculty Development Fund. (\$10,000). Seed Award to stimulate research that will lead to additional funding. The Iceland Project. Submitted February 15, 2016.

National Science Foundation (NSF), Directorate for Education and Human Resources (EHR) Change Makers grant (\$2,053,500). “Urban agricultural networks as a resource for community based environmental STEM pedagogy.” Co-PI with PI John Carr and co-PI Christopher Lippitt. Four-year project. Submitted December 5, 2016. *Not granted.*

PUBLICATIONS:

BOOKS:

- **Milstein, T.,** Pileggi, M., & Morgan, E. (Eds.) (2017). *Environmental Communication Pedagogy and Practice*. London, UK: Routledge.

JOURNAL ARTICLES:

- **Milstein, T.** (2016). The performer metaphor: “Mother nature never gives us the same show twice.” *Environmental Communication*, 10 (2), 227-248. doi: 10.1080/17524032.2015.1018295
- **Milstein, T.,** & Pulos, A. (2015). Culture jam pedagogy and practice: Relocating culture by staying on one’s toes. *Communication, Culture, & Critique*, 8 (3), 395-413. doi: 10.1111/cccr.12090
- **Milstein, T.** (2013). Communicating “normalcy” in Israel: Intra/intercultural paradox and interceptions. *Tourism and Cultural Change*, 11 (1-2), 73-91.
- **Milstein, T.** & Dickinson, E. A. (2012). Gynocentric greenwashing: The discursive gendering of nature. *Communication, Culture, & Critique*, 5 (4), 510-532. doi 10.1111/j.1753-9137.2012.01144.x
- Chen, Y.W., **Milstein, T.,** Sandoval, J., Anguiano, C., & Knudsen, L. (2012). Challenges and benefits of community-based participatory research: A case of collaboratively examining ecocultural struggles in New Mexico. *Environmental Communication: A Journal of Nature and Culture*, 6 (3), 403-421. doi:10.1080/17524032.2012.698291

- **Milstein, T., & Kroløkke, C.** (2012). Transcorporeal Tourism: Whales, fetuses, and the rupturing and reinscribing of cultural constraints. *Environmental Communication: A Journal of Nature and Culture*, 6 (1), 82-100. doi:10.1080/17524032.2011.642079
 - **Milstein, T.** (2012). Survive, critique, and create: Guiding radical pedagogy and critical public scholarship with the discursive guideposts of ecopedagogy. *Green Theory and Praxis Journal*. 6 (1), 3-16.
 - **Anguiano, C., Milstein, T., De Larkin, I., Sandoval, J., & Chen, Y.W.** (2012). Connecting Community Voices: Using a Latino/a critical race theory lens on environmental justice advocacy. *Journal of International and Intercultural Communication*, 5 (2), 124-143. Doi: 10.1080/17513057.2012.661445
 - **Milstein, T., Anguiano, C., Sandoval, J., Chen, Y.W., & Dickinson, E.** (2011). Communicating a “new” environmental vernacular: A sense of relations-in-place. *Communication Monographs*, 78 (4), 486-510. doi: 10.1080/03637751.2011.618139
 - **Peterson, J., Milstein, T., Chen, Y.W., & Nakazawa, M.** (2011). Self-efficacy in communication: The development and validation of a sojourners’ scale. *Journal of International and Intercultural Communication*, 4 (4), 290-309.
 - **Milstein, T.** (2011). Nature identification: The power of pointing and naming. *Environmental Communication: A Journal of Nature and Culture*, 5 (1), 3-24. doi:10.1080/17524032.2010.535836
 - **Milstein, T.** (2009). ‘Somethin’ tells me it’s all happening at the zoo:’ Discourse, power, and conservationism. *Environmental Communication: A Journal of Nature and Culture*, 3 (1), 25-48. doi:10.1080/17524030802674174
 - **Milstein, T. & Manusov, V.** (2009). Oppositional discourse in Israeli media: Reflections of multiple cultural identities in coverage of the Rabin-Arafat handshake. *Howard Journal of Communications*, 20 (4), 353-369.
 - **Milstein, T.** (2008). When whales “speak for themselves”: Communication as a mediating force in wildlife tourism. *Environmental Communication: A Journal of Nature and Culture*, 2 (2), 173-192. doi:10.1080/17524030802141745
- Top Article Award: 2009 Christine L. Oravec Award for Outstanding Scholarship in Environmental Communication, National Communication Association**
- **Milstein, T.** (2008). The nature inside our heads: Exploring possibilities for widespread cultural paradigm shifts about nature. *Drain: Journal of Contemporary Art and Culture*, 10.

- Manusov, V., & **Milstein, T.** (2005). Interpreting nonverbal behavior: Representation and transformation frames in Israeli and Palestinian media coverage of the 1993 Rabin-Arafat handshake. *Western Journal of Communication*, 69 (3), 183-201.
- **Milstein, T.** (2005). Transformation abroad: Sojourning and the perceived enhancement of self-efficacy. *International Journal of Intercultural Relations*, 29 (2), 217-238.
- Howard, T., Carr, J., & **Milstein, T.** (2005). Digital technology and the market for political surveillance. *Surveillance & Society*, 3 (1), 59-73.

BOOK CHAPTERS:

- **Milstein, T.** & Griego, S. (2017). Environmental privilege walk: Unpacking the invisible knapsack. In Milstein, T., Pileggi, M., & Morgan, E. (Eds.), *Environmental Communication Pedagogy and Practice*. London, UK: Routledge.
- **Milstein, T.**, Alhinai, M, Castro, J., Griego, S., Hoffmann, J, Parks, M., Siebert, M. & Thomas, M. (2017). Breathing Life into Learning: Ecocultural Pedagogy and the Inside-Out Classroom. In Milstein, T., Pileggi, M., & Morgan, E. (Eds.), *Environmental Communication Pedagogy and Practice*. London, UK: Routledge.
- **Milstein, T.** (2012). Banging on the divide: Cultural reflection and refraction at the zoo. In E. Plec (ed.) *Perspectives on Human-Animal Interaction: Internatural Communication* (pp. 162-181). London, UK: Routledge.

Top Book Award: 2013 Christine L. Oravec Award for Outstanding Scholarship in Environmental Communication, National Communication Association

- **Milstein, T.** (2012). Greening Communication. In S.D. Fassbinder, A. J. Nocella II & R. Kahn (Eds.), *Greening the Academy: Ecopedagogy through the Liberal Arts* (pp. 161-174). Rotterdam, Netherlands: Sense Publishers.

Top Book Award: 2013 Critics Choice American Educational Studies Association

- Hall, D., Bernacchi, L., **Milstein, T.**, & Peterson, T.R. (2009). Calling all artists: Moving climate change from my space to my place. In D. Endres, L. Sprain, & T.R. Peterson (eds.) *Social movement to address climate change: Local steps for global action* (pp. 53-80). Amherst, NY: Cambria Press.

Top Book Award: 2010 Christine L. Oravec Award for Outstanding Scholarship in Environmental Communication, National Communication Association

- Sprain, L., Norton, T., & **Milstein, T.** (2009). Step It Up! and image politics in the Pacific Northwest. In D. Endres, L. Sprain, & T.R. Peterson (eds.) *Social*

movement to address climate change: Local steps for global action (pp. 281-308). Amherst, NY: Cambria Press.

- Howard, P., & **Milstein, T.** (2004). Spiders, spam, and spyware: New media and the market for political information. In M. Consalvo (Ed.) *Internet research annual: Selected papers from the Association of Internet Researchers conference* (pp. 18-26). 2000-2002, vol. 1. Bern, Switzerland: Peter Lang.

ENCYCLOPEDIA ENTRIES:

- **Milstein, T.** (2009). Environmental communication theories. In S. Littlejohn & K. Foss (eds.). *Encyclopedia of communication theory* (pp. 344-349). Thousand Oaks, CA: Sage.
- **Milstein, T.** (2007). Human communication's effects on relationships with animals. In M. Bekoff (Ed.), *Encyclopedia of human-animal relationships: A global exploration of our connections with animals* (Vol. 3, pp. 1044-1054). Westport, CT: Greenwood Publishing Group.

RESEARCH BLOGS:

- **Milstein, T.** (2016, May 31). Is nature really the greatest show on Earth? [Web log post]. Retrieved from <http://www.humansandnature.org/is-nature-really-the-greatest-show-on-earth>. Center for Humans & Nature.
- **Milstein, T.** (2015, November 13). From SeaWorld to the wild, a nature-as-performer metaphor holds sway [Web log post]. Retrieved from <https://theieca.org/blogs/alison-anderson/2015/11/17/seaworld-wild-nature-performer-metaphor-holds-sway>. International Environmental Communication Association/Taylor & Francis.

BOOK REVIEWS:

- **Milstein, T.** (2013). Book review: Arran Stibbe, *Animals Erased: Discourse, Ecology, and Reconnection with the Natural World*. *Discourse & Society*, 24 (4), 504-506. doi: 10.1177/0957926513486580
- **Milstein, T.** (2004). Book review: Howard Williams, *The ethics of diet: A catena of authorities deprecatory of the practice of flesh-eating*. *Ethics, Place, and Environment*, 7 (3), 216-219.

OTHER RESEARCH PUBLICATIONS:

- **Milstein, T.** (2017). From the Source. In K. Foss & J. Oetzel (eds) *Theories of Human Communication, 11th Edition*.

- **Milstein, T.**, Anguiano, C., Chen, Y. W., & Sandoval, J. (2010). *Hispanic environmental meanings and messages: Report to Conservation Voters of New Mexico and The Wilderness Society on research findings of the Connecting Community Voices study*. Albuquerque: University of New Mexico.
- **Milstein, T.** (2008). From pointing and naming to speaking for whales: A study of communicative acts as they inform human-nature relations. In B. Willard & C. Green (eds.) *Communication at the intersection of nature and culture: Proceedings of the ninth biennial Conference on Communication and Environment*. Chicago: College of Communication, DePaul University. 238-252.
- **Milstein, T.** (2007). Learning in the field: Engaging students via experience and application. *Ecologue*, Fall, 2-4.
- **Milstein, T.** (2004). Report on the presentation of IALIC and Language and Intercultural Communication to Annual Conference of the International Communication Association. *Language and Intercultural Communication*, 4 (3).

PUBLICATIONS IN PROCESS:

- Milstein, T., Thomas, M., & Hoffmann, J. (revise/resubmitted). Dams and flows: Immersing in environmental meaning systems in Western settings. *Environmental Communication*.
- Legesse, A., Milstein, T., Oda, O., & Regassa, A. (under review). “Tree is life:” The rising of dualism and declining of mutualism among the Gedeo of southern Ethiopia. *International Journal of Environmental Studies*.
- Carr, J., & Milstein, T. (under review). Keep burning coal or the manatee gets it: Rendering the carbon economy invisible through endangered species protection. *Antipode*.
- Sandoval, J., Anguiano, C., Chen, Y.W., & Milstein, T. (under review). La resolana: Storytelling and (re)connecting to place in the Connecting Community Voices project. *Journal of International and Intercultural Communication*.
- Milstein, T., Thomas, M., & Hoffmann, J. (in process). *Overcoming the Western nature-culture binary in the classroom*.
- Thomas, M., Milstein, T., & Hoffmann, J. (in process). *Troubling the nature-culture binary*.

- Hoffmann, J., Milstein, T., Thomas, M., & Carr, J. (in process). *City vs. nature: Western binary of urban living vs. environmental connectedness*
- Milstein, T. (in process). *"It is your job to entertain the dolphins:" Reversing the performer metaphor in swim-with wild dolphin tourism in New Zealand.*
- Milstein, T. (in process). *Orcas and 'dorcass': The cultural limits to expressing connection with nature.*

RESEARCH PRESENTATIONS (past 10 years):

- Milstein, T., & Lester, L. (2017, June-July). *Representational risks and opportunities in no-compromise direct environmental action: Sea Shepherd 40 years on.* Paper. International Environmental Communication Association Conference on Communication and Environment. Leicester, UK.
- Milstein, T. (2017, June-July). *Hegemonic Western anthropocentric identity and the disciplining of ecocentric identity.* Paper in the panel "The politics of ecological identity." International Environmental Communication Association Conference on Communication and Environment. Leicester, UK.
- Milstein, T., & Carr, J. (2017, June-July). *Endangered manatees and paradoxical practices: Finding and framing sanctuary in fossil fuel-fired power plants.* Paper in the panel "Critical animal and media studies: Communication for nonhuman animal advocacy in environmental contexts." International Environmental Communication Association Conference on Communication and Environment. Leicester, UK.
- Clarke, T., de Los Santos Upton, S., Marin, C., Milstein, T., Morgan, E., & Sowards, S. (2017, June-July). *Slowing down to engage what matters: A 'slow professor' dialogue for environmental communication scholars.* Panel. International Environmental Communication Association Conference on Communication and Environment. Leicester, UK.
- Siebert, M. & Milstein, T. (2017, June). *Lessons from the field: On-campus community food gardens.* Association for Environmental Studies and Sciences. Tucson, AZ.
- Legesse, A., Milstein, T., Ongaye, O., & Regassa, A. (2017, May). *"Tree is life:" The rise of dualism and the decline of mutualism among the Gedeo of Southern Ethiopia.* Paper. International Communication Association, San Diego, CA.

Top Paper: Environmental Communication Division

- Milstein, T., Thomas, M., & Hoffmann, J. (2017, May). *Dams and flows: Immersing in environmental meaning systems in Western settings*. Paper. International Communication Association, San Diego, CA.
- Milstein, T. (2017, May). *Environmental communication interventions*. Workshop panelist. International Communication Association, San Diego, CA.
- Milstein, T. (2017, March). *Constructing humanity's place in "the environment."* Featured speaker. Department of Geography and Environmental Studies Colloquium Series. University of New Mexico.
- Milstein, T. (2016, October). *Communication as Environmental Resource*. Featured speaker. University of Texas El Paso.
- Milstein, T. (2016, September). *Understanding the ecological power of communication: Culture & nature tourism contexts*. Featured speaker and webinar. Association of Polar Early Career Scientists.
- Milstein, T. (2016, June). *Greening communication*. Featured speaker. Sponsored by the Institute for Social Change and the Department of Journalism, Media, and Communications in the School of Social Sciences. University of Tasmania. Hobart, Australia.
- Milstein, T., Frohoff, T., Oriel, E., & Bridgeman, L. (2016, March). *How interspecies coastal communities inform conservation of shared ecosystems*. Featured speakers. National Center for Ecological Analysis and Synthesis. Santa Barbara, CA.
- Milstein, T. (2016, February). *Environmental communication: Constructing humanity's place in nature*. Featured speaker. Geography Seminar Series. University of Canterbury. Christchurch, New Zealand.
- Milstein, T. (2015, November). *What is environmental communication?* Featured speaker. Hawai'i Pacific University. Honolulu, HI.
- Milstein, T., Frohoff, T., Oriel, E., & Bridgeman, L. (2015, October). *Living with cetaceans: Interacting and cohabitating as mirrors of human relations with/in ecological systems*. Co-presenter with behavioral and wildlife biologist, conservation biologist, and executive director of Sonar. Santa Fe Institute. Santa Fe, NM.
- Milstein, T. (2015, June). *Boundary creatures and bridging divides*. Panelist. International Environmental Communication Association Conference on Communication and Environment. Boulder, CO.

- Castro, J., Griego, S., Hoffmann, J., Milstein, T., Parks, M., Siebert, M., Thomas, M. (2015, June). *Rediscovering querencia: Narratives of displacement and dwelling in ecocultural scholarship from the American Southwest*. Panel. International Environmental Communication Association Conference on Communication and Environment. Boulder, CO.
- Carr, J., & Milstein, T. (2015, April). *Of manatees and power plants: The naturalization of ecological destruction through environmental law and its discursive sites of protection*. Paper. Association of American Geographers. Chicago, IL.
- Milstein, T., Alhinai, M., Castro Sotomayor, J., Griego, S., Hoffmann, J., Perez Marin, M., & Siebert, M. (2014, November). *Ecocultural pedagogy and the inside-out classroom*. Panel. Environmental Communication Pedagogy and Practice Preconference Scholars Seminar. National Communication Association, Chicago, IL.
- Milstein, T., Alhinai, M., Castro Sotomayor, J., Griego, S., Hoffmann, J., Perez Marin, M., & Siebert, M. (2014, November). *Roundtable on pedagogy*. Chair and co-panelist. Environmental Communication Pedagogy and Practice Preconference Scholars Seminar. National Communication Association, Chicago, IL.
- Milstein, T. (2014, November). *Ethical and political sensibilities with/in the more than human world: Disciplining expressions of emotional connection to flora and fauna in Western settings*. In the panel "Giving Voice to Animals in Communication Research: Decentering the Human and Expanding the Compassion Footprint." National Communication Association, Chicago, IL.
- Milstein, T. & Pulos, A. (2014, November). *YouTube presents the culture jam dance: Relocating the practice and pedagogy of transformative communication*. Paper. National Communication Association, Chicago, IL.
- Carr, J., & Milstein, T. (2014, October). *Man vs. manatee: The legal framing of neoliberal environmental discourses*. Paper. Southwest Association of American Geographers. Albuquerque, NM.
- Milstein, T. (2014, May). *The performer metaphor: "Mother nature never gives us the same show twice."* Paper. International Communication Association, Seattle, WA.
- Milstein, T. (2013, May). *Critical theory, activism, and social transformation*. Panelist with Professor Charles Mills after Mills' keynote for University of New Mexico's Language, Literacy & Sociocultural Studies Lecture Series, Albuquerque, NM.

- Milstein, T. (2013, April). *A critical and community-based look into environmental communication and ecocultural change*. Featured speaker with activists Michelle Otero and Henry Rael. University of New Mexico's Language, Literacy & Sociocultural Studies Lecture Series (Critical Theory, Activism, and Social Transformation), Albuquerque, NM.
- Milstein, T. (2013, February). *Global localism: Creating campus community food gardens on the ground and online*. Co-chair and roundtable panelist. Western States Communication Association, Reno, NV.
- Milstein, T. (2013, February). *Idea to Article*. Well-published authors speak on how to take an idea and turn it into something publishable. Panelist. Western States Communication Association, Reno, NV.
- Milstein, T. (2013, February). *Food on film: Screening of Dirt!: The Movie*. Chair and roundtable panelist. Western States Communication Association, Reno, NV.
- Milstein, T. & Dickinson, E. A. (2012, October). *Gynocentric greenwashing: The discursive gendering of nature*. Presented in annual colloquium series in Department of Women's and Gender Studies at University of North Carolina at Chapel Hill, NC.
- Milstein, T. & Dickinson, E. A. (2012, May). *Gynocentric greenwashing: The discursive gendering of nature*. Paper. International Communication Association, Phoenix, AZ.

Top Paper: Environmental Communication Division

- Milstein, T. (2012, May). *Ecotourism, culture, and communication*. Colloquium presenter. Auckland University of Technology's New Zealand Tourism Research Institute. Auckland, NZ.
- Milstein, T. (2012, April). *Ecotourism and communication*. Featured speaker. Nelson Marlborough Institute of Technology's Ecotourism Management. Nelson, NZ.
- Milstein, T. (2012, March). *Interpretation in nature tourism*. Featured speaker. Nelson Marlborough Institute of Technology's Adventure Tourism. Nelson, NZ.
- Milstein, T. (2012, February). *How culture and communication shape our relations with nature*. Featured speaker. Nelson Luncheon Club. Nelson, NZ.
- Milstein, T. (2011, November). *Banging on the divide: Cultural reflection and refraction at the zoo*. Paper. National Communication Association, New Orleans, LA.

- Milstein, T. (2011, November). *"The neatest part I think is hearing the whale": Experiencing and interpreting nature's voice*. Paper. National Communication Association, New Orleans, LA.
- Milstein, T. & Dickinson, E. A., (2011, June). *The gynocentric-androcentric dialectic: Gendering nature in ocean and forest contexts*. In the panel "Environmental Dialectics: Exploring the Material-Symbolic Tensions of Human-Nature Relations." Conference on Communication and Environment, El Paso, TX.
- Milstein, T. (2011, March). *Communication strategies in Mexican gray wolf reintroduction*. In the panel "The Challenge of Mexican Wolf Recovery: Multi-Disciplinary Perspectives of Key Players." University of New Mexico Law School.
- Anguiano, C., Milstein, T., De Larkin, I., Sandoval, J., & Chen, Y.W. (2011, February). *Connecting Community Voices: Using Latino/a critical race theory to analyze environmental justice coalitions in New Mexico*. Paper. Western States Communication Association, Monterey, CA.

Top Paper: Environmental Communication Division

- Milstein, T., & Kroløkke, C. (2010, November). *Transcorporeal tourism: Whale watching, fetus watching, and the rupturing and reinscribing of cultural constraints*. Paper. National Communication Association, San Francisco, CA.

Top Paper: Environmental Communication Division

- Milstein, T., Anguiano, C., Sandoval, J., & Chen, Y.W. (2010, November). *Relations-in-place: Identifying an ecocultural premise*. Paper. National Communication Association, San Francisco, CA.
- Chen, Y.W., Milstein, T., Sandoval, J., & Anguiano, C. (2010, November). *Challenges and benefits of community-based participatory action research: A case of collaboratively examining environmental struggles in New Mexico*. Paper. National Communication Association, San Francisco, CA.
- Sandoval, J., Chen, Y.W., Milstein, T., & Anguiano, C., (2010, November). *La Resolana: An exploration of a new narrative paradigm in the Connecting Community Voices collaboration*. Paper. National Communication Association, San Francisco, CA.
- Milstein, T. (2010, February). *Pan-American Nature: Culture, Communication, and Borderland Whales*. Featured speaker. Monthly meeting of Pan-American Round Table (PART), Albuquerque, NM.
- Milstein, T., Anguiano, C., Chen, Y.W., Dickinson, E., Rucker, I., Sandoval, J., Knudsen, L., Otero, M., Benavidez, J., Martinez, J., Sandoval, A., & Rael, H. (2009, November). *Environmental communication and community participatory*

action research with US Southwest Hispanic communities. Paper. National Communication Association, Chicago, IL.

- Milstein, T. (2009, November). *Critical directions and emerging theoretical trends: Environmental communication five years out.* Panelist. National Communication Association, Chicago, IL.
- Milstein, T., Anguiano, C., Chen, Y.W., Dickinson, E., Rucker, I., Sandoval, J., Knudsen, L., Otero, M., Benavidez, J., Martinez, J., Sandoval, A., & Rael, H. (2009, June). *Connecting communities through environmental communication and empowerment: Examining local Hispanic environmental meaning systems in the US Southwest.* Paper. Conference on Communication and Environment, Portland, ME.
- Milstein, T. (2009, June). *Orcas and 'dorcass': The cultural limits to expressing emotional connection with nature.* Panelist. Conference on Communication and Environment, Portland, ME.
- Milstein, T. (2009, October). *Ideology in environmental communication.* Panelist. University of New Mexico Cultural Studies Panel "What is Ideology?" Albuquerque, NM.
- Milstein, T. (2008, November). *Whale of a 'show' or 'encounter?' Lived metaphor and eco-cultural experience.* Paper. National Communication Association, San Diego, CA.
- Milstein, T. (2008, September). *Ecocultural conversations: Killer whale tales and other discourses of human-nature relations.* Colloquium presenter. UNM's Communication and Journalism Department, Albuquerque, NM.
- Milstein, T. (2008, February). *Animal discourse: Reflexively redirecting human-nature relations.* Paper. Invited response following Marc Bekoff's lecture, *Animal passions and beastly virtues: Reflections on redecorating nature* at University of New Mexico Law School.

Research presentations previous to past decade available upon request.

LEADERSHIP & SERVICE:

TRANSDISCIPLINARY:

Steering Committee. International Ecolinguistics Association. 2017-present.

Steering Committee. The Iceland Project. 2016-present.

Fulbright U.S. peer review committee. Grant applications to Australia and New Zealand. Washington, DC. 2014.

Fulbright U.S. peer review committee. Grant applications to New Zealand. Washington, DC. 2013 & 2012.

Panel chair. “Food justice and food futures.” *Decolonizing Nature: Resistance/Resilience/Revitalization* (<http://decolonizingnature.unm.edu/>), transdisciplinary environmental justice conference. National Hispanic Cultural Center, Albuquerque, NM.

Course presenter. “Transforming ecoculture to counter climate disruption: Communicating the global small-scale food growing movement.” In *Communicating to Inspire Change: Food Security and Sustainability, United Nations’ Headquarters for Food and Agriculture (FAO)* and *John Cabot University*. Rome, Italy. July 2015.

Facilitator/presenter with John Carr. “Teaching smarter, not working harder: Effective pedagogy in changing cultural and educational contexts.” *School of Land and Food, University of Tasmania*. Hobart, Australia. May 2016.

Workshop presenter. “Turn your classroom inside out: Pedagogy and free writes.” *Institute for the Study of Social Change & School of Social Sciences, University of Tasmania*. Hobart, Australia. June 2016.

Workshop presenter. “Sustainability, place-based learning, and the campus garden as a learning laboratory.” *Center for Scholarship & Teaching, St. Martin’s College*, Olympia, WA. May 2014.

DISCIPLINARY:

ASSOCIATIONS:

Board of Directors. International Communication Association. Directed monthly newsletter column, networking sessions, workshops, orientation seminars, presentation panels, and grand-scale graduate student receptions at annual conference. 2004-2006.

Co-Chair, International Communication Association Student Affairs Committee. Selected and facilitated international committee members in shaping ICA graduate student agenda. 2004-2006.

Immediate-Past Chair. Environmental Communication Interest Group. Founding committee. *Western States Communication Association*. 2007-2008.

Teaching Committee. Environmental Communication Division. *National Communication Association.* 2016-present.

RESEARCH:

Faculty Sessions Leader. *National Communication Association's Doctoral Honors Seminar.* University of Maine. 2013.

Editorial Board

- *Environmental Communication: A Journal of Nature and Culture.* 2010-present.
- *Frontiers in Science and Environmental Communication.* 2016-present.
- *Green Theory and Praxis: The Journal of Ecopedagogy.* 2008-present.
- *Journal of International & Intercultural Communication.* 2014-2015. (Guest editorial board special issue on intercultural nonprofit partnerships.)
- *Kaleidoscope: A Graduate Journal of Qualitative Communication Research.* 2005-present.
- *Language & Ecology.* 2004-present.
- *Peace Studies Journal.* 2009-present.
- *Western Journal of Communication.* 2014-present.

Review Board. *Citizen Critics.* Sustainability Desk. www.citizencritics.org. 2017-present.

Advisory Board. Monograph Series: Environmental Communication and Nature: Conflict and Ecoculture in the Anthropocene. *Rowman and Littlefield.* 2016-present.

Book Proposal Reviewer

- *Ecological Entanglements in the Anthropocene: Working with Nature.* Lanham, MD: Lexington Books/Rowman & Littlefield. 2016.
- *Strategic Environmental Communication: Science and Story.* By Lisa Leombruni. Oakland, CA: University of California Press. 2016.
- *Sustainability/Story: Principles, Plots, Practice; Acts of Hope for Troubled Times,* By Mimi Stokes-Katzenbach. London, UK: Routledge. 2015.
- *Ecolinguistics,* by Arran Stibbe. London, UK: Routledge. 2012.
- *Ecofeminism and Ecotourism: Phenomenology of Gender, Race, Class, and the Environment,* by Stacey K. Sowards. New York, NY: Berghahn Books. 2012.
- *Writing Right in the Environmental Sciences: Communicating with Government Regulators and the Community,* by Carolyn Boiarsky & Susan Cook. Boulder, CO: University Press of Colorado. 2011.

Chapter Reviewer

- *Handbook of Sustainability Literacy in Education.* 2009.

Textbook Reviewer

- *Communication: A Critical/Cultural Introduction, 2nd Edition*, by Warren and Fassett. May 2013. February 2013.
- *Communication: A Critical/Cultural Introduction, 1st Edition, and input on 2nd Edition revision plan*, by Warren and Fassett. 2011.
- *Human Communication in Society, 3rd Edition*, by Alberts, Nakayama, and Martin. 2010.
- *Human Communication in Society, 2nd Edition*, by Alberts, Nakayama, and Martin. 2008.

Ad Hoc Journal Article Reviewer

- *Communication, Culture, & Critique*. 2008.
- *Communication Yearbook*. 2012.
- *Environmental Communication: A Journal of Nature and Culture*. (Editorial Board 2010-present), 2010, 2009, 2008.
- *Geoforum*, 2015.
- *Health Communication*, 2015.
- *International and Intercultural Communication*. 2014, 2012, 2011 (multiple), 2010 (multiple), 2009, 2008.
- *Kaleidoscope: A Graduate Journal of Qualitative Communication Research*. (Editorial Board 2010-present). 2008, 2003.
- *Language and Intercultural Communication*. 2006, 2005, 2004.
- *Southern Communication Journal*. 2015, 2014.
- *Tourism and Cultural Change*. 2010.
- *Tourism in Marine Environments*. 2016.
- *Western Journal of Communication*. (Editorial Board 2014-present). 2013, 2008.

Grant Reviewer

- Human-Animal Studies Fellowship (for professors and PhD candidates), *Animals and Society Institute*. 2011.

Conference Reviewer

- *National Communication Association* Environmental Communication Division competitive papers & panels: 2016 Philadelphia, PA; 2015 Las Vegas, NV; 2014 Chicago, IL; 2013 Washington DC; 2012 Orlando, FL; 2011 New Orleans, LA; 2010 San Francisco, CA; 2009 Chicago, IL; 2007 Chicago, IL; 2005 Boston, MA.
- *International Communication Association* Environmental Communication Division competitive papers & panels: 2017 San Diego, CA; 2016 Fukuoka, Japan; 2015 San Juan, Puerto Rico; 2014 Seattle, WA; 2013 London, UK; 2012 Phoenix, AZ.
- *International Environmental Communication Association Conference on Communication and the Environment* competitive papers & panels: 2017 Leicester, UK; 2015 Boulder, CO; 2013 Uppsala, Sweden; 2011 El Paso, TX.
- *Western States Communication Association* Environmental Communication Division competitive papers & panels: 2017 Salt Lake City, UT; 2014 Anaheim,

CA; 2013 Reno, NV; 2012 Albuquerque, NM; 2011 Monterey Bay, CA; 2010 Anchorage, AL.

- *Eastern Communication Association*. Intercultural Communication Division competitive papers & panels: 2013 Pittsburg, PA.

- *World Congress of Applied Linguistics* hosted by American Association of Applied Linguistics, Language and Ecology Division: 2005 Madison, WI.

Conference Panel Organizer/Chair

- *Roundtable on pedagogy*. Environmental Communication Pedagogy and Practice Preconference Scholars Seminar. National Communication Association, Chicago, IL. November 2014.

- *Ecocultural pedagogy and the inside-out classroom*. Environmental Communication Pedagogy and Practice Preconference Scholars Seminar. National Communication Association, Chicago, IL. November 2014.

- *Global localism: Creating campus community food gardens on the ground and online*. Western States Communication Association, Reno, NV. February 2013.

- *Environmental Dialectics: Exploring the Material-Symbolic Tensions of Human-Nature Relations*. Conference on Communication and Environment, El Paso, TX. June 2011.

- *Eco-cultural manifestations and reverberations: Discursively negotiating the human-environment nexus*. Conference on Communication and Environment, Portland, ME. June 2009.

- *Re-encountering nature: Questioning conventional discourse, seeking the unconventional*. National Communication Association, San Diego, CA. November 2008.

- Chair. *Global holy, heritage, and slave tourism*. Language and Global Communication Conference. Cardiff University. Wales, United Kingdom. July 2005.

UNIVERSITY:

Affiliated Faculty. University of New Mexico.

- *Geography and Environmental Studies Department*. 2014-present.
- *Sustainability Studies Program*. 2007-present.
- *Water Resources Program*. 2009-present.

University Sustainability Council. University of New Mexico. 2017-present.

Faculty Pedagogy Workshop Leader. *Turning the Classroom Inside-Out*. Center for Teaching Excellence. Fall 2016. Fall 2015.

Executive Board Member. *Women Studies Program*. University of New Mexico. 2007-2010.

Board Member. *Lobo Gardens*. University of New Mexico. 2009-present.

Caucus Member, UNM Faculty Women's Caucus. 2012-present.

Board Member. Collaborative for Foodshed Development. University of New Mexico. 2010-2014.

Selection Committee, Presidential Teaching Fellow and Outstanding New Teacher of the Year Awards. University of New Mexico. 2017. **Outstanding New Teacher of the Year Award.** University of New Mexico. 2012-2013.

Founding Member, New Mexico Animal Studies Group. UNM and Central New Mexico Community College collaborative dedicated to promoting cross-disciplinary dialogue within university and with community and advocacy groups. 2011-2015. <http://nmanimalstudiesgroup.com/>

Faculty Position Search Committee

- Sustainability Studies Program Lecturer II position. 2017.

Guest Lecturer

- Speaker representing faculty. Campus-wide graduate student Jump Start Orientation by Graduate Resource Center and Office of Graduate Studies. Fall 2016. Winter 2015. Fall 2014. Summer 2014. Student Union Ballroom.
- Environmental sustainability, communication, and Lobo Gardens. Dr. Ric Richardson's Community and Regional Planning Methods course. Fall 2012.
- Panelist. Dr. Melinda Harm Benson, "Geographies of Mt. Taylor: The legal, political, and cultural implications of proposed uranium mining development in one of New Mexico's most sacred spaces." UNM Alfonzo Ortiz Center for Intercultural Studies symposium. 2010.

Creator/facilitator, "Book Author Roundtable" for campus-wide faculty interested in writing first books. University of New Mexico. 2013.

Founding Member. Transdisciplinary Research Group. University of New Mexico. 2008-2010.

Faculty advisor for campus student organizations

- Lobo Community Gardens Club. 2016-present.
- UNM Acrobatics Club. 2010-present.
- Vegetarians and Vegans of UNM. 2010-2012.

Founder/Director. University of Washington Nature, Culture, and Public Scholarship Research Collaborative. Crossdisciplinary network of 50+ faculty, graduate students, and practitioners in interdisciplinary and applied ecocultural research. Listserv and met regularly at UW Simpson Center and field sites; committed to dialogue among professionals and scholars from more than a dozen disciplines. University of Washington. 2004-2007.

DEPARTMENT:

Executive Committee. 2016-2017.

PhD Program Director. 2013-2015.

PhD committee. 2013-2015 (chair). 2012-2013.

Graduate Program Associate Director. 2012-2013.

Organizer, Environmental Communication Bachelor Degree emphasis for department. 2012-2013. Emphasis in effect as of Spring 2014.

Scholarship & Awards committee. 2016-2017 (chair).

Intercultural Engagement committee. 2013-2014. Fall 2010.

Organizer, Scholar Visits

- Dr. Donal Carbaugh, University of Massachusetts Amherst. Close Ecocultural Encounters with Dr. Donal Carbaugh: A 2-day workshop at UNM with a public lecture, a methodology workshop, and a field study. Spring 2014.
- Dr. Stacey Sowards, University of Texas El Paso, and seven visiting scholars from Indonesia, including the College of Forestry at the University of Mulawarman, Samarinda, East Kalimantan: Public talk titled Culture, Society, and Environment in Indonesia. Spring 2014.

Faculty Mentoring committee. 2012-2013.

Web Site-Public Relations committee. 2015-2016, 2014-2015 (editor), 2013-2014 (editor), 2012-2013 (chair, editor), 2011-2012 (editor), 2010-2011 (editor).

Web Site Redesign Task Force. 2015 (chair).

Hospitality committee. 2015-2016, 2014-2015.

Faculty course coordinator

- C&J 478 Media Theory & Research. 2017.
- C&J 438 Communicating Lobo Gardens. 2013-2016.
- C&J 365 History of Media. 2017.
- C&J 318 Language, Thought, and Behavior. 2011-2013.
- C&J 314 Intercultural Communication. 2012-2013.
- C&J 101 Intro to Communication. 2013-2014, 2007-2012.

Faculty Matrix. Originated and maintain research interest matrix for C&J faculty, for use in collaboration, graduate program information, etc. 2008-present.

Graduate brochure, editor/writer. Spring 2014, Fall 2012.

New Faculty Mentor

- Myra Washington, 2012-2013.
- Shana Heinricy, 2010-2011.

Faculty Position Search Committee

- Intercultural Communication Assistant Professor position. 2011-2012.
- Lecturer II in Multimedia position. 2012.
- Visiting Lecturer in Communication. Spring 2010.
- Health Communication Open Rank position. 2007-2008.

Community Relations Committee. 2011-2012 (chair). 2009-2010.

Department Colloquium Series. 2009-2010 (chair).

Graduate Program Committee (combined MA-PhD committee). 2007-2009.

Faculty Merit/Work Productivity Committee. 2008-2009 (co-chair).

Faculty Adviser. Graduate Student-generated Enviro Crew/Green Team. 2009-2012.

Guest Lecturer

- Dr. David Weiss'/ Dr. Shinsuke Eguchi's PhD professionalism seminar. Spring 2017. Fall 2016.
- Dr. Judith Hendry's senior seminar. Graduate school. Fall 2014. Fall 2013.
- Dr. Shinsuke Eguchi's grad seminar. Ecoculture, faculty-student work. Fall 2012.
- Dr. Patricia Covarrubius' grad seminar. Environmental metaphors. Spring 2011.
- PhD Professionalism Seminar: environmental communication, April 2013. conferences, April 2010; evaluator, end-of-semester colloquium, April 2010; research programs, February 2010; team research projects, October 2008
- Dr. Ilia Rodriguez's grad seminar: Qualitative software, August 2010.

New Graduate Curriculum course committees: Culture, Change, and Sustainability (lead member); Methods: Fieldwork; Methods: Textual Analysis; Methods: Practicum. Summer 2009. Intercultural Communication Graduate Curriculum Taskforce. Fall 2009.

TEACHING EXPERIENCE:

UNIVERSITY OF NEW MEXICO (Albuquerque, NM)

**Ecocultural Communication: Humans & “The Environment”
(C&J 313)**

Undergraduate course on intersections of society, culture, and environment. Fall 2017, Fall 2016, Fall 2015, Fall 2014, Spring 2014, Spring 2013, Spring 2010.

**Ecocultural Places and Spaces: Borders and Transformations
(C&J 519/502)**

Graduate intensive field study-based course explores ecocultural and discursive negotiations of place and space, with a focus on issues of cultural-spatial re/production and transformation. Themes include naturalizing, touring, reclaiming, greening. Fall 2017, Fall 2015, Spring 2009.

**Ecoculture, Sustainability, and Change
(C&J 517/502)**

Graduate seminar and field study course explores cultural and discursive ways humanity informs, shapes, and shifts ecological relations, focusing on local and global environmental contexts and issues of sustainability. Fall 2016, Spring 2015, Spring 2013, Fall 2008.

**Communicating Community, Food, and Change: Lobo Gardens
(Sustainability Studies 438/C&J 438)**

Hybrid undergraduate-graduate service learning and field study-driven course on community food gardens, growing food sustainably, and food justice. Spring 2017, Summers 2013, 2012, 2011, 2010.

**PhD Professional Seminar
(C&J 509)**

Prepares PhD students in ethical professional development, publishing and flourishing, and public and transformative scholarship and pedagogy. Spring 2015, Fall 2014, Spring 2014.

**Language, Thought, and Behavior
(C&J 318)**

Undergraduate theory course aligned with UNM Research Service Learning Program, Fall 2013, Fall 2012, Fall 2011, Fall 2010.

**Intercultural Communication
(C&J 314)**

Core course for undergraduate intercultural communication students. Spring 2017, Fall 2012, Fall 2009.

**Introduction to Communication
(C&J 101)**

Large undergraduate lecture with TA and 12 student peer facilitators. Spring 2010, Spring 2009 (ITV enhanced), Spring 2008, Fall 2007.

Critical and Cultural Studies (C&J 506)

Graduate methodology course. Fall 2011, Fall 2009, Fall 2007.

Independent studies:

Undergraduate (C&J 490):

Lena Skipper, futures in ecocultural communication. Spring 2014.

Taylor Blueher, Lobo Gardens. Spring 2014.

Cole LaRue Howard, Brazil human trafficking/World Cup. Fall 2013.

Joe Paul Castillo, local foodsheds. Fall 2011.

Alyssa Concha, honors student-teacher communication. Summer 2011.

Stephen Griego, Nuevo Mexicano environmental discourse. Summer 2010.

Travis Lilley, culture and community farm networks. Summer 2010.

Graduate (C&J 593):

Melissa Francis, ecocultural research and writing. Spring 2017.

Maryam Alhinai, ecocultural ethnographic research methods. Spring 2017.

Edward Williams, ecocultural pedagogy. Fall 2016.

Melissa Francis, nature, women, and horror films, Fall 2016.

Mariko Thomas, medicinal wild plants and ecoculture. Summer 2016.

Melissa Parks, ecocultural literature, pedagogy, Fall 2015.

Mariko Thomas, ecocultural pedagogy, meaning. Fall 2014.

Jeff Hoffmann, ecocultural pedagogy, meaning. Fall 2014.

José Castro, ecocultural pedagogy and Ecuador. Spring 2014.

Olivia Hawkins, local food systems. Spring 2013.

Jason Boys, ecocultural ethnography. Spring 2013. Fall 2012.

Ricky Hill, focus area readings. Fall 2012.

Carmen Lowry, focus area readings. Summer 2012.

Stephen Griego, qualitative research methods. Summer 2012.

Mona Angel, Lobo Gardens. Summer 2012.

Brittany Stone, qualitative research methods. Spring 2012.

Mona Angel, Lobo Gardens. Summer 2011.

Brendan Picker, public space and Lobo Gardens, Fall 2010.

Lora Roberts, Lobo Gardens. Summer 2010.

Antonio Lopez, PhD Candidate Course Mentor, Prescott College student. Spring 2010.

Jennifer Sandoval, research in environmental communication. Spring 2009.

Nichole Carnevale, ecoculture graduate course creation. Spring 2009.

Jennifer Sandoval, community-engaged collaborative research. Fall 2008.

Several C&J PhD and MA students, academic submission/publication. Resulted in publications in top journals, seeded student-organized colloquium on publishing, launched discipline-wide website to support grad/faculty publication. Spring 2008.

Internship in Communication Education (C&J 491)

Mentor/oversee 12 students in small group facilitation for C&J 101. Spring 2014, Fall 2013, Fall 2012, Fall 2011, Fall 2010, Spring 2010, Spring 2009, Spring 2008, Fall 2007.

JOHN CABOT UNIVERSITY (Rome, Italy)

**Intercultural Communications
(CMS 280)**

Condensed undergraduate course. International students. Summer 2015

PORTLAND STATE UNIVERSITY (Portland, OR)

**Communication & Sustainability
(CMU 399)**

Condensed undergraduate course to launch Department of Communication's efforts to create sustainability focus. Fall 2009

UNIVERSITY OF WASHINGTON (Seattle, WA)

**Culture, Communication, and the Human Relationship with Nature
(Contemporary History of Ideas 270)**

Fall 2007. Stand-alone instructor.

**The World in Motion: Animation in Theory and Practice
(Humanities 203)**

Spring 2007. Teaching Assistant.

**The Cultural Impact of Information Technology
(CHID 370)**

Winter 2007. TA.

**Communication, Media, and Cultural Difference
(Com 495)**

Spring 2006. TA.

**Introduction to Communication II
(Com 202, culture & communication)**

Winter 2006. TA.

**Becoming Strangers: Travel, Trust, and the Everyday
(Hum 201, interdisciplinary)**

Fall 2005. TA.

**Interpersonal Communication
(Com 270)**

Spring 2005; Fall 2004. Stand-alone instructor.

**Introduction to Communication I
(Com 201, culture & media)**

Winter 2005; Winter 2003. TA.

**Introduction to Public Speaking
(Com 220, inform, persuade, and protest)**

Spring 2004, Fall 2003. Stand-alone instructor.

**UNIVERSITY OF COLORADO AT DENVER'S
INTERNATIONAL COLLEGE AT BEIJING (Beijing, China)**

Intercultural Communication, Public Speaking

Undergraduate courses. Stand-alone instructor. Chinese and Mongolian students.
November 2001 - January 2002

UNIVERSITY OF NEW MEXICO

Intercultural Communication.

Fall 2001. Stand-alone instructor.

Interpersonal Communication

Fall 2000. Stand-alone instructor.

Public Speaking

Spring 2000, 2001. Stand-alone instructor.

Writing for the Mass Media II

Spring 1999, Fall 1999, Spring 2000. Stand-alone instructor.

Writing for the Mass Media I

Fall 1998. Stand-alone instructor of writing sections.

MENTORSHIP:

CURRENT PHD STUDENTS:

- **Adviser, UNM C&J, José Castro Sotomayor.** José's in-progress dissertation is titled "Translating global nature in transboundary sites: Environmental discourses of place and space between Ecuador and Colombia." 2014-present.

- **Adviser, UNM C&J, Mariko Thomas.** Mariko's research focuses on ecoculture, identity, plant knowledges, and access to the wild. 2014-present.
- **Adviser, UNM C&J, Jeff Hoffmann.** Jeff's research focuses on ecoculture, discourses of sustainability, and urban settings. 2015-present.
- **Adviser, UNM C&J, Edward Williams.** Ed, a public radio investigative reporter, is focused on ecoculture and social and environmental justice. 2015-present.
- **Committee Member, UNM C&J, Maggie Siebert.** Maggie studies food justice, health, and environmental communication. 2013-present.
- **Committee Member, UNM C&J, Stephen Griego.** Stephen focuses on ecoculture, heritage, food, and the world's largest matanza festival, in Belen, NM. 2014-present.
- **Committee Member, UNM C&J, Lissa Knudsen.** Lissa is focused on activism, women's health, and political communication. 2010-present.

CURRENT MA STUDENTS:

- **Adviser, UNM C&J, Melissa Francis.** Melissa's interests are in gender, nature, and media, with a specific focus on horror films, the wild, and women. 2016-present.
- **Committee Member, UNM Community and Regional Planning, Jake Foreman.** Jake is focused on culture, social justice, and food. 2012-present.

GRADUATED PHD STUDENTS:

- **Adviser, UNM C&J, Maryam Alhinai.** Dissertation: Humanature relations in Oman: Connections, disconnections, and globalization. *Graduated May 2017.*
- **Adviser, UNM C&J, Ricky Hill.** Dissertation: Trans/formations: A photovoice assessment of transgender people's wellness. *Graduated December 2016.*
- **Adviser, UNM C&J, Carmen Lowry.** Dissertation: Traversing invitational spaces: The beautiful Iraqi women project. *Graduated July 2013.*
- **Committee Member, UNM C&J, Sarah Upton.** Dissertation: Constructing the conspiring community: Using practices of invitational rhetoric to create sustainable solutions to community-identified needs. *Graduated May 2014.*

- **Committee Member, Prescott College, Antonio Lopez.** Dissertation: Greening the media literacy ecosystem: Situating media literacy for green cultural citizenship. *Graduated May 2013.*
- **Committee Member, UNM C&J, Brandi Lawless.** Dissertation: Ending poverty? Critical interrogations of class subjectivities, agency, and ideologies in discursive and embodied texts from a US nonprofit. *Graduated May 2012.*
- **Committee Member, UNM C&J, Claudia Anguiano.** Dissertation: Undocumented, unapologetic, and unafraid: Analyzing the discursive strategies of the DREAMer immigrant youth movement. *Graduated May 2011.*
- **Committee Member, UNM C&J, Elizabeth Dickinson.** Dissertation: Constructing, consuming, and complicating the human-nature binary: Communication practices in forest environmental education. *Graduated May 2010.*

GRADUATED MA STUDENTS:

- **Adviser, UNM C&J, Melissa Parks.** Thesis: Ecocultural adjustment: A Peace Corps sojourn. *Graduated June 2016.*
- **Adviser, UNM C&J, Jeff Hoffmann.** Thesis: “Organic is more of an American term... We are *traditional* farmers”: Discourses of place-based organic farming, heritage, and sustainability. *Graduated June 2014.*
- **Adviser, UNM C&J, Jason Boys.** Thesis: Tensions in (agri)culture: The negotiation of environmental dialectics at an urban farmers’ market. *Graduated July 2013.*
- **Adviser, UNM C&J, Kenneth Lythgoe.** Thesis: Over and under the rainbow: A (queer) rhetorical analysis of the Rainbow Sash Movement and Rainbow Sash Alliance. *Graduated August 2011.*
- **Committee Member, UNM Geography & Environmental Studies, Aaron Russell.** Thesis: Solar powered discourse analysis: Using Q-methodology to evaluate perceptions of solar energy projects in San Luis Valley. *Graduated May 2017.*
- **Committee Member, UNM C&J, Avery Myers-Regulinski.** Thesis: A rainbow with one color. *Graduated May 2017.*
- **Committee Member, UNM C&J, TJ Martinez.** TJ created an ecocultural film documentary thesis project focused on sacred agricultural ritual in Northern New Mexico. *Graduated May 2014.*

- **Committee Member, UNM Geography & Environmental Studies, Crystiana Baca-Bosilijevac.** Thesis: Connecting people and place: Farmers, resilience, and the future of smallholder farms in Albuquerque. *Graduated May 2014.*
- **Committee Member, UNM Geography & Environmental Studies, Stephen Griego.** Thesis: Restaurant regions: An ecological community based model of restaurant chain distribution in the United States. *Graduated July 2013.*
- **Committee Member, UNM Community and Regional Planning (CRP), Mona Angel.** Thesis: The Lobo Gardens Extreme Local project: Cultivating place within the institutional framework of the University of New Mexico. *Graduated June 2013.*
- **Committee Member, UNM CRP, Lora Roberts.** Thesis: Farm to restaurant Albuquerque: Recommendations for implementation. *Graduated May 2012.*
- **Committee Member, UNM CRP, Brendan Picker.** Thesis: Community Collaboration: Design recommendations for a gay, lesbian, transgender, and questioning community center in Albuquerque, NM. *Graduated August 2011.*
- **Committee Member, UNM CRP, Michael Redondo.** Thesis: Natural resource planning in Wounaan communities: A rapid assessment of planning issues in Rio Hondo, Panama. *Graduated May 2011.*

PAST UNDERGRADUATE STUDENTS:

Internship faculty sponsor:

- Yolanda Ramirez Piñela, Spanish-language radio. Spring 2011.
- Eric Esparza's, Office of the State Engineer/Interstate Stream Commission. Spring 2009.

Thesis Adviser: University of Washington Comparative History of Ideas program, 2006-2007.

- Jennifer Estes: intercultural immersive travel, interviewed sojourners, created and performed a one-woman show based on her research.
- Brett Zimmerman: environmental autoethnography of rural and urban senses of place, the embodied dialectic of belonging versus ownership.
- Erin McGee: activist project on collectively run organizations included creation of a grocery cooperative for her low-income urban neighborhood.

Research Mentor: Trained UW Communication majors in database research, coding, transcription for research on culture, discourse, and environment.

- Ben Sommers, Jackie Jensen, Michelle Zimmer, Grace MacMillan (Winter 2007)
- Gerardo Fernandez, Michelle Labuwi, Grace MacMillan (Fall 2006)
- Kristine Mroczek, Ashley Graeber (Spring 2006)

PUBLIC SCHOLARSHIP & PEDAGOGY:

Pro Bono Consultant

- *Sea Shepherd*. Representations of organization and direct action environmental and species campaigns. 2016.
- *Conservation Voters of New Mexico*. Messaging to Hispano communities. May 2013.
- *350.org New Mexico*. Messaging for current campaigns. March 2013.
- *The Graceful Descent* documentary. Framing and messaging in New Zealand-based sustainability and permaculture film. December 2012.
- *Practicing Engaged Presence*. Enriching improv-based communication workshops. December 2012.
- *Wild Earth Guardians*. Public reframings of endangered and reintroduced Mexican Gray Wolves. September 2011.
- *Hablamos!*, annual event of La Semilla Institute to engage local schools in environmental research to build community, innovative approaches to environment, and cross-cultural and intergenerational awareness. 2007-2009.

Media Outreach & Coverage

- Expert media source, *Animals and Media: A Style Guide for Giving Voice to the Voiceless*. Source for journalists and filmmakers for fair and respectful coverage of nonhuman animal lives. 2015-present.
- Article and presentation coverage. On overcoming the human/nature binary. *Sonar*. <http://wearesonar.org/2016/04/28/overcoming-human-nature-binary/>. April 28, 2016.
- Featured article. “Green Issue: New Course Explores Ecology and Communication.” *Daily Lobo*. <http://www.dailylobo.com/article/2016/04/18-nature-communications-course>. April 18, 2016.
- Advisory committee. Film documentary on ecocultural issues around wild horses in New Mexico. Director Adan Garcia. 2013-2015.
- Interviewee. *The Bosque Beast*, article “How to Think about Animals.” June/July 2013 issue.
- Interviewee. *Stories of Wolves: The Lobo Returns*, documentary on Mexican Gray Wolf recovery by Elke Duerr. Film released 2011.
- Interviewee. Series “teaching and learning sustainability.” Aired on public radio NPR-affiliate KUNM 89.9. Albuquerque, NM. March 29, 30, and 31, 2010.
- Frontpage coverage on ecocultural study for which I was PI. Bilingual newspaper *Mas New Mexico*. January 2009.
- Scholar spotlight. Ecotourism and environmental relations. Public radio interview. *Fresh FM* (99.4 FM, 95.4 FM, 88.4 FM). Nelson, New Zealand. September 2007.

- “Foreign Expert” TV talk show guest on intercultural rituals. *China Central Television* (all-English channel, CCTV 9). 200 million+ viewers. Beijing, China. December 2001.

Applied & Community-Based Research

- Advisory Board member, *Sonar*. <http://wearesonar.org/>. 2015-present.
- Principal Investigator. Collaborated with nonprofit organizations, including *Conservation Voters of New Mexico*, *The Wilderness Society*, *Arts of Aztlan*, and *UNM Resource Center for Raza Planning*. Project aimed at identifying Hispano connections to environment and helping organizations shape sustainable ecocultural messages and policy. 2008-2013.
- Board member. *Connecting Community Voices*. Nonprofit emerged from community-based participatory action research project detailed above. 2010-present.
- Workshop presenter. Prepared Canadian and American tour boat naturalists for summer season in world’s highest concentration of whale watch tourism with research-grounded workshops on challenges and strategies for framing messages about endangered whales and ecosystems. *Gear Up* workshop. *The Whale Museum*, Friday Harbor, San Juan Island. 2007 & 2011.
- Co-creator/co-trainer, Intercultural Immersion Workshop. Contracted by University of New Mexico’s *Global Education Office* to present day-long workshop to 70+ students going on foreign exchange for 2000-2001. May 2000.

Public & Community Outreach

- Editorial Board. *Rio Grande Sierran*. Quarterly newsletter of Sierra Club Rio Grande Chapter: New Mexico & West Texas. 2017-present.
- Co-organizer. *Training for Action: Strategy, Tactics, Issues, Solidarity*. Community-generated event. To take place in Albuquerque, NM, on April 23, 2017.
- Co-founder. *Albuquerque Women’s Network*. Outreach and public relations co-chair for Jan. 21, 2017, Women’s March on Washington in Albuquerque. Civic Plaza, Albuquerque, NM. 2016-present.
- Contributor. *Center for Humans & Nature: Expanding our Natural & Civic Imagination*. <http://www.humansandnature.org/tema-milstein>. 2016-present.
- Presenter, Ecomovie series. *Freehouse*. Nelson, New Zealand. January 2016.
- *Sierra Club* Town Hall Panel Moderator. “Climate disruption: Agua, Chile, Piñon.” South Broadway Cultural Center. Albuquerque, NM. April 30, 2013.
- Community Mural co-facilitator. *Creative Revolution On Walls (CROW)* facilitated large-scale discourse among hundreds of community members with four nonpartisan political sidewalk murals. Displayed in *Rem Koolhaas-designed Seattle Central Library*. Press coverage. Sept. 11, 2004.
- Founding member. UW student chapter *The September Project*. International project involved public libraries and citizens in annual Sept. 11 public discussions, events, actions. 2004.

- Facilitator. Preview Forum's "Using Media to Engage the Public and Journalists on Social Issues," nationwide discussions on "Ethnicity and Race in a Changing America." *Ford Foundation*. Seattle, WA. May 2003.

Public Pedagogy

- Organizer. *US constitutional climate lawsuit youth plaintiff teenager Aji Piper* presentation and Q&A with students and wider public. April 7, 2017.
- Administrator. *Ecocultural Communication Facebook open group*. Active collaborative site and public extension of in-class pedagogy. More than 500 members, including current and former students, international scholars, and practitioners. 2013-present.
- *Lobo Gardens*. Centrally engaged via teaching and action in collaborative student, staff, faculty movement to cultivate and maintain organic community food growing on campus and in urban environment. Four campus gardens created. Local farm and community garden service and networks. 2010-present.
- Co-administrator with UNM's Director of Sustainability. *Lobo Gardens Facebook community group*. Active site with more than 700 members. 2013-present.
- *Social activist Mark Rudd and environmental activist Marla Painter* facilitated discussion on effective activism with my graduate class. Fall 2016.
- *Sierra Club regional director Camilla Feibelman and Mark Rudd* facilitated discussion on climate disruption and organizing with my graduate class. Spring 2015.
- Faculty program adviser, *Global Environmental Leadership and Sustainability Program for Teens*. University of California San Diego Extension Academic Connections program in New Mexico. 2014-2016.
- Letter-to-the-editor class workshop with local journalist and *Environment New Mexico*. Students apply educations in letters to editor about issues of importance to them using applied course concepts and skills. Fall 2014, Spring 2014.
- Eco/culture jam final projects. Most of my undergraduate courses include option to create, perform, record, and publically post a public eco/culture jam based on course concepts of importance to students. 2008-present.
- "What is Your Meaning?" Facilitated University of Washington communication students in formulation of course content-focused public events, city chalk mural on key terms of '04 presidential campaign before election, and bridge-to-bridge march with performance. Press coverage. Nov. 1, 2004.
- Total Projection Action. As part of *CROW*, co-organized interactive communication event in heart of campus before presidential election. Projected real-time interactive public-created "virtual graffiti," slides, video, and transparencies at massive scale onto walls of Red Square. Press coverage. Nov. 1, 2004.

PROFESSIONAL ASSOCIATION MEMBERSHIPS:

- International Ecolinguistics Association (Steering Committee)
- International Environmental Communication Association (Founding and Lifetime Member)

- International Coastal and Marine Tourism Society
- International Communication Association (Board Member, 2004-2006)
- National Communication Association
- Western States Communication Association
- US Fulbright Alumni Association & Fulbright New Zealand Alumni Association

PAST PROFESSIONAL EXPERIENCE:

EDITOR-IN-CHIEF *The New Mexico Jewish Link*

December 1996-August 2002

Developed nationally syndicated articles, internship program (interns went to *Boston Globe*, *National Geographic*, *Jerusalem Post*, *Kol Israel radio*, *Ha’Aretz*, National Public Radio’s *Native America Calling*), thriving op-ed pages. Directed content, layout, budget, printing, subscriptions, mail and street distribution.

RADIO CALL-IN SHOW HOST 89.9 FM KUNM, National Public Radio affiliate

May 1998-January 2000

One of three rotating hosts for weekly live “KUNM Call-in Show,” following NPR’s “Morning Edition.” Chose/researched topics, recruited/interviewed guests.

SENIOR EDITOR/COPY EDITOR *Crosswinds Weekly*

July 1998-June 1999

Then second largest weekly in New Mexico. Guest editor-in-chief (4/99-6/99).

ASSISTANT EDITOR *The New Mexico Jewish Link*

September 1995-December 1996

Researched, wrote articles. Assumed editor's responsibilities during absences.

TECHNICAL EDITOR & PUBLIC RELATIONS DIRECTOR *Tefen International*

February 1995-January 1996

Edited technical/non-technical proposals for Israeli Intel/Philips Semiconductors consulting firm. Developed public relations agenda, news placement.

FREELANCE JOURNALIST

October 1994-December 1996

Editorial writer and proofreader for Albuquerque's largest weekly newspaper, *Alibi*. Wrote cover stories: *Alibi*, *New Mexico Jewish Link*, City Human Rights office.

ASSOCIATE EDITOR *Albuquerque Monthly Magazine*

February 1993-June 1993

Second in editorial authority. Assigned, wrote, edited features. Coordinated writers, photographers, graphic artists.

GENERAL ASSIGNMENT REPORTER INTERN *Albuquerque Journal*

August 1992-February 1993

Then most sought after journalism internship in state. Covered breaking news on daily deadline. Front-page/feature stories. Four paid shifts per week while carrying full university load. Extended duration of internship upon editor's request.

FEATURES/ARTS EDITOR *New Mexico Daily Lobo*

April 1991-January 1992

Supervised 15-person staff at 30,000-circulation, independent student-run newspaper. Editor of weekly features/arts pullout, *Detour*. Oversaw budget, hired/trained reporters, led weekly planning meetings, edited copy daily.

NEWS REPORTER *New Mexico Daily Lobo*

August 1990-June 1992

Established and covered minorities' and women's beat, covered breaking news, wrote news analysis and commentary.

PAST PROFESSIONAL HONORS & AWARDS:

- Under my editorship, *LexisNexis* identified *The New Mexico Jewish Link* as one of nation's three exceptional Jewish community newspapers to be carried as service's first "ethnic" newspapers. 2001.
- Under my editorship, *The New Mexico Jewish Link* placed first in nation in 1996 and 1999, and second in 1997 and 2000, in editorial cartooning. *American Jewish Press Association*.
- Voted best journalist at University of New Mexico's *Daily Lobo*, an independent, student-run daily newspaper. 1992.
- Top 10 in national *William Randolph Hearst Foundation* competition, spot news writing category. Awarded scholarship. 1991.
- Third place in national *Society of Professional Journalists* competition, feature writing category. 1991.

Lindsay A. Smith

**Dept. of Anthropology,
University of New Mexico**

November 2016

Educational History

PhD, December 2008, Harvard University, Cambridge, MA, Anthropology
Dissertation: “Subversive Genes: Reconstituting Family, Identity, and Human Rights in Argentina,” Committee: Arthur Kleinman (chair), Sheila Jasanoff, Michael Herzfeld, Kimberly Theidon. Kay Wareen.

MA, May 2004, Harvard University, Cambridge, MA, Medical Anthropology

BA, May 2002, Rice University, Houston, TX, Anthropology, Psychology

Employment History

Assistant Professor, August 2012 – present, Dept. of Anthropology, University of New Mexico, Albuquerque, NM.

Postdoctoral Fellow, September 2010 – August 2012, Center for Society and Genetics, University of California, Los Angeles, Los Angeles, CA.

Postdoctoral Fellow, August 2008 – August 2010, Science in Human Culture, Northwestern University, Evanston, IL.

Professional Recognition & Honors

Fellow. Mellon and the United Negro College Fund Summer Seminar. “In Search of Home: An Interdisciplinary Exploration of the Shared Experiences of Indigenous and Immigrant Populations in Colonized Space”. July 2014.

Research Group Fellowship, Title: Between Life and Death: Necropolitics in the Era of Late Capitalism, March-June 2012, University of California Humanities Research Institute.

Diversity Program for Innovative Courses in Undergraduate Education Award, Course: Global Health and Human Rights. January 2012. University of California, Los Angeles.

Dissertation Completion Fellowship, September 2007 – August 2008, American College of learned Societies and Mellon Foundation, New York, NY.

Individual Dissertation Research Grant, January-December 2006, Wenner-Gren Foundation for Anthropological Research, New York, NY.

Jacob K. Javits Fellowship, support for Graduate Study, September 2002 – August 2006, United States Department of Education, Washington, DC.

Research, Teaching and Service Statement

My teaching and research lie at the nexus of human rights, health, and the social studies of science. Through close ethnographic attention to scientific ways of knowing within particular vulnerable communities, I contribute to the growing anthropological literature on science in the global south, competing sovereignties, political subjectivity, and biopolitics. As an ethnographer, I work with both international scientific networks and transnational social movements in Latin America, paying particular attention to the role of women and indigenous groups in organizing after civil war and state repression. My service to the discipline and wider community grows out of a commitment to public engagement, which I have pursued through community-based research, collaborative filmmaking and writing projects, and policy work on the ethics of forensic identification in post-conflict and post-disaster settings.

I am currently participating in three major research and writing projects: Subversive Genes, Migrant DNA, and Expert Knowledges. (1) *Subversive Genes* is a book manuscript focusing on the development and application of forensic DNA in Argentina to identify the Disappeared from the Dirty War. By examining in detail the creation of the first human rights genetic technology, the book argues that the social power of genetics as a post-conflict tool of individual, familial, and national healing lies in the fusing of an apolitical discourse of science with a technology constructed as capable of bringing together the past and present in a timeless truth of biology. I examine the broader history of forensic DNA as a tool of “scientific diplomacy” through a comparative ethnographic study of the Latin American Initiative to Identify the Disappeared as it has been implemented in post-conflict Guatemala, Peru, and Argentina. (2) *Migrant DNA* is a collaborative cross-border ethnography funded by the Wenner-Gren Foundation that examines the use of DNA databases to address the human rights crisis of migratory deaths between Guatemala, Mexico, and the United States. The project traces how genetics makes migrant bodies legible, how they disappear and re-appear, and how they are transformed from “private bodies” into “public bodies” on the Guatemala-Mexico-USA migratory route. (3) *Expert Knowledge and Genetic Ancestry* is an NSF funded collaborative project that interrogates the understanding and dissemination of genetic ancestry testing and its results in a small town in Argentina. Argentina is a settler colonial state, founded on a myth of European immigration and exceptional whiteness. Although population-wide genetic studies have suggested high levels of *mestizaje*, African and indigenous descendent populations have been largely erased from the national imaginary. By offering individual results back to participants and examining individual and broader social reactions, we seek to better understand how ideas about genetics, race, and identity are negotiated in Argentina, in the midst of an emerging market for genetic testing as an imagined form of identity truth-telling.

My teaching agenda focuses on the development of an interdisciplinary feminist science studies and health and medicine core at the University of New Mexico. I have developed core courses in Global Health and Human Rights, Genetics and Society, and biomedicine and culture. I also teach courses on international human rights and qualitative research methodology. Through my teaching, I aim to open-up interdisciplinary conversations between health studies, law, biology, and environmental studies both within the classroom as students integrate these multiple threads of contemporary knowledge and institutionally through teaching collaborations, guest lectures, and new cross-listed offerings. My pedagogical style emphasizes student participation in the wider world through community research all based in a comprehensive understanding of theory and social analysis. Because learning happens both within and outside of the classroom, I have worked to actively incorporate undergraduates into the research process through research apprenticeships, which give undergraduates and masters students first-hand experience in social science methods both in their communities and internationally.

Through service to the department, the university, the discipline and the wider community, I work to create a vibrant intellectual community and collaborate with scholars and activists to build sustainable approaches to human rights, health and transitional justice. I seek to work to build interdisciplinary bridges between the Medical School, Public Health and the social sciences, strengthen faculty governance, and foster community-based research and activist scholarship.

Scholarly Achievements

Articles in Peer Reviewed Journals

Smith, Lindsay. 2016 “Identifying Democracy: Citizenship, DNA, and Identity in Post-dictatorship Argentina.” Science, Technology, and Human Values Expected Publication (online first, July 2016)

Smith, Lindsay. 2013 “Genetics is a Study in Faith: Forensic DNA, kinship analysis, and the ethics of care in post-conflict Latin America.” *The Scholar and the Feminist*. Vol. 11, no 3.

Articles Appearing in Chapters in Edited Volumes:

Garcia Deister, Vivette and Lindsay Smith. 2016 “Ensamblajes de la ciencia forense en América Latina” in Gisela Mateos y Edna Suárez-Díaz editors. *Lo local y lo global: Latinoamérica en la historia de la ciencia contemporánea*. Colección Eslabones en la Ciencia, Centro de Estudios Filosóficos, Políticos y Sociales Vicente Lombardo Toledano, México.

Smith, Lindsay and Arthur Kleinman. 2010 “ Emotional Engagements: Acknowledgement, Advocacy, and Direct Action.” In *Emotions in the Field*. Davies, J. and Spencer D. Palo Alto: Stanford University Press. Pp 171-187, 2010

Other Writings:

Smith, Lindsay. 2015 “Genetics as a tool for Social Justice” Genetics, Behavior, and Society, in James Wright Editor, *The International Encyclopedia of Social and Behavioral Sciences*. Elsevier. Pp 969-974

Smith, Lindsay and Sarah Wagner. 2007 "DNA Identification: Checking Expectations of Truth and Justice," *Anthropology News*, Vol. 48, no. 5.

Work in Progress

Accepted for Publication

Smith, Lindsay. “The missing, the martyred, and the disappeared: global networks, technical intensification, and the end of human rights genetics.” *Social Studies of Science* (in press); online first November 2016.

Under Review

Smith, Lindsay and Vivette Garcia Deister. “Migrant Death on the Borders of Cognition: Crisis, Unknowability, and the Making of the Missing” Under Review *Perspectives on Science* (June 2016). 7065 words.

Smith, Lindsay. Subversive Genes: Making DNA and Human Rights in Argentina. Book manuscript. Words: 78,952. Under review Duke University Press

Invited or Refereed Abstracts and/or Presentations at Professional Meetings:

“Centering and decentering DNA. On the sociotechnical imaginary of the Mexico-US border”
Invited Workshop Presentation. Doing the Individual and the Collective in Forensic Genetics:
Governance, Race and Restitution. University of Manchester. September 8-10, 2016

“Migrant death on the borders of cognition: spectacular science and ordinary politics” co-
authored with Vivette Garcia. Invited Workshop presentation. Populations of Cognition.
Universidad Nacional Autonoma de Mexico. December 3, 2015

“Identifying Genocide: Cold-War Terror, Forensics, and the Indigenous body” Invited
workshop presentation. Cold War Indigeneity in Science and Medicine. Yale University. New
Haven. September 14, 2015

“DNA Migrante: Forensics, Violence, and Recognition in the Mexican Borderlands’ Invited
Lecture. March 3, Colgate University, 2015

“Genealogical time: DNA, scientific temporality, and discourses of healing in Latin America.”
American Anthropological Association Annual Meeting. Washington, DC. December 5, 2014.

“Genetics as Mother’s Work: Forensics and the Politics of refusal in Argentina and Mexico”
invited presentation at the Institute for Research on Women and Gender at the University of
Michigan Feminist Workshop: *Feminist Postcolonial Science and Technology Studies*. Oct 2-5,
2014

“Proyecto DNA migrante: estudios sociales de la genética forense en México, Guatemala y
Estados Unidos” (presented with Garcia Deister) Seminario en la licenciatura de ciencia Forense.
UNAM. August 29, 2014.

“Making Genocide Visible: Forensic DNA, indigeneity, and competing frames of justice”
Society for the Social Studies of Science Meeting. Buenos Aires Argentina. Aug 22, 2014

“Embedding Ethics in Social Life: Anthropology and Human Rights in Latin America
Invited Lecture. University of Tennessee. Dec 2, 2013

“Engaged ethics: participant observation as ethical praxis in human rights” Invited Lecture.
University of Tennessee. Dec 1, 2013

“Genetics As Kinship: Sameness, Difference, and DNA in Post-Conflict Argentina and
Guatemala” American Anthropological Association Annual Meeting. Chicago, IL. Nov 2013.

“Spectral Lives: DNA, Disappearance, and performance of sovereignty” Symposium
Presentation. TransitoMx 05: Biomediaciones. Mexico City. September 28-29 2013

"Databases, Archives and Testimonials: the politics of knowledge in post-conflict settings"
Conference presentation. Disasters, Displacements, and Human Rights Symposium. University of Tennessee. February 2013.

"There is no word for a mother who has lost her child: Forensics and Care in Latin America"
Invited Lecture. Universidad Nacional Autónoma de México. Nov. 12, 2012.

"Identifying Democracy: The Latin American Initiative to Identify the Disappeared and Scientific Governance." Society for the Social Studies of Science Annual Meeting. Cleveland, OH. November 2011.

"Knowledge without Acknowledgment: Forensic DNA, transitional justice, and the purification of politics." American Anthropological Association Annual Meeting. Montreal, Quebec. November 2011.

"Genetics is a Study in Faith": The Disappeared of Latin America, Science as Development, and the Fragility of Identification. Invited Lecture. Harvard University. STS Circle. September 26, 2011.

"DNA and the Archive: Secrecy, Innovation, and the Making of Democratic Argentina."
American Anthropological Association Annual Meeting. New Orleans, LA. Nov. 20, 2010.

"DNA Identification, Human Rights, and Social Justice. Invited Lecture." University of Tennessee, Department of Anthropology Speaker Series. Knoxville, TN. August 24, 2010

"Identifying Democracy: Citizenship, and DNA in Post-dictatorship Argentina." Invited Lecture. American Bar Foundation. Chicago, IL. March 17, 2010.

"'Bring them back alive': Negotiating genetics and identity in post-dictatorship Argentina.
Invited Lecture. Klopsteg Lecture Series. Science in Human Culture. Northwestern University. January 25, 2010.

"Forensic Peripheries and Centers: Dactyloscopy and DNA identification in Argentina."
American Anthropological Association Annual Meeting. San Francisco CA. November 2008.

"Subversive Genes: Reconstituting Identity in Argentina" Invited Lecture. Department of Anthropology, Vanderbilt University. Nashville, TN. November 6, 2008.

"DNA Identification and Human Rights in Argentina." Paper given and film screened. Society for the Social Studies of Science annual meeting. Vancouver, Canada. Nov. 4, 2006.

"When the body can speak: DNA and experience in the US criminal justice system" American Anthropological Association Annual Meeting. San Jose, CA. Nov. 23, 2006.

"Biological Narratives: DNA fingerprinting and experiential witnessing." Society for the Social Studies of Science Annual Meeting. Paris, France. August 28, 2004.

Research Funding

Standard Research Grant #1344185: *A Longitudinal Study of the Role of Expert Knowledge in the Interpretation & Reception of Genetic Information*
PI: Graciela Cabana; Co-Pi's: Marcela Mendoza; Lindsay Smith
National Science Foundation (SES Division),
2014-2017; \$329,203.

International Collaborative Research Grant. "Identifying the Border: Forensic DNA databases and the New Disappeared in Guatemala, Mexico, and the United States"
PI Lindsay Smith; Co-PI Vivette Garcia Deister
Wenner-Gren Foundation for Anthropological Research
January 2016- August 2017; 34,800
Funded

R01HG005702-01. "The Ethics of Post-Conflict and Post-Disaster DNA Identification"
PI Jay Aronson, with co-PI Sarah Wagner; Role: Research Consultant
National Human Genome Research Institute, National Institutes of Health, Washington, DC
August 2011-August 2014; \$1,201,086.

Summer Travel Grant Argentina: DNA and Human Rights
PI Lindsay Smith
David Rockefeller Center for Latin American Studies, Harvard University
June – August 2008; \$1000

Gr. 7384 "Subversive Genes: Forensic DNA and Human Rights in Argentina"
PI: Lindsay Smith
Wenner-Gren Foundation for Anthropological Research
January – December 2006; \$23,429

Teaching

Doctoral Advisement

Chair of Committee

Elise Trott (Ethnology), (co-chaired with Erin Debenport) Degree expected 2017
Topic: Acequia and water rights in New Mexico

Daniel Shattuck (Ethnology), (co-chaired w/ Ronda Brulotte) degree expected 2017
Topic: Immigrant labor, affect, and nationalism in Italy

Geneva Smith (Ethnology), degree expected 2017
Topic: GMO crops, rural land development, and identity in Argentina

Zsofia Szoke (Ethnology), degree expected 2019
Topic: Neuroscience and the construction of the mind

Danielle Kabella (Ethnology), degree expected 2020
Topic: fetal alcohol syndrome and representations of the brain

Committee Member

Anthony Koehl (Evolutionary Anthropology), Degree received 2016
Topic: Genetic substructure in admixed populations

Nick Barron (Ethnology), Degree expected 2019
Topic: Archives and Indigenity in the US

Caitlin Davis (Ethnology), Degree expected 2019
Topic: preservation and settler colonialism in Palestine

Holly Brause (Ethnology), degree expected 2019
Topic: Green Chile and migrant work in New Mexico

Katie Hoepfner (Ethnology), degree expected 2019
Topic: Food justice tourism in Cuba, Bolivia, and Mexico

Caitlin Davis (Ethnology), degree expected 2018
Topic: conservation politics in Israel/Palestine

Elisheva Levin (Education), degree expected 2017
Topic: autism, scientific knowledge production, diagnosis

Maria del Pilar File-Muriel (Ethnology), degree expected 2017
Topic: Peace Communities in Columbia

Lavinia Nicolae (Ethnology), 2013
Topic: LGBT Marriage Equality in New Mexico

Masters Advisement

Chair

Javier Astorga (LAII), 2016
Topic: Anti-Malaria initiatives and biopolitics in Suriname

Katie Sartor (Ethnology), 2016
Topic: museum representations of indigenous groups in Argentina

Sarah Lesiter (LAII), 2015
Topic: Chronic Kidney Disease and Labor in Nicaragua

Deborah Sposito (LAII), 2013
Topic: Femicide, political violence, and human rights in Guatemala

Committee Member

Geneva Smith (Ethnology), 2013
Topic: Soybeans and agricultural transformation in Argentina

Undergraduate Student Mentoring:

Danielle Kabella (Ethnology), McNair Faculty Mentor
Topic: Suboxone treatment and the medicalization of heroin addiction

Classroom Teaching:

2012; Fall; Global Health and Human Rights; 340-011; 18
2013; Spring; Introduction to Medical Anthropology; 340-007; 16
2013; Spring; Anthropology of Biopolitics; 530-005; 14
2013; Fall; Cultures of the World 130-003; 43
2013; Fall; Genomics and Society 340; 10
2014: Spring. Cultures of the World; 130-009; 81
2014: Fall. Anthropology and Human Rights; 339-001, 52;11
2014 Fall: Problems and Practice in Ethnography; 541-001; 14
2015 Spring: Cultures of the World. 130 Cap 120
2015 Spring: Anthropology of Health; 340; Cap 70
2016 Fall: Introduction to Medical Anthropology, 240, Cap 60
2016 Fall: Anthropology of Biopolitics, 530, 13

Service

Reviewing for Journals and Presses:

2015 : *Presses*: Reviewing for Duke University Press (1), University of Washington Press (1),
and University of Minnesota (1).
Journals: Science, Technology, and Human Values (1); Social Studies of Science (1);
International Journal of Transitional Justice (2), Science as Culture (1)

2014 *Presses*: Reviewing for Cambridge University Press
Journals: Anthropological Forum (1), International Journal of Transitional Justice (2)

2013 *Presses*: Manuscript Review for the School for Advanced Research (1)

2012 2 reviews for the *International Journal of Transitional Justice*

2011 1 review for *Science as Culture*

Service to the College

2014-present Mellon Mays Undergraduate Program Advisor Board Member

2014-present UNM-Mellon Advisory Board Member, graduate fellowship program

2012-15 Grants and Awards Committee member; Latin American and Iberian Institute

2012-13 Faculty Mentor, Ronald E. McNair Scholars Program

Service to the Department

2014-2015 Search Committee Evolutionary Anthropology Hire

2014 Search Committee Ethnology Spousal Hire

2013 -15 Ethnology Graduate Admissions Committee

2012-15 Space and Resources Committee

2012-13 Medical Anthropology Working Group Convener

Other Professional Service

2015. Participant in guideline drafting for inference in genetic ancestry testing forum for the American Society for Human Genetics (ASHG).

2014 Advisory work with UNAM Ciencias Forenses program in regard to support for the search of the missing in Ayotzinapa

2013 Delegate for “The Missing: An agenda for the future” an international policy forum on the use of DNA in identifying missing people held in The Hague, Netherlands. October 29-31

2013 Member of roundtable on inference in genetic ancestry testing forum for the American Society for Human Genetics (ASHG).

2011-12 United States DNA outreach team member, Guatemalan Forensic Anthropology Foundation

2007 Horizons Jury Prize Member, Society for Cultural Anthropology

2006 Conference Organizer, Values and Moral Experience in Global Health Harvard University

2005-2006 Volunteer Researcher at the Abuelas de Plaza de Mayo, Buenos Aires Argentina

BENJAMIN P. WARNER
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Amherst, MA 01003
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Twitter: [@bpwarner_umass](https://twitter.com/bpwarner_umass)
<http://blogs.umass.edu/bpwarner/>

RESEARCH & PRACTICE INTERESTS

Disciplines: Development geography; sustainable development

Research topics: Rural and agrarian development; environmental change adaptation limits; institutional context of vulnerability and risk; water resources management; socio-geomorphology; sustainability education assessment & policy; participatory action research

Geographic areas: Central America; Latin America; Southwest, USA; New England, USA

EDUCATION

- 2014 Ph.D. Sustainable Development, School of Sustainability, Arizona State University
Dissertation: *Political Economic Barriers to Global Change Adaptations: A Study of Agrarian Rural Development in Northwest Costa Rica*. Director: Dr. Daniel Childers.
- 2006 B.S. Civil Engineering, School of Civil Engineering, Purdue University

APPOINTMENTS

- 2014 – Postdoctoral Research Scholar, University of Massachusetts at Amherst, Dept. of Geosciences/ Dept. of Environmental Conservation
- 2014 Adjunct Faculty, Boston University, Department of Earth and Environment
- 2011 – 2013 Research Assistantship, NSF (#1132832) Catalyzing New International Collaborations Grant – Interdisciplinary workgroup on water sustainability in the Tempisque Basin, Northwest Costa Rica
- 2009 – 2011 Teaching Assistantship, School of Sustainability, Arizona State University
- 2008 – 2009 Project Manager, Planning and Water Engineering Services, HNTB Corporation, Indianapolis, IN
- 2006 – 2008 Project Engineer, Planning and Water Engineering Services, HNTB Corporation, Indianapolis, IN
- 2006 Project Engineer, National Park Service Engineering Department, Denali National Park, Denali, AK

REFEREED ARTICLES

in review	Warner, B. P., Kuzdas, C., Stocks, G. & Childers, D. Smallholder adaptation to drought in Costa Rica's crony capitalist rice economy. <i>Development and Change</i> .
in review	Warner, B. P., Gartner, J. D., Hatch, C. E., Mabee, S., & Kline, M. Participatory approach to geomorphic-based flood risk management in Massachusetts, USA. <i>Journal of American Water Resources Association</i> .
accepted	Milman, A., & Warner, B. P. The interfaces of public and private adaptation: Lessens from flooding in the Deerfield River Watershed. <i>Global Environmental Change</i> .
accepted	Kuzdas, C., Warner, B. P., Wiek, A., Vignola, R., & Morataya, R. Identifying the potential of governance regimes to aggravate or mitigate water conflicts in regions threatened by climate change. <i>Local Environment</i> .
accepted	Warner, B. P. Mixed-methods approaches to understanding climate change risks to agrarian-based livelihoods. <i>SAGE Research Methods Cases</i> . London, United Kingdom. SAGE Publications, Ltd.
2015	Warner, B. P., & Kuzdas, C. Manufactured global change risk pathways in industrial-based agrarian development. <i>Climate and Development</i> . DOI: http://dx.doi.org/10.1080/17565529.2015.1085359
2015	Kuzdas, C., Warner, B. P., Wiek, A., Vignola, R., Yglesias, M., & Childers, D. L. Sustainability assessment of water governance alternatives: the case of Guanacaste Costa Rica. <i>Sustainability Science</i> . DOI: http://dx.doi.org/10.1007/s11625-015-0324-6
2015	Warner, B. P. Understanding actor-centered adaptation limits in smallholder agriculture in the Central American dry tropics. <i>Journal of Agriculture and Human Values</i> . DOI: http://dx.doi.org/10.1007/s10460-015-9661-4
2015	Warner, B. P., Kuzdas, C., Yglesias, M. G., & Childers, D. L. Limits to adaptation to interacting global change risks among smallholder rice farmers in Northwest Costa Rica. <i>Global Environmental Change</i> , 30, 101–112. DOI: http://dx.doi.org/10.1016/j.gloenvcha.2014.11.002
2015	Warner, B. P., & Elser, M. How Do Sustainable Schools Integrate Sustainability Education? An Assessment of Certified Sustainable K–12 Schools in the United States. <i>The Journal of Environmental Education</i> , 46(1), 1–22. DOI: http://dx.doi.org/10.1080/00958964.2014.953020
2015	Kuzdas, C., Wiek, A., Warner, B. P., Vignola, R., & Morataya, R. Integrated and participatory analysis of regional water governance regimes – The case of Guanacaste, Costa Rica. <i>World Development</i> . 66, pp. 254–266. DOI: http://dx.doi.org/10.1016/j.worlddev.2014.08.018
2014	Kuzdas, C., Wiek, A., Warner, B. P., Vignola, R., & Morataya, R. Sustainability appraisal of water governance regimes – The case of Guanacaste Province, Costa Rica. <i>Environmental Management</i> . 54(2), pp. 205-222. DOI: http://dx.doi.org/10.1007/s00267-014-0292-0

- 2013 Kuzdas, C., Yglesias, M., & Warner, B. P. Advancing Sustainable Governance of Water Resources in Costa Rica. *The Solutions Journal*. 4(4), Aug 2013. <http://thesolutionsjournal.com/node/23918>

POLICY DOCUMENTS & POPULAR SCIENCE ARTICLES

- in press Vogel, E., Gillett, N., Warner, B. P., Schoen, J., Payne, L., Chang, D., ... Slovin, N. Supporting New England Communities to Become River-Smart: Federal and state policies and programs that can help New England towns thrive despite river floods. *Army Corp of Engineers Institute for Water Resources*. Alexandria, VA.
- 2015 Arguedas Ortiz, Diego. November 5. Riesgos manufacturados afectan desarrollo agrícola rural. SciDevNet. p. 2. San José, CR. Retrieved from <http://www.scidev.net/america-latina/agropecuaria/noticias/riesgos-manufacturados-afectan-desarrollo-agricola-rural.html>
- 2015 Warner, B. P. September 21. Sustainability science is a new academic discipline. But is it sustainable? *The Conversation*, p. 2. Boston, MA. Retrieved from <https://theconversation.com/sustainability-science-is-a-new-academic-discipline-but-is-it-sustainable-46719>
- 2015 Warner, B. P. & Kuzdas, C. Origins of water scarcity in rural development in the Costa Rican dry tropics: Neoliberalism, international trade, and climate change. *GWF Discussion Paper*. Global Water Forum. Canberra, Australia. <http://www.globalwaterforum.org/2015/08/03/origins-of-water-scarcity-in-rural-development-in-the-costa-rican-dry-tropics-neoliberalism-international-trade-and-climate-change/>
- 2014 George, Michele St. May 6. Sustainability grad focuses on water management. *ASU Now*. Tempe, AZ. Retrieved from <https://asunow.asu.edu/content/sustainability-grad-focuses-water-management>
- 2012 Kuzdas, C., Yglesias, M., Wiek, A., Warner, B. P., Vignola, R., & Morataya, R. Sustainability assessment of water systems and water governance in the Portrero, Caimital, and Upper Nosara Watersheds. *Comisión para el Manejo de las Cuencas Potrero-Caimital*. Nicoya, GTE, Costa Rica (Spanish)
- 2010 Warner, B. P. The Kerala Model of Development: A Path to Sustainability. *The Sustainability Review*. 1(1), March 2010. <https://thesustainabilityreview.org/the-kerala-model-of-development-a-path-to-sustainability/>

GRANTS & AWARDS

- 2014 – 2017 **SP** – U.S. Department of Agriculture (USDA, #2013-51130-21488) National Institute of Food and Agriculture (NIFA) Integrated Water Quality Grant Program – *Farms, floods and fluvial geomorphology: making the most of our natural resources* – PI: Christine Hatch – Amount: **\$640,000**
- 2014 **Award** – Arizona State University Doctoral Graduate Education Spring 2014 Completion Grant – Amount: **\$9,500**

2013 – 2014	PI – C.W. & Modene Neely Charitable Foundation Grant – <i>Managing water allocation equitably: Risks to smallholder farmers in Costa Rica’s Arenal-Tempisque Irrigation District</i> – Amount: \$2,900
2012 – 2013	Award – Senior Fellowship, NSF (#0841374) Graduate STEM Fellowship (GK-12) – Amount: \$30,000
2012 – 2013	Award – Arizona State University, School of Sustainability Travel Grant – Amount: \$1,400
2012 – 2013	CoPI – GISER funded Integrative Society and Environment Research Grants Program – <i>Mitigating Water Conflicts in the Río Tempisque Basin, Costa Rica</i> – Amount: \$1,245
2012	Award – Visiting IPoS Scholar at University of Tokyo and Asian Institute of Technology – <i>Livelihood Strategies for Adaptation to Climate Change</i> – Amount: \$9,000
2011 – 2012	CoPI – USGS funded Water Resources Research Center 104(b) Grants Program (#2011AZ436B) – <i>Hydrology Versus Ecology: The Effectiveness of Constructed Wetlands for Wastewater Treatment in a Semi-arid Climate</i> – Amount: \$40,000
2011 – 2012	Award – Junior Fellowship, NSF (#0841374) Graduate STEM Fellowship (GK-12) – Amount: \$30,000
2010	PI – NSF (#0553925) International Graduate Research Experience Grant, Palo Verde Biological Station, Costa Rica – <i>Climate resilience in agriculture in Guanacaste Province, Costa Rica</i> – Amount: \$13,000

CLASSES TAUGHT

Graduate level:

Fall 2014	GE600 Environment and Development: A Political Ecology Approach, Department of Earth & Environment, Boston University
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Undergraduate level:

Fall 2014	GE400 Environment and Development: A Political Ecology Approach, Department of Earth & Environment, Boston University
2010 – 2011	SOS 110 Sustainable World, Curriculum designer, School of Sustainability, Arizona State University
Fall 2009	SOS 110 Sustainable World Lab, School of Sustainability, Arizona State University

PRESENTATIONS & POSTERS

- 2015 Warner, B. P. Climate Change, Sustainability and Social Science Research. UMass Institute for Social Science Research - Fall Seminar Series. November 6. Amherst, MA. <https://www.umass.edu/issr/events/climate-change-sustainability-and-social-science-research>
- 2015 Warner, B. P. Limits to adaptation to interacting global change risks among smallholder rice farmers in Northwest Costa Rica. UMass Department of Geosciences Professional Seminar. March 27. Amherst, MA.
- 2015 Warner, B. P., Hatch, C. Farms, Floods and Fluvial Geomorphology: Making the Most of Our Natural Resources. Presented at Soil and Water Conservation Society International Annual Conference. July 28, 2015. Greensboro, NC. www.swcs.org/15ac
- 2012 Warner, B. P. Agricultural Adaptation to Water Scarcity in Northern Costa Rica. Intensive Program on Sustainability (IPoS) Workshop at the Asian Institute of Technology, 8/2012.
- 2012 Warner, B. P. Do sustainability projects make sustainable schools? Integrating K-12 campuses in communities to create sustainable schools. Presented at the 41st Annual North American Association for Environmental Educators (NAAEE) Conference, Oakland CA (10/12). Poster presented. <http://www.naaee.net/sites/default/files/conference/program/NAAEE.Prog.Final.9.28.12A.pdf>.
- 2012 Sanchez, C., Childers, D. L., Turnbull, L. J., Warner, B. P., & Weller, N. The contribution of evapotranspiration to the water budget of an aridland urban treatment wetland. Presentation at the 7 June 2012 INTECOL International Wetlands Conference, Orlando, FL.
- 2012 Foley, R. W., Kuzdas, C., Warner, B. P., Withycombe-Keeler, L., Iwaniec, D. & Wiek, A. Designing sustainable governance: Cross-domain comparison and evaluation. Poster presented at the 19-22 February 2012 3rd Annual International Conference on Sustainability Science, Tempe, AZ.
- 2012 Sanchez, C. A., Childers, D., Turnbull, L., Warner, B. P., & Weller, N. The contribution of evapotranspiration and evaporation to the water budget of a treatment wetland in Phoenix, AZ, USA. Poster presented at 13 January 2012 CAP LTER 14th Annual Poster Symposium and All Scientist Meeting, Global Institute of Sustainability, Arizona State University, Tempe, AZ.
- 2011 Warner, B. P., & Kuzdas, C. Approach for Coordination, Collaboration and Effectiveness in Sustainability Science (ACCESS). Presented at Annual Organization for Tropical Studies Directorate Meeting (3/11). Poster. <http://www.ots.ac.cr/images/downloads/information-resources/otspublications/annual-report-fy/fy2010.pdf>.
- 2011 Warner, B. P., Turnbull, L., & Childers, D. Hydrology versus Ecology: The Effectiveness of Constructed Wetlands for Wastewater Treatment in a Semi-Arid Climate. Poster presented at Central Arizona-Phoenix Long Term Ecological Research (LTER) Annual Symposium (1/11).

2010	Warner, B. P. & Kuzdas, C. Measuring urban vulnerability using a model of ecological resilience: An assessment methodology. Poster presented at the January 14, 2010 12th Annual Central Arizona-Phoenix Long-Term Ecological Research Poster Symposium, Global Institute of Sustainability.
2008	Warner, B. P. The Application of Leadership in Energy and Environmental Design (LEED) to Water and Wastewater Treatment Plants. Presentation at Indiana Water Environment Association (IWEA) Annual 2008 Conference (11/2008).

PROFESSIONAL MEMBERSHIPS & SERVICE

- Mixed Methods International Research Association
- Association of American Geographers
- America Water Resources Association, Future Risk Committee

NEW MEXICO JOINT DOCTORAL PROGRAM IN GEOGRAPHY **Projected Finances, First Six Years**

New Costs, First Six Years (refer to Table 7.1 in proposal for explanation of assumptions)

Category/Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Faculty: One Expansion						
Open-Rank Hire: Geographic Information Science (search to be conducted before program begins)						
Faculty search	\$3,000					
Startup package	\$30,000					
Salary	\$85,000	\$86,700	\$88,434	\$90,203	\$92,007	\$93,847
Fringe Benefits	\$30,260	\$30,865	\$31,483	\$32,112	\$32,754	\$33,409
Staff: Program Coordinator Line						
Grade 10 Midpoint	\$42,494	\$43,344	\$44,211	\$45,095	\$45,997	\$46,917
Fringe Benefits	\$15,128	\$15,430	\$15,739	\$16,054	\$16,375	\$16,702
Student Funding: Stipend/Benefits for Six New GA/TA Lines (3.0FTE)						
Funded by A&S:1.5FTE	\$42,116	\$65,467	\$67,829	\$70,269	\$73,096	\$75,713
Funded separately: 1.5FTE		\$21,822	\$67,829	\$70,269	\$73,096	\$75,713
Other						
CAT-6 Wiring upgrade, BAE	\$25,000					
Targeted Recruitment	\$2,500	\$2,600	\$2,704	\$2,812	\$2,925	\$3,042
Operations Increase	\$2,500	\$2,600	\$2,704	\$2,812	\$2,925	\$3,042
Total New Costs	\$277,998	\$268,828	\$320,933	\$329,626	\$339,175	\$348,385

Projected Program Balances, First Six Years (refer to Table 7.5 in proposal)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Projected New Costs						
Startup	\$58,000	\$0	\$0	\$0	\$0	\$0
Recurring	\$219,998	\$268,828	\$320,933	\$329,626	\$339,175	\$348,385
Total	\$277,998	\$268,828	\$320,933	\$329,626	\$339,175	\$348,385
Projected New Revenues						
A&S reallocation	\$247,998	\$241,806	\$247,696	\$253,733	\$260,229	\$266,589
F&A generation	\$75,000	\$82,500	\$90,750	\$95,288	\$100,052	\$105,054
Total	\$322,998	\$324,306	\$338,446	\$349,021	\$360,281	\$371,643
Total Balances	\$45,000	\$55,478	\$17,513	\$19,394	\$21,106	\$23,258

Projected Financial Impact to UNM, First Six Years (refer to Table 7.6 in proposal)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Program balances	\$45,000	\$55,478	\$17,513	\$19,394	\$21,106	\$23,258
Tuition generation	\$21,759	\$44,389	\$77,920	\$112,775	\$148,993	\$158,902
Total Impact	\$66,759	\$99,866	\$95,433	\$132,169	\$170,100	\$182,160

Projected UNM Tuition Rates, 2016-2024

Year	In-State	Out-of-State	Assumptions
2015-2016	\$254.26	\$858.42	published rates, UNM Bursar's office
2016-2017	\$259.35	\$875.59	assumes 2% increase from previous year
2017-18	\$264.53	\$893.10	assumes 2% increase from previous year
2018-19	\$269.82	\$910.96	assumes 2% increase from previous year
2019-2020	\$275.22	\$929.18	assumes 2% increase from previous year
2020-2021	\$280.72	\$947.77	assumes 2% increase from previous year
2021-2022	\$286.34	\$966.72	assumes 2% increase from previous year
2022-2023	\$292.06	\$986.05	assumes 2% increase from previous year
2023-2024	\$297.91	\$1,005.78	assumes 2% increase from previous year

Projected Program Tuition Revenue, 2018-2024

Year	Full Time Students		Part Time Students		Total Revenue
	SCH	Revenue	SCH	Revene	
Yr1 (AY18-19)	30	\$8,094.68	15	\$13,664.43	\$21,759.11
Yr2 (AY19-20)	60	\$16,513.15	30	\$27,875.44	\$44,388.59
Yr3 (AY20-21)	75	\$21,054.27	60	\$56,865.90	\$77,920.17
Yr4 (AY21-22)	90	\$25,770.43	90	\$87,004.83	\$112,775.26
Yr5 (AY22-23)	105	\$30,666.81	120	\$118,326.57	\$148,993.38
Yr6 (AY23-24)	108	\$32,173.86	126	\$126,727.76	\$158,901.62

F&A Generated and Returned by Fiscal Year, FY08-FY15

860A - Geography Department, UNM

Total New		Total Grant	# of GA's	Annual Total F&A		Distributed To		GA TA Salaries	
Awards		expenditures	funded	Generated		GES		on grants	% return % TO GES
FY08	1	\$97,402	4	\$17,153		\$1,503		\$18,261	17.6% 8.8%
FY09	3	\$99,672	3	\$25,215		\$3,877		\$16,018	25.3% 15.4%
FY10	3	\$145,145	5	\$38,407		\$2,041		\$37,153	26.5% 5.3%
FY11	3	\$123,045	4	\$38,101		\$4,506		\$27,690	31.0% 11.8%
FY12	2	\$156,690	4	\$49,869		\$7,705		\$29,805	31.8% 15.5%
FY13	1	\$34,562	0	\$5,480		\$767		\$0	15.9% 14.0%
FY14	0	\$10,865	0	\$0		\$0		\$0	
FY15	2	\$145,768	3	\$41,051		\$5,988		\$24,180	28.2% 14.6%
FY16	1	\$541,716	6	\$65,562		\$9,033			12.1% 13.8%
FY17	6	\$251,314	8	\$42,474		\$5,054			16.9% 11.9%
Average									22.8% 12.3%

F&A Projections for FY18-FY23

860A - Geography Department, UNM

FY18	4-6	\$300,000	9	\$75,000		\$4,500
FY19	4-6	\$330,000	10	\$82,500		\$4,950
FY20	4-6	\$363,000	11	\$90,750		\$5,445
FY21	4-6	\$381,150	11	\$95,288		\$5,717
FY22	4-6	\$400,208	11	\$100,052		\$6,003
FY23	4-6	\$420,218	11	\$105,054		\$6,303

Assumptions used in projections for FY16-FY24

FY18	known grants and RA funding, prediction of returns
FY18	25% increase due to first awards received by GIS replacement hire
FY19	50% increase over previous yr due to maturity of GIS replacement hire and addition of water hire who brings existing grants on ar
FY20	10% increase over prior year due to increased capacity of PhD program
FY21	10% increase over prior year due to increased capacity of PhD program

Advisory Board membership

Member	Organization	Since	Term
Chris Carpenter	GIS Supervisor, PNM	2012	2018
Bill Kraussman	Geospatial Group Leader, U.S. Forest Service	2012	2017
Robert Mallory	Owner, Acoustic Resources of New Mexico	2012	2018
Zach McCormick	Modrall Sperling law offices	2012	2016
Laurie Moye	Public Participation, PNM	2012	2016
Frank Norris	Historian, NPS National Trails System	2012	2017
Debbie Stover	City of Albuquerque	2012	2016
Sheila terBruggen	Design professional	2012	2017
Denise Bleakly	Sandia	2015	2018

Projected Assistantship Costs, 2018-2024

Year	Minimum Stipend	Competitive	Fringe	Tuition*	Insurance	Total	Assumptions (see below)
2015-2016	\$15,312.37	\$15,500.00	\$155.00	\$1,525.56	\$1,705.00	\$18,885.56	#1
2016-2017	\$15,771.74	\$16,000.00	\$160.00	\$1,556.07	\$1,876.00	\$19,592.07	#2, #3
2017-18	\$16,244.89	\$16,600.00	\$166.00	\$1,587.19	\$2,063.00	\$20,416.19	#2, #3
2018-19	\$16,732.24	\$17,000.00	\$170.00	\$1,618.94	\$2,269.00	\$21,057.94	#2, #3
2019-2020	\$17,234.21	\$17,500.00	\$175.00	\$1,651.32	\$2,495.90	\$21,822.22	#2, #4
2020-2021	\$17,751.23	\$18,000.00	\$180.00	\$1,684.34	\$2,745.49	\$22,609.83	#2, #4
2021-2022	\$18,283.77	\$18,500.00	\$185.00	\$1,718.03	\$3,020.04	\$23,423.07	#2, #4
2022-2023	\$18,832.28	\$19,100.00	\$191.00	\$1,752.39	\$3,322.04	\$24,365.43	#2, #4
2023-2024	\$19,397.25	\$19,600.00	\$196.00	\$1,787.44	\$3,654.25	\$25,237.68	#2, #4

*6 credits, in-state rate

List of Assumptions

- #1
- published stipend minimum (for post-master's TAs), fringe and insurance
- #2
- projected stipend minimum, based on typical 3% increase
- #3
- published fringe and insurance
- #4
- projected fringe and insurance, based on typical increase of 10%/year



Office of the Dean

To: Greg Heileman, Associate Provost for Curriculum
From: Mark Peceny, Dean, College of Arts and Sciences
Re: Support for the Ph.D. Program in Geography
Date: 1/6/15

New Mexico needs a Ph.D. in Geography to train the next generation of academic leaders, resource managers, policy makers, and geospatial analysts to understand and respond to the rapidly changing environment of the southwest. UNM's Department of Geography and Environmental Studies has forged a unique partnership with the Department of Geography at New Mexico State to develop a joint Ph.D. program that takes advantage of the complementary capabilities of the two programs to craft what we will believe will be a nationally competitive Ph.D. program. This effort has my full support.

The Department of Geography and Environmental Studies must increase the ranks of the tenure track faculty to build a sufficiently strong Ph.D. program to be nationally competitive. The College will make every effort to increase the ranks of the tenure track faculty by a net of three over the next half dozen years. We expect that one of those new faculty lines will receive bridge funding from the LAII's Ecuador initiative, since there a number of faculty at the Universidad Central del Ecuador who would like to earn Ph.D. degrees in Latin American Studies with an emphasis in geography.

Although we expect that many graduate students will be supported by the sponsored research of their faculty mentors, we will also need to provide 1.5 FTE in additional TA/GA lines to the department, which will simultaneously advance the Ph.D. program and improve undergraduate education for majors and for students who take Geography courses in the core curriculum.

Finally, the one staff position now associated with the department will be insufficient to support the increasing complexity of a new Ph.D. program that spans two universities, an increasingly robust portfolio of sponsored research projects, and three new faculty members. The College will need to provide another staff line to the department to support these new initiatives.

Together, these promises represent a commitment in excess of a quarter million dollars, money that the College expects to reallocate from other initiatives. Recent experience suggests that it may take some time for this degree program to receive state approval. I suspect, therefore, that many of these commitments will be fulfilled for the FY 18 and FY 19 fiscal years, about the time we can expect new cohorts of Ph.D. students to enter the department.

Office of the Dean

To: Craig White, Interim Provost
From: Mark Peceny, Dean, College of Arts and Sciences
Re: Support for the Ph.D. Program in Geography
Date: 8/1/17



New Mexico needs a Ph.D. in Geography to train the next generation of academic leaders, resource managers, policy makers, and geospatial analysts to understand and respond to the rapidly changing environment of the southwest. UNM's Department of Geography and Environmental Studies has forged a unique partnership with the Department of Geography at New Mexico State to develop a joint Ph.D. program that takes advantage of the complementary capabilities of the two programs to craft what we will believe will be a nationally competitive Ph.D. program. This effort has my full support.

The Department of Geography and Environmental Studies must add a tenure track faculty member specializing in the use of GIS techniques to build a sufficiently strong Ph.D. program to be nationally competitive. That position is included in year three of the faculty hiring plan recently submitted by the College of Arts and Sciences so that the new faculty member would be in place at the same time that we would expect to see the first class of Ph.D. students for this innovative cross-university program.

Although we expect that many graduate students will be supported by the sponsored research of their faculty mentors, we will also need to provide 1.5 FTE in additional TA/GA lines to the department, which will simultaneously advance the Ph.D. program and improve undergraduate education for majors and for students who take Geography courses in the core curriculum.

Finally, the one staff position now associated with the department will be insufficient to support the increasing complexity of a new Ph.D. program that spans two universities and an increasingly robust portfolio of sponsored research projects. The College will need to provide another staff line to the department to support these new initiatives.

Together, these promises represent a commitment of nearly \$200,000, money that the College expects to reallocate from other initiatives. Recent experience suggests that it may take some time for this degree program to receive state approval. I suspect, therefore, that many of these commitments will be fulfilled by fiscal year 2021, about the time we can expect new cohorts of Ph.D. students to enter the department.



THE UNIVERSITY of
NEW MEXICO

Office of the Vice Provost for Academic Affairs
MSC05 3400
1 University of New Mexico
Albuquerque, NM 87131-0001
505.277.2611

Date: March 15, 2015

To: Maria Lane, Associate Professor, Geography

From: Gregory L. Heileman, Associate Provost for Curriculum

Re: UNM-NMSU joint PhD in Geography – Pre-Approval

Cc: Chaouki Abdallah, Provost and EVP for Academic Affairs
Nancy Middlebrook, University Accreditation Director
Elizabeth Barton, Associate Registrar
Carolyn Montoya, Chair, Curricula Committee

Thank you for submitting the preliminary review outline for the UNM-NMSU joint PhD in Geography. In my judgment, the proposed PhD has been sufficiently well developed to warrant submission to the Faculty Senate Curricula Committee, please feel free to proceed.

Draft outline for MOU in support of UNM/ NMSU Joint Ph.D. Program

Drafted 1 September 2015 by Christopher Brown, based on NMSU guidelines

Revised 9 September 2015 by Maria lane and Christopher Brown

Revised 19 September 2015 by Maria Lane

Revised 1 October 2015 and 5 October 2015 by Maria Lane and Christopher Brown

Revised 20 October 2015 by Maria Lane and Christopher Brown

Revised 7 January 2016 by Christopher Brown, with input from Maria Lane and NMSU Associate Dean Beth Pollack

Revised 8 February 2016 with input from NMSU's HLC person and NMSU's Graduate Catalog, with input from Maria Lane

Revised 15 February 2016 by Maria Lane with input from UNM Grad dean Julie Coonrod

Name and type of approved degree to be awarded – The New Mexico Joint Doctoral Program in Geography.

Accreditation status of the program and institution – NMSU and UNM are institutionally accredited by the Higher Learning Commission (HLC) and have approval to offer any degree program appropriate to the missions of the two universities. No specific accreditation or licensure requirements exist for doctoral programs in Geography; however, both institutions commit to interface with HLC as the program is developed and proceeds through the approval process at NMSU and UNM.

Management structure – The New Mexico Joint Doctoral Program in Geography will be managed by the Doctoral Program Steering Committee (Steering Committee), and the Steering Committee will be responsible for screening applications; making admissions decisions; reviewing and advising curriculum; handling conflicts, grievances, and appeals that cannot be resolved within the student's research committee; and maintaining communication between both institutions on relevant issues as they arise. Composition of the Committee will reflect representation of faculty from both institutions, specifically including, at a minimum, the graduate program director and at least one additional faculty member from each department. Committee membership may change annually, based on teaching assignments, interest, sabbatical leave, and other fluctuations of effort among faculty members. Meetings of the Steering Committee may occur as face-to-face meetings or via Skype or other Web-assisted technologies.

Program curriculum – Each department maintains full responsibility for its own course offerings, but both departments commit to coordinate changes that would affect the program as a whole. Specifically, we agree to a three-week notice and comment period for any addition, removal or modification of doctoral-level courses in either university's catalog, during which input to proposed changes are accepted from the institution not making the change. Some courses will be offered at UNM, some will be offered at NMSU, and some will be offered at distance. See attached table for summary of proposed classes and delivery formats.

campus. In the event that a student desires to switch to a new adviser who is not resident at the student's home institution (thus necessitating a change in the student's home institution), the registrars of the two institutions will work together to facilitate a transfer and change of adviser without any prejudice against the student's standing or progress.

Financial arrangements – As discussed in the admissions portion of the full proposal, students will apply to the New Mexico Joint Doctoral Program in Geography at one of the two institutions, and the point of contact at that institution will route all relevant materials to a joint review committee composed of faculty from both institutions that will make admissions decisions. Payment of application fees will be handled via the intake portal at the home institution, and students that are admitted to and enroll in the program will handle all financial matters related to tuition, fees, financial aid, and stipend/salaries associated with graduate assistantships through the home institution. Only in the event that a student desires to switch advisers that would involve a change in the home institution would the two institutions need to discuss any cross-institutional interactions on financial matters involving student support.

As noted in the full proposal, the funding for the joint program coordinator will be provided by UNM, and both institutions will benefit from and be served by this staff person. Although UNM faculty will have the primary responsibility for screening, hiring, and managing this staff person, NMSU faculty will provide input into these processes. Specifically, UNM will select finalists for the staff position and invite comment from NMSU before making any final decision. The UNM department chair will be the direct supervisor, but the Steering Committee will be asked to provide input to the official annual review process.

Statement on faculty hiring – Each department maintains full responsibility for its own faculty hiring, but both departments commit to communicate about any searches for faculty that would be expected to participate in the joint doctoral program. Specifically, we agree that the institution planning the faculty search will provide a three-week notice and comment period to the partner institution before finalizing and posting a faculty job advertisement unless prohibited by the timeline necessary to conduct a successful hire. We also agree that upon successful completion of a faculty search, the institution conducting the hire will notify the partner institution in a timely manner of the search results, and will initiate a discussion about the role of the new faculty member in the joint doctoral program.

Statement on who is responsible for advising students – Successful applicants to the program will research potential advisors prior to applying, establish a relationship with a likely advisor, and speak to this relationship in their application materials. During the process of reviewing the applications, the review committee will interact with likely advisors, ask them to review the file, and ask for a commitment to be interim advisor if the applicant is admitted to the program. The interim advisor will assist the student in assembling and finalizing a joint doctoral committee, preparing and submitting an appropriate program of study, and conducting the first semester diagnostic interview. Primary responsibility for advising rests

Program Assessment

The Steering Committee composed of faculty from both institutions will be tasked with conducting regular reviews of student learning and program quality in three distinct phases: entrance interviews, annual student reviews, and exit surveys. In general, this assessment structure is designed to evaluate both employment placement and the quality of student research products. Each academic year, the Steering Committee will synthesize the results these assessments and will share them with the entire program faculty (across both institutions). A joint faculty meeting will then be held to discuss the assessment outcomes for purposes of guiding improvements to the program or affirming successes. This "internal" review will be conducted on an annual basis, with an external review commissioned after 5 years. The New Mexico Joint Doctoral Program in Geography will additionally be assessed within the regular cycle of Academic Program Review at each institution.

Signature sheet of approval by senior administration of participating institutions - See the attached draft signature page that will be deployed as the proposal and MOU moves forward.

Process of adding participating institutions - As the New Mexico Joint Doctoral Program in Geography is a focused joint Ph.D. program proposed solely by the faculty in the NMSU Department of Geography and the UNM Department of Geography & Environmental Studies, there is no expectation that new participating institutions will be added.

**Development of Graduate level Cross Enrollment Agreements among
Universities in New Mexico**
Received October 2, 2015

Cross Enrollment of graduate students among select four year New Mexico universities would allow fully admitted and enrolled students to take courses offered at institutions participating in the agreement (Host schools), without the need for an additional formal admission procedure. This would differ from transient enrollment, which requires admission, registration, and payment to the host school, which is currently the case.

The fundamental benefit is to allow students to take courses, which are germane to their respective graduate program, that are not offered by their home institution. This is assuming that the Graduate Advisor, Department, and Office of Graduate Studies are in the agreement that the course(s) is/are important for the completion of the student's degree program. The goal of Cross Enrollment is to facilitate relatively painless and seamless cross enrollment and successful course completion by graduate students among cooperating universities rather than them having to surmount the obstacles inherent in transient enrollment. Each university with a graduate program has graduate courses offered that are not duplicated by any other institution in the state. The New Mexico universities will be able to complement their course offerings amongst themselves and thereby broaden their graduate students educational opportunities. In a time of increasingly limited resources for higher education, this should be viewed as a prime opportunity to increase the quality of graduate education in New Mexico. It should be welcomed by the participating universities and embraced by both the Higher Education Department and the Legislature.

Implementation of a Graduate Student Cross Enrollment Program will require an agreement to allow reciprocal cross enrollment among participating schools. There are a number of such agreements that have been developed by cooperating university groups across the country. These agreements provide proof of concept. These include participating universities in the Pittsburgh Council on Higher Education (Carnegie Mellon, University, University of Pittsburgh, Duquesne University and 5 other universities), Boston College-Tufts University-Brandeis University-Hebrew College consortium, USC/UCLA Resource Sharing Program, University of California Intercampus Exchange Program for Graduate Students (IEPGS), Berkeley-Stanford Exchange Program, the New York Universities plus Princeton and Rutgers Inter-University Doctoral Consortium, and the Atlanta Regional Council of Higher Education Cross Registration Agreement (20 participating institutions). The ongoing success of these agreements provides strong support for implementing a Cross Enrollment Agreement for New Mexico Universities.

- c. Obtain the signatures of your graduate advisor and dept. graduate coordinator.
- d. Obtain approval of the official instructor of record at the Host univ. Email approval is permitted.
- e. Bring your petition to Enrollment Management for approval.
- f. After you have obtained this approval you may register for GEX 600 for 0 credit hours at the Home university. The application will be sent to the Host NM university for final processing and the eventual assigning of the grade. Upon receipt of the application from the Home univ., the Host university will enroll the student in GEX601 for 1-4 credit hours. The course title for both GEX 600 (at the Home univ.) and GEX601 (at the Host univ. will be the same as the course title of the actual departmental course.

The following rules will apply.

- 1. Students are not permitted to retroactively enroll in GEX600/GST601 after they have taken and completed a course at the Host university. Permission must be obtained before the first day of the course.
- 2. Only courses available for graduate credit are eligible.
- 3. If you are on a fellowship or assistantship please check with your home department regarding whether your award covers GEX600.
- 4. Graduate students registered for GEX600 will pay the Home university tuition.
- 5. Student Credit Hours for formula funding will be awarded to the Host institution via registration in GEX601.
- 6. GEX600 will be graded "Credit" or "No Credit" although the student must earn a "B" or better in the Host course to earn credit for GEX600.
- 7. If the student drops the GEX class after the Home univ. add/drop date a W will appear on the student's transcript.
- 8. The Home univ. Department has the sole discretion to determine whether to apply GEX towards a student's degree.
- 9. Graduate Studies does not place a limit on the number of times a student may apply to take a class at a Host university. However, individual departments may place a limit on the number of GEX600 courses they will count towards the degree. Students will also be subject to Home university residency and registration requirements.
- 10. GEX 600 may not be used as a substitute for required Home univ. courses.

In order to implement this procedure at NM universities each university would have to establish equivalent special graduate courses. We propose GST600 and GST601. This would involve getting Faculty Senate approval for creation of these courses from each university. Graduate Studies offices at each participating university would have to agree to be the administrative home for the process. The apportionment of tuition and student credit hours will have to be agreed to by the participating universities administrations. We believe the proposed procedure will minimize




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Memorandum

Date: March 5, 2018

To: Maria Lane, PhD, Department Chair, Geography and Environmental Studies, UNM

From: Carol Campbell, PhD, Department Head, Department of Geography, NMSU 

Re: Update on Joint UNM-NMSU PhD program

The proposal to establish a joint PhD program between our two universities has received approval through all levels of the University and the office of the Regents at New Mexico State University. The office of the Provost and of the Chancellor signed our proposal in October 2016. The Board of Regents signed the document in May 2017.

The delay between these two groups of signatures occurred because the Regents requested information about the need for PhD level researchers in the workforce. We conducted a survey of 50 employers from private industry and federal state and local businesses. The survey indicated that employers would seek approximately 13 PhD's per year for the next five years. The largest employer was the federal government due to a high rate of retirement for baby boomers.

NMSU is strongly committed to the success of this proposal as indicated by the graduate Dean's commitment to add two additional graduate assistantships to the program once we begin this venture. In addition, our Dean approved the replacement of a retiring faculty member in the geography department. We currently have a visiting faculty member in house, and are conducting a search for the permanent faculty member. This is an important indicator at a time when many departments are shrinking and losing faculty.

The University support is also strong as indicated by the letters of support from each of the colleges on campus and the USDA – ARS Jornada Experimental Range, with whom we collaborate, and our students gain employment. We anxiously await news of the progress you are making toward approval of this joint UNM-NMSU PhD program.



Association of American Geographers

January 3, 2016

1710 Sixteenth Street Northwest
Washington, DC 20009-3198
Voice 202-234-1450
Fax 202-234-2744
gaia@aag.org
http://www.aag.org

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Executive Director
Douglas Richardson

Dr. Maria Lane
Chair, Department of Geography & Environmental Studies
University of New Mexico

Dr. Christopher Brown
Chair, Department of Geography
New Mexico State University

Dear Drs Lane and Brown:

Thank you for the opportunity to write a letter of support for your proposal to create a joint doctoral program in geography. As president of the American Association of Geographers, I welcome all initiatives to expand and enhance our profession. More than that, I believe your cooperative program is a model for graduate education in geography. Let me expand on that idea.

Graduate education is a topic of great interest right now in higher education. It is clear that there is a need for careful reflection on the purposes of a Ph.D. both for the individual and for society. We need to understand that it is not sufficient to simply reproduce ourselves but to prepare highly skilled, knowledgeable, and flexible individuals able to move between academia, industry, and government and to contribute to all in a range of ways. As we re-think graduate education, we must consider how to bridge theory and practice, intellectual pursuits with the real needs of society.

As I read your proposal I see that you have grappled with these key ideas in a novel and innovative fashion. You have crafted a program focus that meets the needs of New Mexico and the Southwest, that capitalizes on the strengths of two geography departments, and uses a central practice of geography, spatial analysis through geospatial technologies, as a foundation and unifying theme. Further, you recognize that you are preparing geographers for varied purposes. As enrollments decline in colleges and universities but demands for the skills and practices of geographers grow elsewhere, your program is unique in exploring a new model of graduate education.

I commend you for the very thorough and careful work that has gone into the formulation of the proposal. You have a solid and exciting plan, well-supported by your two institutions which deserves to be approved. I look forward to hearing future reports of your successes and advise you to make public the plans and ongoing progress to success as the program evolves.

Best of luck and please let the Association know how we can support you in pursuing the goal of creating a new doctoral program

Sincerely,

Sarah Witham Bednarz
Professor of Geography, Texas A&M University
President, American Association of Geographers



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Darren Purcell
University of Oklahoma

Susan M. Roberts
University of Kentucky

Susy S. Ziegler
Northern Michigan University

Jeremy Tasch
Towson University

Executive Director
Douglas Richardson

Association of American Geographers

December 8, 2015

K. Maria D. Lane, Chair
Department of Geography & Environmental Studies
University of New Mexico

Christopher Brown, Head
Department of Geography
New Mexico State University

Dear Professor Lane and Professor Brown:

I have conducted a thorough review of the UNM-NMSU proposal for a jointly-administered doctoral program in Geography.

The proposal makes a very compelling and timely case for the program. It creatively combines UNM and NMSU's highly complementary areas of geographic expertise to offer prospective students highly significant opportunities to pursue research on integrated human-environment systems in the local context of New Mexico.

The proposed curriculum will be unique in the nation and has strong potential to attract students with backgrounds in geography, geoscience and other social and environmental sciences. Finding effective solutions to environmental challenges requires the unique analytical perspective of geography. With its synthetic focus on human-environment interaction, the UNM-NMSU joint doctoral degree in Geography will prepare a new generation of students in New Mexico and beyond to become leaders, educators and researchers in the discipline.

As you know, I have directed the AAG's Enhancing Departments and Graduate Education program for several years. From my perspective as EDGE project director, I consider this proposal to be comprehensive and well-supported by data and appropriate citations on U.S. doctoral education, including the EDGE project as well as original data gathered from local focus groups. In every sense, the proposed PhD program is fully responsive to national workforce trends and makes use of effective practices for professional development, career preparation and graduate student mentoring.

On behalf of the AAG, congratulations on such a fine proposal, and thank you for your leadership. The AAG looks forward to supporting this new program and working with you to help it succeed in the coming years.

Sincerely,

Michael Solem
Director of Educational Research and Programs



College of Arts and Sciences

(Breland Hall, Room 137)

Department of Geography

MSC MAP

New Mexico State University

P.O. Box 30001

Las Cruces, NM 88003-8001

575-646-3509, fax: 575-646-7430

nmsu.edu/~geoweb/

Dr. Gregory L. Heileman
Associate Provost for Curriculum
The University of New Mexico (UNM)

5 December 2014

Dear Dr. Heileman,

I draft this letter to document the work that the leadership of the UNM Department of Geography and Environmental Studies and I have done in the past to advance a joint Ph.D. program in Geography. I also share with you details of our commitment to work together on this effort in the future.

For the last 18 months, members of the two departments have worked together to investigate the development of a joint Ph.D. program in Geography that would build on the respective strengths of our two departments, and we are fully committed to continue this work in the future. In fact, the development and implementation of this joint Ph.D. program is our number one goal in our strategic plan for the future. We are proceeding on the belief that such a joint program would truly be greater than the sum of the individual parts; the joint program we seek to advance will provide much greater benefit to both institutions than our departments could provide individually.

I also note that Maria Lane and I have established a very good working relationship based on mutual respect for each other that fully extends to our faculty, as we work to build a program whereby each department will be a true partner to the other. We very much look forward to working with the team in the UNM Department of Geography and Environmental Studies to develop plans for an administrative structure and curriculum to support the success of the program. We are especially excited about the upcoming retreat where we will lay the foundation for and begin drafting the detailed proposal documents that will allow the program proposal to move through the various administrative units at both UNM and NMSU. Thank you in advance for your support as our faculty members work together to advance this important program.

Best regards,

A handwritten signature in blue ink, appearing to read "Christopher Brown".

Christopher Brown, Department Head
NMSU Department of Geography



United States Department of the Interior

U.S. Geological Survey
Fort Collins Science Center
Jemez Mountains Field Station
15 Entrance Road
Los Alamos, New Mexico 87544
Phone: 505-672-3861 X 720 Fax: 505-672-9607

K. Maria D. Lane, Chair
Department of Geography and Environmental Studies
University of New Mexico

Christopher Brown
Head, Department of Geography
New Mexico State University

Dear Drs. Lane and Brown,

Thank you for the opportunity to review materials for the proposed New Mexico Joint Doctoral Program in Geography. Here at the USGS Jemez Mountains Field Station we strongly support your effort to launch this program and commend the work of your faculties in crafting a comprehensive proposal. From our perspective within a federal science agency (USGS) that has been physically based here in northern New Mexico since 1993 providing science support to land managers and policy makers, the addition of such a program would be a valuable way to substantively increase relevant scientific capacity in New Mexico. Such a program would create important doctoral-level training and research findings needed by society (including private landowners, tribes, federal and state agencies, policy-makers) to effectively address many historical and emerging environmental management issues and challenges directly affecting local, regional, and statewide communities and environments.

Based on our review of the proposal, the New Mexico Joint Doctoral Program in Geography is designed to provide exactly the type of research training that is sorely needed in our state. Its focus on integrative research methods, on interdisciplinary perspectives, and on the combination of theory and praxis is well suited to both the environmental and employment contexts of New Mexico. This program could leverage the strengths of both UNM and NMSU to effectively compete for resources and talent with other regional programs. The program graduates will be capable of filling important scientific and leadership roles in federal land management and scientific agencies.

Once the joint doctoral program is approved and launched, we see tremendous potential for USGS to become a strong partner in terms of scientific collaboration. The foundation of the program ensures comprehensively trained students who have an understanding of integrative human-environment dynamics, which fits well with the interdisciplinary and often applied focus of our Field Station. We currently are in the process of building greater research and collaborative capacities, and can envision numerous new research activities and programs that could mesh well with this proposed doctoral program; certainly we are willing to work with UNM/NMSU faculty and doctoral students to identify relevant topics and datasets that build on our long-term work physically based in this region. Where appropriate, some of our personnel could participate in

Subject: letter in support of joint geography ph.d.

Date: Monday, January 18, 2016 at 12:07:35 PM Mountain Standard Time

From: McCormick, Peter

To: Maria Lane

CC: McCormick, Peter

Dear Maria,

I apologize for the delay in my response. As I mentioned briefly at the SWAAG meetings in San Antonio and in later e-mails, I was, at first glance, very impressed with the New Mexico Joint Doctoral Program in Geography. I am very encouraged by the program because it is both innovative and appropriate. As a geographer trained in the cultural-historical tradition and as a professional working in an interdisciplinary Environmental Studies program, I see the benefits of what UNM and NMSU propose from the disciplinary level. The integrative approach, merging cultural landscape studies, arid land management, and environmental change via the geosciences -- is a very thoughtful and practical approach to both reintegrating the sub-disciplines of geography while at the same time understanding the importance of broad, integrative training at the graduate level. As you know, many disciplines, including geography, history, and the humanities, more and more, are merging traditional humanistic and social science approaches with technology; moreover, there are national concerns about the lack of cohesion between the humanities, social sciences, and the STEM disciplines, including recent conversations at the National Academies of Sciences, Engineering, and Medicine. I mention this because this national trend -- reintegrating the disciplines -- is important pedagogically and also from a practical perspective. This program is a model for developing both applied and theoretical skills, which is very important for your future students. This diverse approach makes them more marketable and gives them the necessary skills to work in a variety of professions. Lastly, I am also very happy to see that your proposal employs various pedagogical approaches and delivery modes. This makes the program more rich, but also much more practical and accessible to your potential student population. My institution, like yours, serves the Southwest and Four Corners, as well as a large non-traditional and first-generation population. Opening up your program to diverse delivery models and limited residency requirements caters to this population. Perhaps it is the focus your program has on your regional characteristics -- and your programs' strengths -- that makes this proposal so innovative and appropriate. The program is a model for developing both applied and theoretical skills in diverse cultural landscapes and in arid landscapes, and gives them the scientific and technical skills to apply this knowledge. This, coupled with the programs accessibility, is really encouraging and exactly what our region needs. I would not think twice to recommend our graduates to pursue such a program. I applaud you and your colleagues for your effort in putting this together and I hope that it will be received well.

If there is anything else I can do to support your efforts, please let me know.

With every best wish,

Pete McCormick, Ph.D.

Associate Professor of Environmental Studies

Associate Dean of the School of Arts and Sciences

Fort Lewis College

1000 Rim Drive

Durango, CO 81301 USA

970.764.7787



Office of the Dean

K. Maria Lane, Ph.D.
Professor and Chair
Department of Geography
College of Arts and Sciences
University of New Mexico
Albuquerque, New Mexico, 87131

January 19, 2016

Dear Dr. Lane,

I am writing to offer my strongest support for your proposal for the Joint Doctoral Program in Geography offered cooperatively by UNM and NMSU. This is one of the most exciting educational programs I have reviewed during my tenure as a UNM faculty member and Associate Dean for Research in the College because it joins forces among our research universities to fill a critical need in the state and in interdisciplinary research and education efforts we are actively growing. Expert-level geographic knowledge and tools are now integral to virtually every aspect of science, humanities, and policy making, and a linchpin of private-sector and non-governmental organization planning, design, and execution of business activities. It is simply impossible under the current funding climate to build individual geography programs at both UNM and NMSU, and so this joint program represents an innovative solution for filling a critical need in the state while minimizing costs and maximizing the potential for collaboration in our shared educational and research missions.

As you know, the College of Arts and Sciences is developing the Data-to-Knowledge (D2K) initiative that unites core research and computing capabilities into new space that will allow our best and brightest faculty and graduate students to work together in a think-tank atmosphere to solve some of New Mexico's most pressing problems. The Environmental Data Analysis and Synthesis Laboratory will be one of four units to be located in 30,000 square feet of state-of-the-art laboratory and teaching space. Geographic Information Systems (GIS) and remote sensing applications will be key contributors of big data that will be integrated across disciplines to address issues of border-land security, ecology and economics of dryland systems, and health-care delivery to rural populations in New Mexico to name a few applications. The most important opportunity this space provides is the chance for Geography graduate students to interact with students in other disciplines to apply their skills to create new knowledge and innovative solutions. Cross-disciplinary thinking and application are perhaps the most highly sought-after skills that fuel robust economic growth. Our capacity for remote learning and broad student participation will increase dramatically when your program institutionalized, and new resources provided by D2K will only enhance its impact.

Because New Mexico is a resource-limited state, it is imperative that we capitalize on investments in higher education to produce programs that will grow future opportunities. Your proposal does just that. I support it wholeheartedly and will do whatever I can to ensure its success.

With Best Regards,

A handwritten signature in dark ink, appearing to read "T. Turner", written over a horizontal line.

Thomas F. Turner, Ph.D.
Associate Dean for Research



The University of New Mexico

Department of Anthropology
MSC01 1040, 1 University of New Mexico
Albuquerque, NM 87131-1086
Telephone (505) 277-4524
FAX (505) 277-0874

November 2, 2015

Memo to:
Professor Maria Lane
Chair, Department of Geography
University of New Mexico
Albuquerque, NM 87131

Dear Dr. Lane:

I write to you to express my strong and enthusiastic support for the proposed New Mexico Joint Doctoral Program in Geography that would be based here at UNM as well as at New Mexico State University.

It was my pleasure to circulate the proposal for the new joint doctoral program to my colleagues. I received many positive responses, but I would like to quote from one at length, that I received from a colleague in the Archaeology subfield of my department.

“Quick note to let you know (you will no doubt also hear from the other archaeologists) that ALL of the courses that Maria Lane listed (Spatial Statistics, Basic Programming for GIS, Advanced Programming for GIS, Drylands, Remote Sensing Seminar for advanced students) will draw archaeology students, many of whom take GIS and/or remote sensing classes for their skills requirement (and many take additional courses). Drylands will likely be of interest to our grad students doing more environmental work in the SW or other arid regions (like the Atacama!) who want to tie past to present.

A number of the arch faculty work on environmental/ecological/land use topics, and others have students working on more cultural-spatial topics so we will continue to draw students who will be interested in the new courses.

Really excited to hear about their new program, it's a great department.”

I think that succinctly sums up the reaction from my department with respect to the proposed new program. Please let me know if Anthropology can do more to support this tremendously important and innovative development.

Very best,

Les Field
Professor and Chair



William T. Pockman

Professor and Chair
Regents' Lecturer

Tel: (505) 277 2724
Fax: (505) 277 0304
E-mail: pockman@unm.edu

November 14, 2015

Maria Lane
Chair, Department of Geography
University of New Mexico

Dear Maria:

I am writing to express my support for your efforts to create The New Mexico Joint Doctoral Program in Geography. The Biology Department already has significant research collaborations with faculty in Geography. The goal of increasing the research capacity is certainly one that will continue to development the research collaborations between Biology and Geography faculty. Moreover, many Biology students seek to take a spatially explicit approach to their research and will benefit from the increased teaching and mentoring capacity that will come along with this program. Finally, a number of graduate-level Biology courses would be a good fit in the degree program of students from GES or other departments (e.g. Ecosystem Ecology, Plant Physiological Ecology, Community Ecology, Flora of New Mexico, etc). Although many of these courses have prerequisites for undergraduates (most are cross-listed 400/500 for advanced undergraduates and graduate students), instructors often override prerequisites for graduate students with appropriate interests. Although these courses are well-subscribed, they are often below capacity and could collectively accommodate a significant number of students from GES or other departments.

The Biology Department strongly supports the development of this Joint Doctoral Program. If I may provide any additional information or perspective, please contact me.

Sincerely,

William T. Pockman



The University of New Mexico

School of Architecture & Planning
MSC04-2530

1 University of New Mexico
2401 Central Avenue NE
Albuquerque, New Mexico 87131-0001
Telephone (505) 277-2903
FAX (505) 277-0076

November 24, 2015

To: K. Maria D. Lane, Associate Professor & Chair, Geography

From: Renia Ehrenfeucht, Professor & Director, Community and Regional Planning

RE: Joint PhD in Geography

Dear Dr. Lane,

This letter expresses the Community and Regional Planning program's support for the Joint PhD in Geography. I have reviewed the proposal.

The two courses included in the proposed curriculum, CRP 515 and CRP 516, are offered at least once every two years and would have space available for up to five students from the PhD program in Geography.

Currently, MCRP students take geography courses and CRP faculty members use spatial analysis and mapping in their natural resource conservation and cultural landscapes research. We see the potential for future collaborations and we look forward to working together.

Department of Civil Engineering

November 23, 2015

To: Maria Lane, Professor and Chair, Department of Geography

From: Mahmoud R. Taha, Professor, Chair and Regents' Lecturer, Department Civil Engineering, UNM

RE: New PhD Joint Program in Geography

Dear Maria,

It is my pleasure to endorse and strongly support your proposed efforts to create a new Joint PhD program in Geography in the state of New Mexico through collaboration between University of New Mexico and New Mexico State University. I understand reviewing your proposal that you plan to have some of the new PhD program students taking some graduate classes in civil engineering. I confirm here that those classes, you listed in your proposal, are offered annually. I also ensure you that we will be very pleased to have students from this new PhD program participating in Civil Engineering graduate classes. This new PhD program and level of interaction between us comes at no surprise given the significant level of collaboration the department of Geography currently has with Civil Engineering represented by a number of collaboratively funded research grants and Geography and Civil Engineering faculty serving on graduate student committees in both departments. I also believe that your proposal for the joint PhD program is timely as further interdisciplinary research strongly tied to Geography has been growing over the years. Our recent collaboration with you and other faculty in your department on the new research initiative on resilient communities is an excellent example on the need to train PhD students in both departments to address these future multidisciplinary challenges.

I strongly support your proposal for the joint PhD program in Geography. I am confident that the faculty in Civil Engineering will be pleased to support this new program through mentoring and advising of students and making our graduate classes and resources available to all your PhD students.

Sincerely,



Dr. Mahmoud Reda Taha, P. Eng.
Professor and Chair



The University of New Mexico

Department of Earth and Planetary Sciences
Northrop Hall, Room 141
MSC03-2040
1 University of New Mexico
Albuquerque, NM 87131-0001 U.S.A.
Telephone (505) 277-4204
FAX (505) 277-8843

November 18, 2015

Maria Lane
Chair, Department of Geography
University of New Mexico

Dear Maria:

I am writing on behalf of the Department of Earth & Planetary Sciences (EPS) to express our general support for your efforts to create a Joint Doctoral Program in Geography between your unit and New Mexico State University. EPS already has significant interactions with Geography programs, as our undergraduate majors in both EPS and Environmental Science may already take courses in Geography to satisfy core requirements. In addition, many of our graduate students utilize Geography courses in their Programs of Study. Graduate students in your past programs have taken EPS courses in, for example, water, geographic information systems, soils and geomorphology. Several graduate-level EPS courses would be a good fit in the degree program of students from GES or other departments (e.g. Geomorphology and Topics in Geomorphology, Computational and GIS Applications in Geomorphology, Soil Stratigraphy, Hydrology, and Climate Dynamics, etc). Although many of these courses have prerequisites for undergraduates (most are cross-listed 400/500 for advanced undergraduates and graduate students), instructors often override prerequisites for graduate students with appropriate interests and sufficient background. Although these courses are well subscribed, they are often below capacity and could collectively accommodate a significant number of students from GES or other departments.

The Department of Earth & Planetary Sciences supports the development of this Joint Doctoral Program. If I may provide any additional, please let me know.

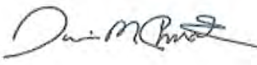
Best regards,

Laura J. Crossey
Professor and Chair, Earth & Planetary Sciences



Janie M. Chermak, Professor and Chair
Department of Economics
University of New Mexico
MSC05 3060, 1UNM
Albuquerque, New Mexico 87131
505-277-2037
FAX 505-277-9445

To: Maria Lane, Chair – Department of Geography & Environmental Studies

From: Janie M. Chermak, Chair – Department of Economics 

Re: New Mexico Joint Doctoral Program in Geography Program Description

November 11, 2015

I've reviewed the proposal provided on the Joint Doctoral Program and support it. There is the potential to increase the interactions between our departments and to develop new synergies not only through the teaching mission, but also through joint research.

A number of graduate students from economics currently enroll in courses in the Geography and Environmental Studies Department – specifically GIS courses. I can envision future students having interest not only in current courses, but also proposed courses. This would allow select economics PhD student the opportunity to expand their background and toolset, which can improve their marketability.

In addition, the economics graduate courses included in the program description will generally have space available for up to four PhD Geography students. While there are pre-requisites that are required for these courses, there is normally space available in the pre-requisite courses as well. These courses (ECON 540, ECON 542, ECON 543, ECON 544) are taught on a rotating basis and are generally offered every fourth semester.

I commend the work that you've done to develop this proposal. Again, I support the proposed degree and see potential opportunities exist between the Economics and the Geography Graduate Programs.

Subject: Re: Cross-institutional PhD program in Geogrpahy - UNM/NMSU
Date: Wednesday, October 28, 2015 at 1:41:41 PM Mountain Daylight Time
From: Debby Knotts
To: Maria Lane

Hi Maria,
I have reviewed your document and it looks very comprehensive. I also sent it on to Monica, Elisha (EL IT) and Becky (EL Faculty Support) for review, as well. I was scheduled to be out of the office starting at 1:00PM today and will not be back in town until Monday. I will touch base with them next week.

Per the distance learning component there will be some logistical considerations, but you have outlined flexibility in your document. It is good to know that Dean Peceny is providing funding for this great program you have outlined!

Best,
Debby

Debby Knotts
Executive Director, Strategic Initiatives
Extended Learning

MSC03 2190
1 University of New Mexico
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(o) 505-277-9000 (c) 505-269-1810
<http://extendedlearning.unm.edu>
<http://online.unm.edu>
<http://newmedia.unm.edu>

From: Maria Lane
Sent: Wednesday, October 28, 2015 6:28 AM
To: Debby Knotts
Subject: Re: Cross-institutional PhD program in Geogrpahy - UNM/NMSU

Hi Debby,
One more followup on this, with apologies for pestering: is there anyone else I should be copying on this request? I would be happy to circulate this to Monica and/or Becky, depending on who should be brought into the review loop. Alternatively, please feel free to forward as appropriate.
Thanks,
Maria

—
K. Maria D. Lane
Associate Professor & Chair
Geography & Environmental Studies



The University of New Mexico
Latin American and Iberian Institute
MSC02 1690
1 University of New Mexico
Albuquerque, NM 87131-0001

November 30, 2015

K. Maria D. Lane
Associate Professor & Chair
Geography & Environmental Studies
University of New Mexico (UNM)
Bandelier West Room 215
MSC01 1110
Albuquerque, NM 87131

Dear Maria,

This letter is intended to formalize something I've told you on many occasions: that I am wholeheartedly and enthusiastically in support of the initiative to create a joint Ph.D. in Geography, which would be administered between your department and the Department of Geography at New Mexico State University (NMSU). The program will serve the needs of the State of New Mexico and its population at a time when the understanding of geography, natural resources and related subjects has never been more essential to avert the negative consequences of rampant climate change and the economic globalization that contributes to it. Effectively educated doctoral students from your program will be prepared for important jobs in the private, government and academic sectors within our state, and will also respond to national market demand for people with these kinds of skills.

The proposed doctoral program in geography is extremely important to keep UNM and NMSU abreast of current academic trends, in which the Ph.D. is increasingly expected of professional geographers, not just within academia but increasingly beyond it. Without a Ph.D. granting geography program in the state, New Mexico will keep losing out to programs in neighboring states, even though the quality of their faculty and curricula may be substantially lower than yours.

One of the aspects of the proposed degree that especially suits it to UNM and NMSU--and portends strong future enrollments due to the novelty of its intended niche--is its emphasis on Latin America, the U.S. Southwest, and the US-Mexico borderlands. One definite source of students will be the docents in the LAII's Ecuadorian Program. Currently the LAII is partnering with two Ecuadorian universities (Universidad Central del Ecuador and the University of Cuenca) to provide Ph.D. level education for their faculty. Of those who are earning their Ph.D.'s in Latin American Studies a number have selected geography as one of their two concentrations. Most of them would prefer earning their degree in Geography, but the lack of a Ph.D. program at UNM precludes this possibility. The newly-created geography concentration is a welcome addition to our LAS Ph.D. program, and it is making an increasingly important

contribution to the program and to our students. It has also given UNM Geography faculty valuable experience working with Ph.D. students from Latin America to help prepare them for the development of their own Ph.D. program and its international clientele. But it's clear that the benefits of participation in UNM's Geography Ph.D. courses will not be confined to LAS students, but will be more broadly available to students with interests in other geographical areas and cultures through the world.

The specializations of the UNM and NMSU faculty with their expertise in Latin America, the US Southwest, and the U.S.-Mexico borderlands will enable the proposed program to offer specializations that will be highly attractive to potential constituencies who have few other universities nationally with which to pursue these kinds of regional foci. The proposed program offers numerous possibilities for collaboration with the LAII and with our counterpart organization at NMSU (CLABS- the Center for Latin American and Border Studies) which will only grow in the future, as the program evolves and expands.

In short, on behalf of the LAII, and its faculty and staff, I offer my strong endorsement for your proposed joint Ph.D. program.

Sincerely,

A handwritten signature in cursive script that reads "Susan B. Tiano". The signature is written in dark ink and is positioned above the printed name and title.

Susan B. Tiano
Director, Latin American & Iberian Institute and
Professor of Sociology

Subject: Re: draft proposal for joint UNM-NMSU Geography PhD program

Date: Sunday, November 8, 2015 at 8:59:48 AM Mountain Standard Time

From: Gabriel Ramon Sanchez

To: Maria Lane

CC: John Newman Carr

Hello Maria, thanks for sharing the proposal and glad to see that you have made a lot of progress since we discussed this.

What you have laid out is good with me and remains consistent with where we are at the RWJF Center. We have also recently established a larger Institute for Policy, Evaluation and Applied Research (IPEAR) in the Vice President for Research office. This new institute will coordinate the activities of CEPR, BEBER, GPS, and a couple of other smaller Centers who engage in applied research. The goal of IPEAR is to provide infrastructure for applied policy research that is supported by soft money and to help connect faculty and students to that work more formally. When the degree is on-line we should be up and running and be helpful to support some of the initiatives you have laid out in the proposal.

Thanks for sharing, and let me know if you would like to meet again to discuss the IPEAR model and how it might fit with your plans.

Thanks
Gabe

Gabriel R. Sanchez, Ph.D.
Associate Professor
Department of Political Science
Executive Director
RWJF Center for Health Policy
University of New Mexico
(505) 277-0130

From: Maria Lane

Sent: Tuesday, October 13, 2015 9:50 PM

To: Gabriel Ramon Sanchez

Cc: John Newman Carr

Subject: draft proposal for joint UNM-NMSU Geography PhD program

Dear Gabe,

When we talked this past year about the proposal for a joint UNM-NMSU PhD program in Geography, I promised to send you a copy of the program description when it was ready. We have now completed a full draft of the "Program Description and Purpose" for the proposal, and I invite you to take a look at the structure and curriculum we have designed with our NMSU partners. (See attached PDF, which includes a curriculum summary table on the last page).

As discussed, we have attempted to leverage existing strengths at UNM while adding new



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October 25, 2015

To: Maria Lane, Chair, Department of Geography and Environmental Studies (GES), UNM

From: Robert Berrens, Director, Water Resources Program (WRP), and Professor, Department of Economics, UNM

Robert P. Berrens

Re: Review Comments on Proposed Joint Doctoral Program in Geography, UNM and NMSU

Per your invitation, I am writing to provide my review comments on the proposed Joint Doctoral Program in Geography between the University of New Mexico (UNM) and New Mexico State University (NMSU). I have had the opportunity to review the program summary and proposed curriculum in detail. I have a number of linkages to the curriculum, through the different roles I have at UNM (WRP Director, and Professor of Economics). In both those roles, I focus on interdisciplinary approaches to environmental and sustainability problems. Thus, as an overall comment, I am highly supportive of the innovative, proposed joint program, which "puts integrative thinking at the center of its structure." Further, I support the argument in the proposal that there is the opportunity for significant "curricular synergy" with current programs at UNM. Of note, the Geography and Environmental Studies (GES) program already supports the WRP in significant ways: (i) a faculty member (Melinda Benson) serves on the WRP Advisory Committee; (ii) WRP students regularly take GES graduate courses such as, 561, 562, 563 and 581; (iii) GES faculty members regularly serve as chairs or members for WRP professional projects. Further connections are discussed in detail below.

First, I am the Director of the interdisciplinary Water Resources Program (WRP) at UNM, which offers the applied Masters of Water Resources (MWR) degree, and participates in the joint MCRP-MWR degree with Community and Regional Planning (CRP). For the WRP, several of our core courses are included in the Human Geography

sub-curriculum of the proposed program: (i) WR 571: Contemporary Issues (with a water policy focus); and (ii) WR 572 Modeling. WR 571 is offered every Fall semester, and WR 572 is offered every Spring semester, annually. There is a strong commitment at UNM to keep teaching both of these courses (as part of a 3 course core sequence for WRP), as has been done for last, roughly, 25 years. I regularly co-teach WR 571 as part of an interdisciplinary team. We have about 12/13 graduate students in our core cohorts taking the WR 571 and WR 572 classes (with a seats available); we could regularly accommodate an and additional 4-8 students annually with no additional resources. The WRP would be happy to include geography graduate students in our courses (as occasionally happens currently).

Second, I am also a Professor (and former Chair) in the Department of Economics (EC) at UNM, specializing in the field of Environmental and Resource Economics (ERE). The field of ERE is an area of traditional and historical strength in the PhD program in Economics, and our field courses (EC 540, 542, 543 and 544) are offered on a regular schedule. Roughly, the four courses are rotated on a semester basis (so each course is offered every other year), with approximately 5/6 Economics faculty members that participate in teaching. I encourage you to confer with my ERE colleague (and current Department of Economics Chair), Janie Chermak, for more details. I note that all four of the ERE PhD field course are included in the Human Geography sub-curriculum of the proposed Joint Doctoral Program. Of those, I teach EC 544: Environmental Economics. Historically, EC 544 is offered every other year in the Spring semester (currently scheduled for Spring 2016). Historically, we have about 7-9 Economics graduate students in a typical EC 544 class (with seats available); we could regularly accommodate an additional 4-6 students with no additional resources in this writing-intensive course. EC 544 would be particularly appropriate for Geography PhD students with an empirical or statistical orientation. With a course focus on valuing changes in ecosystem goods and services, paper topics that combine GIS skills with statistical or econometric modeling would be good fits with course content. Over the years, I have had occasional geography students take EC 544, and I currently sit on one thesis committee for a GES graduate student.

In closing, I am supportive of the proposed Joint Doctoral Program in Geography between UNM and NMSU. The WRP at UNM benefits greatly from a synergistic working relationship with GES at UNM, and I expect this to be sustained and enhanced once the Joint Doctoral Program is in place.

Let me know if I can be of any further assistance.

**Pathways in Geospatial Post-Secondary Education and Careers:
Education Pathways Project**

by

Amy Ballard and Leland Pierce

With contributions from

Theresa Watson and Joe Zebrowski

New Mexico Geographic Information Council

2016

Education Pathways Project

While the conference proved to be overly ambitious at this time, it remains a goal, and this document is the first step on our own pathway towards this conference. Amy Ballard, Dr. Joe Zebrowski, and myself gathered to discuss how to move “Pathways” forward. We felt a survey identifying what resources for geospatial education are currently locally available as well as identifying current education and industry trends, would be a good start. Within this document are the results of our survey and our analysis of it. We’ve also asked for some professionals to provide a little context on how they see the geospatial landscape of New Mexico.

We hope this will be the first of a regular series of reports on geospatial education and industry. We hope to revise it as needed, improving with each update. The document is not intended to be the final word on geospatial education and industry in the state of New Mexico. Our intent is to inform the NMGIC membership about education and industry in their fields. If the document is of benefit outside of NMGIC, all the better. Our hope is the NMGIC membership will find something interesting and useful within this work. Our goal is for this work to inspire people to come together so that we may discuss the Pathways toward great careers in the fields we love.

Warmest Regards,

Leland J. S. Pierce

Former President, NMGIC Board of Directors

Pathways Project Co-Chair

Acknowledgements

NMGIC Board, Gathen Garcia, Ginny Seamster, Su Zhang, Rick Koehler, and all who took the time to respond to our survey.

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As those of us who have been in the geospatial industry know, there are a number of factors that make our profession somewhat complicated in terms of education and training. First, our skills can be applied across an extremely broad spectrum of industries. From an educational perspective, this means that geospatial training might occur within an academic program, such as Geography, Urban Planning, or Anthropology; or it could occur separately as a stand-alone certificate from a school or other organization. Second, Geospatial does not mean GIS only. The range of skills encompassed by geospatial includes software-based tasks, but can also encompass photogrammetry, surveying and other extremely demanding, quantitative fields. This makes it difficult to know what should be included in a program. Finally, we, as an industry have not settled on a widely-accepted nomenclature for what we teach. Programs can be variously identified as Geospatial, Geographic Information Technology, Geomatics, GIScience, etc.

There have been various national level efforts to address geospatial curriculum in terms of what should be offered by academic programs. The first, known as the Geospatial Science and Technology (GIST) Body of Knowledge (University Consortium for Geographic Information Science, 2006) was published in 2006 and sought to establish model curriculum for Geospatial programs. It included recommended competencies for Geospatial professionals and detailed curriculum recommendations. Another, similar effort was undertaken by the GeoTech Center Consortium beginning around 2008. This NSF-funded Center included faculty from community college Geospatial programs across the country as Co-PI's, including from Central New Mexico Community College in Albuquerque. The results of this effort include model Geospatial programs and curricula, which can be downloaded and adopted for use by faculty (see <http://www.geotechcenter.org/>). The extent to which the Body of Knowledge and/or GeoTech curricula have been adopted is not clear at this time. Notably absent from this report is any discussion of K-12 geospatial education. We hope to address this important topic in future reports.

I. New Mexico Post-Secondary Geospatial Academic Programs

The range of geospatial training and education options includes individual courses, certificates, associates, bachelor's and master's degrees, offered by two and four year colleges and universities. This section of the report attempts to compile a list of all available programs. The overall documentation effort is complicated by the fact that curriculum is less a permanent fixture than a dynamic system, with regular changes to certificates, degrees and courses. This listing is meant to capture the current state of programs as we currently know them.

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Table 1. Academic Geospatial Programs at New Mexico Colleges and Universities

II. The Survey

The Pathways survey was designed to collect information that would be helpful for those engaged in educating the State’s Geospatial workforce, from representatives of the New Mexico Geospatial industry. It includes 18 questions and was administered using an online tool. The survey was available for respondents to take between April and June, 2015. We received a total of 31 responses from representatives of government (Local, County, State and Federal), commercial, education, and non-profit organizations ranging in size from sole proprietorships to large agencies. Based on the above, we feel that the survey adequately represents the range of geospatial employers in the state. This section presents the data and analysis of the survey questions.

Characteristics of Survey Respondents

The Albuquerque/Rio Rancho area provided the most responses with 16, Santa Fe next with 9. Responses were also received from Aztec, Belen, Clovis, Las Vegas and Los Alamos. Some respondents had offices outside of New Mexico, such as Rockville, MD, San Francisco, CA, and Tampa, FL. The map below provides a graphic display of the information collected.

“...there is really no substitute for using the software and learning by doing, and even more importantly, learning by making mistakes and asking questions of your instructor and your peers.”

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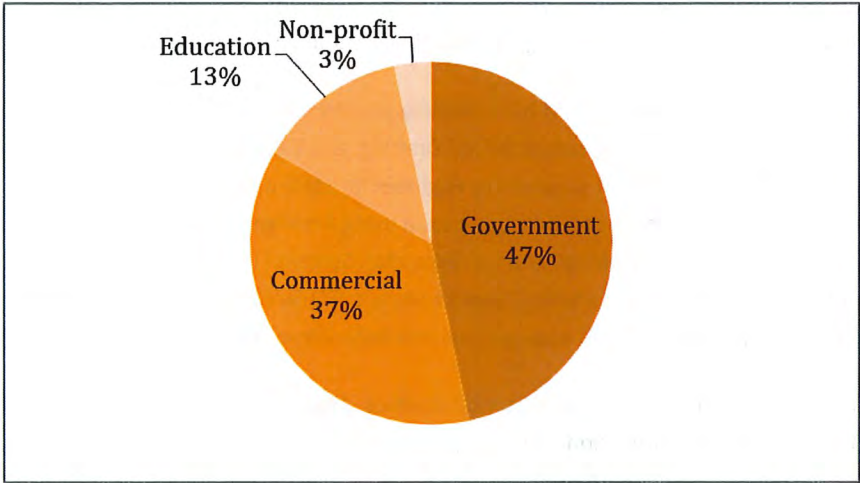


Figure 2. Types of Institutions represented in sample.

Professional Profile: Gathen Garcia, PNM



Background: I began my career more than 3 decades ago in the Civil and Map drafting industry as a manual drafter. All through high school, I studied mechanical and architectural drafting and was exposed to one of the first computer-aided drafting systems that were held at Sandia National labs. After graduating from West Mesa High School in 1975 I took a job as an apprentice in a print shop as a type setter and offset printer.

Two years later I registered at the Albuquerque Technical Vocational Institute (now CNM) in the Civil and Map drafting program which included courses in drafting and surveying. Surveying classes included boundary and Land Survey maps. This is where I was first exposed to cartography and map making hand scribing contour maps and creating documents from information gathered in the field. While attending TV-I, I worked for a local company surveying for mineral claims and drafting, even got to survey an underground mine

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planning between the training institutions and the private sector these barriers could be overcome. The training being held is at a high level and does not prepare students for advancement careers in the industry.

Students need to be exposed how GIS is used in an enterprise and not just within a given department. An enterprise GIS improves organization workflows since it applies a geographic approach to relate legacy and new information for better decision making; greater efficiency with money, time, and resources; and more effective communication across the corporation. GIS integrates hardware, software, and data for managing, capturing, and displaying all forms of geographically referenced information.

The enterprise GIS framework has the following characteristics; Scalable, extensible, reliable, and secure, open, interoperable, and standards based, capable of being effectively integrated within the enterprise. May be complex to implement; requires significant planning and support; delivers a high return on investment.

Advice for Students: My advice to students is to never stop learning how geospatial data can be used. Push the boundaries of GIS usage today.

- Data management - Enterprise GIS data management focuses on the efficient storage and retrieval of all the organization's relevant geographic information.
- Visualization - The visualization of information in a geographic context provides an intuitive means for accurate and rapid decision making. Visualization is the most obvious demonstration of enterprise GIS. Enterprise GIS will also exploit visualization capabilities by incorporating them into tasks and activities not traditionally associated with GIS.
- Spatial analysis - The wealth of geographic information in our organization is the goal of spatial analysis for the enterprise. It is this capability that nontraditional users of GIS will most greatly benefit from.
- Always ask the question what if?

Advice for Teachers: The advice I would give teachers and instructors is to providing a good foundation of current GIS efforts which are diverse and include: creation of map products, spatial analyses, database queries, records management, and ad hoc information retrieval.

Be willing to share your practical experiences with the GIS technology and profession. Listen to your student's questions as they can provide insight to problems we have yet to figure out. Sometimes the student is the teacher and provides us an opportunity to step-outside our own comfort zone. At the beginning of any new class, let students know there may be some questions you cannot answer, but will work to find an answer/ solution to their question.

“Sometimes the student is the teacher and provides us an opportunity to step-outside our own comfort zone.”

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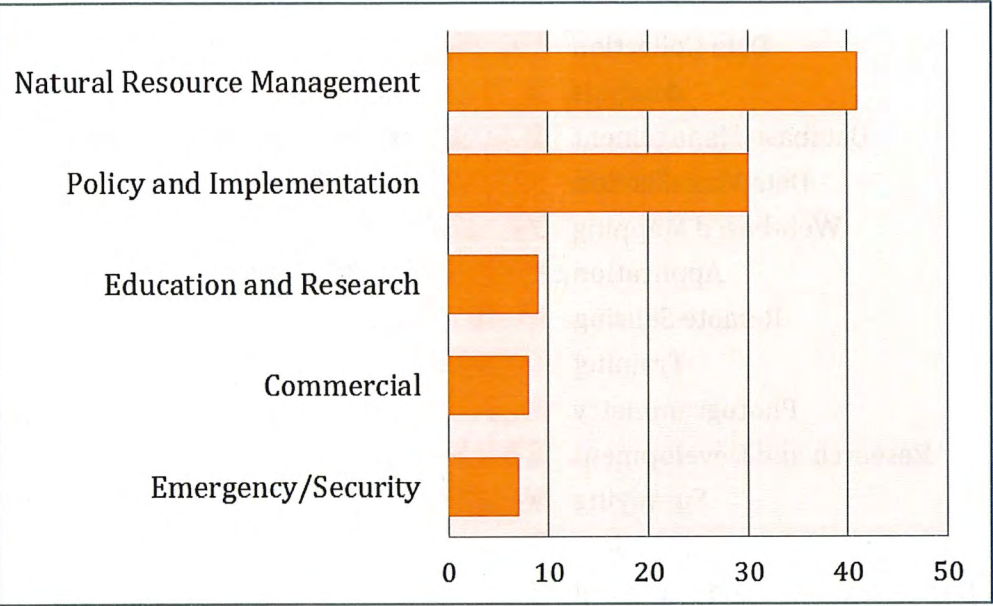


Figure 3. Industries Represented in the Sample

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Respondents were asked to rank these tasks from 1-12 in terms of frequency with which they are performed, with 1 being most frequent and 12 least frequent. Therefore, each respondent would rank every task. While not straightforward to interpret, one way to think about this question is to examine which tasks were most frequently identified as more common (receiving a lower number in the ranks). To do this, first a mean value was generated for each task. Tasks with a lower mean value were ranked as more frequent than those with a higher mean. The results are presented in the Table 2.

mean than some other tasks, more respondents indicated that field-based data collection is their primary task than any other task in the survey.

IV. Getting the Work Done: Software, Hardware and Equipment

In addition to the specific tasks performed by geospatial employees, information about the tools used to complete this work are crucial for geospatial educators to understand, in order to make informed decisions about purchases. Hardware, software and equipment costs are second only to faculty salaries in terms of overall programs costs, so aligning industry and education in this area is extremely important. Though many geospatial and other skills translate to the workplace regardless of specific brands, in many cases students can gain an advantage by already having knowledge of common industry tools.

In terms of broad categories of software used to perform geospatial work, desktop GIS still dominates the landscape (Figure 6.). Web-based GIS is a close second. As far as specific manufacturers go, Esri tops the list (Figure 7.). As Figure 8 shows, proprietary software is widely used by survey respondents, with only 16% of claiming use of open source software at this time.

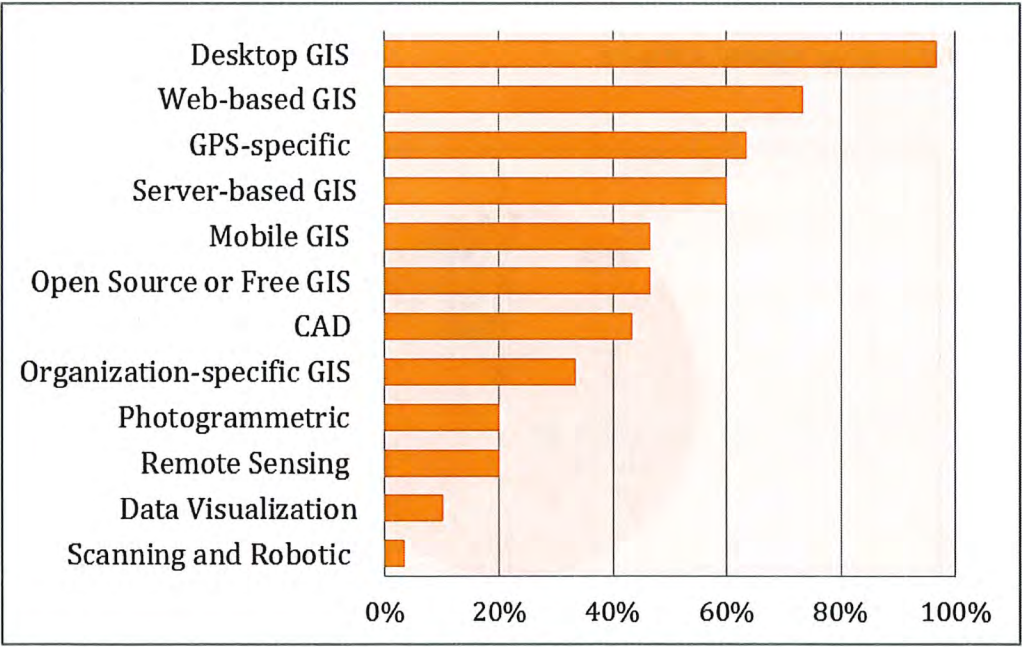


Figure 6. Types of software used to support geospatial projects

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Equipment, of course, also figures prominently in the geospatial industry, and not surprisingly, all respondents report using desktop computers to accomplish their work (Figure 9).

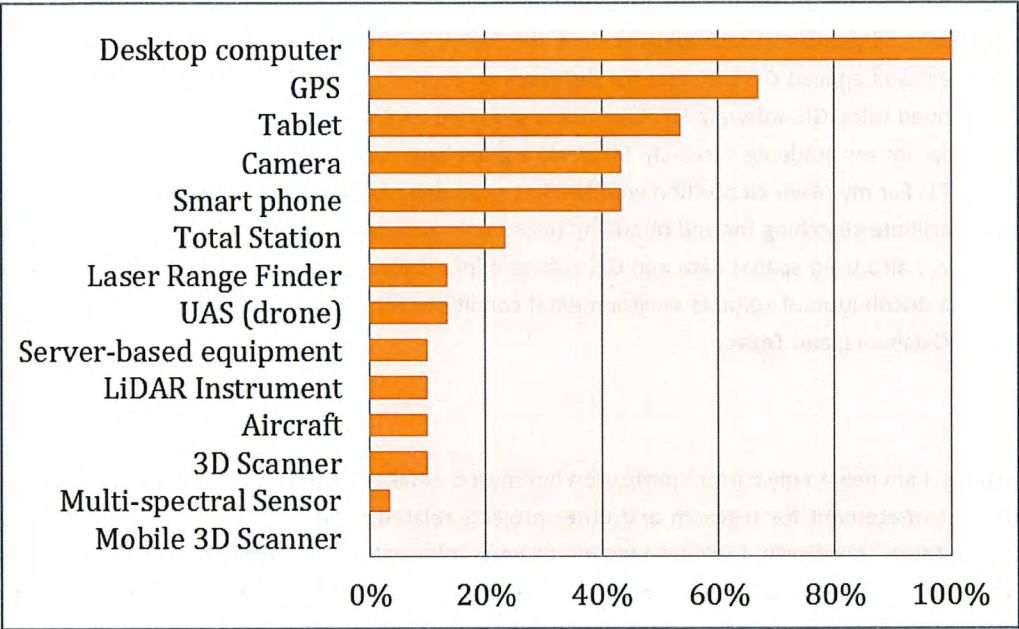


Figure 9. Types of equipment used to support geospatial projects

Professional Profile: Virginia “Ginny” Seamster, NM Dept. Game and Fish



Background: I have a B.S. in Biology and a Ph.D. in Environmental Sciences, both from the University of Virginia. My research in graduate school focused on assessing the impacts of land cover change (grassland to shrubland) on the feeding ecology of the coyote population at the Seville National Wildlife Refuge in central New

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Opinion on Training: I am not very familiar with training available in New Mexico regarding the various geospatial professions. The only GIS training I have received while in New Mexico was on the job training from colleagues. Other information I gathered from on-line forums, assistance from ESRI technical support, and trial and error. My understanding is that, in addition to courses provided on campus through the various universities (New Mexico State University, University of New Mexico, and New Mexico Highlands University), New Mexico State University provides some courses through their NM EDGE program. There are also on-line courses available. I only took three courses related to either GIS or remote sensing when I was a student and the University of Virginia did not have a geography department or any kind of emphasis on GIS training. Thus, I would consider the training available in New Mexico to be much more diverse and allow students to gain a more formal training in GIS than anything I was exposed to or aware of during my academic career.

Advice for Students: Depending on the sort of entity you want to work for, I would recommend learning at least one programming language, possibly multiple, and learning about computer networking. Knowledge of web-based mapping is valuable, if not crucial, given the direction that GIS is heading. I didn't really learn anything about web-based mapping in school and I would have benefited greatly from some prior exposure to the basic concepts, terminology, and functionality of web-based maps. Programming skills are useful for almost any GIS application but especially handy if there is an interest in pursuing positions that entail developing web-based maps or mobile phone applications. Mobile phone applications are definitely the wave of the future and so understanding the differences between designing maps for desktop vs. mobile users is valuable. I'd also recommend gaining as much knowledge as possible regarding database structure, design, and metadata. Knowledge of how to use at least one database software, including SQL Server or MS Access, is helpful as is knowledge of programs that can be used in processing spatial datasets, such as R or Matlab. In general I find that people who have the technical skills are more valued than those who know more on the application end. But again, it depends on what kind of position you are going for; if you want to manage a GIS program or go heavily into web-based application design or data analysis, you'll need more technical skills than if you are interested in being a cartographer or applying GIS to environmental compliance or wildlife issues. Different fields also seem to have different platforms that they prefer; climatologists don't seem to use ArcGIS software at all, they use netCDF files and linux systems while ecologists are more likely to use windows and run R and ArcGIS.

Advice for Teachers: I would recommend having students do as many projects, labs and other activities that involve using GIS and related software (e.g., SQL Server; R) as possible. It is important to acquire a basic understanding of the different data types and become familiar with relevant terminology. But there is really no substitute for using the software and learning by doing, and even more importantly, learning by making mistakes and asking questions of your instructor and your peers. There is rarely a single correct way of performing a geospatial analysis; there are often multiple pathways to the same product. Students learn more about the tools that are available, their functionality, and potential problems that they can run into by trial and error than they ever could listening to presentations in a classroom.

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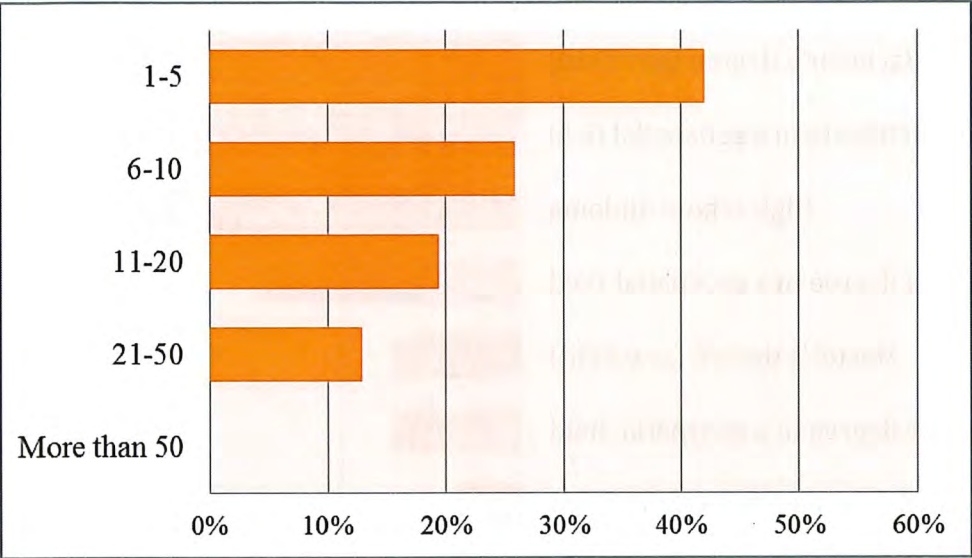


Figure 5. Employees actively engaged in geospatial work at your organization in New Mexico

In terms of the education and training that employers are seeking for entry-level employees, there are some interesting dynamics that appear in the data. Employers are most frequently hiring students with a bachelor’s degree in any field, followed closely by students with a 2-year certificate or high school diploma (Figure 10). Students with a bachelor’s degree in a geospatial field follow. Of course it is not possible to see from this question what types of jobs are being offered to students within the various categories, which would be an important piece of data to have. The lack of employer interest in 2-year geospatial degrees is somewhat surprising, though for the most part these programs could be seen as pipelines into 4-year degree programs.

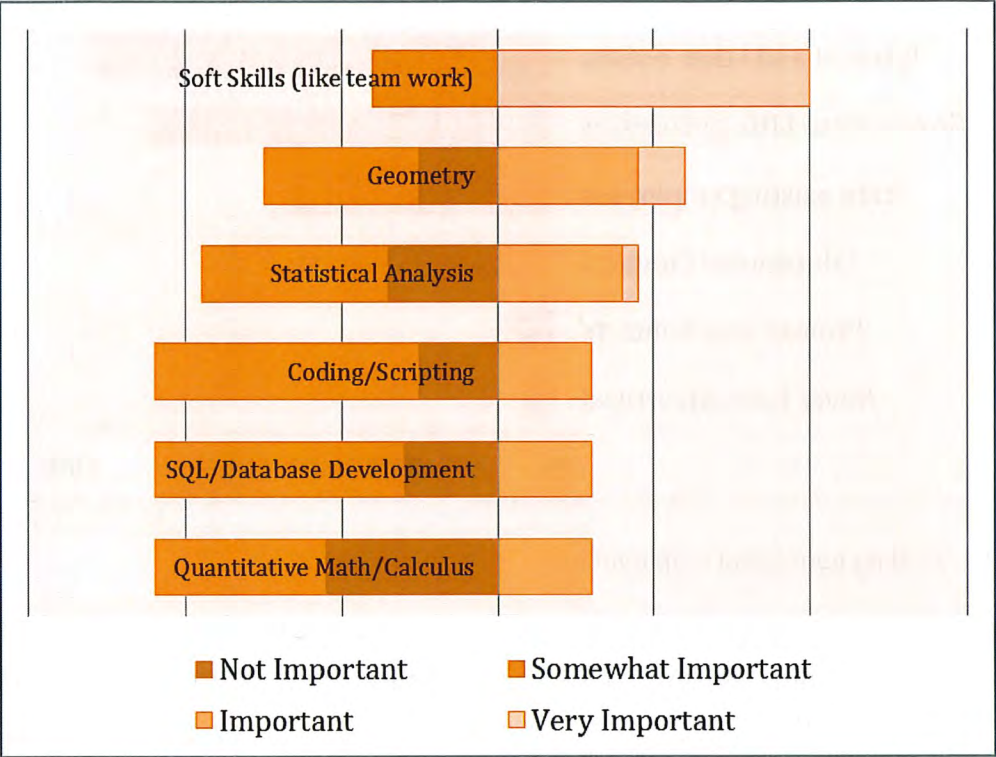


Figure 12. Desirable skills for entry-level geospatial employees

It is clear that employers are looking for employees with basic geospatial skills, but what other specific skills do they value? By a wide margin, employers surveyed responded that soft skills such as ability to work with a team, showing up on time, etc. were very important in potential employees. Working with educators to make sure that these skills are being taught would be an important are for future work. The only other skills identified as very important were geometry and statistical analysis.

When seeking geospatial employees, employers use a number of different approaches (Figure 12). The Internet and other media outlets dominate the survey responses. Since many of the respondents are government entities, the use of government hiring processes figures prominently. A trend also suggested by the responses is the retraining of existing employees to do geospatial work.

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Finally, the survey asked how industry respondents interact with geospatial educators and educational institutions. Sixty percent of respondents said that they have internship programs available to students. Clearly there needs to be more communication between industry and educators about these opportunities and how they are advertised. Many respondents sit on an educational advisory committee. Improving and increasing opportunities for academic and industry interaction should be a high priority for the future.

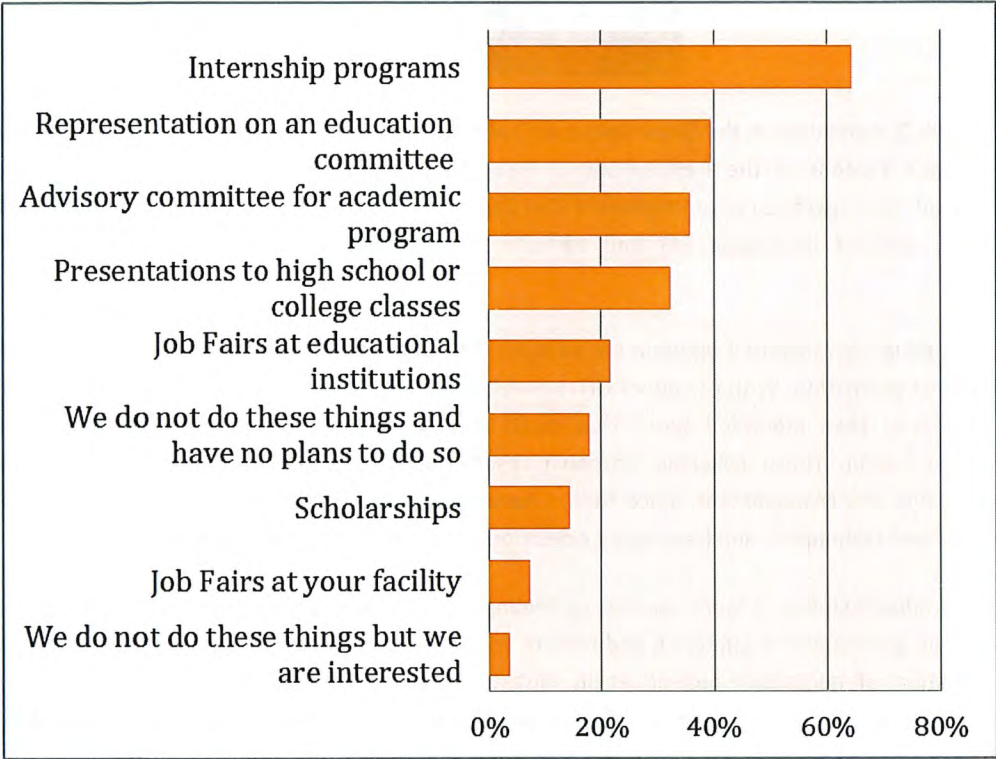


Figure 14. Education/Industry Interactions

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Current Status: Currently I am still a student at UNM. As aforementioned, my goal is to leverage GIS and Remote Sensing Technology (GIT) for infrastructure management. Therefore, I want to apply a position that applies GIT for infrastructure management. It could be some companies that traditionally specializing in civil engineering but currently exploring the geospatial fields, such as Wilson & Company and Bohannon Houston.

Opinion on Job Market: In my opinion, there are many available jobs in New Mexico in the various geospatial professions, although it is less when comparing with other states such as Colorado. The strengths that I can see in the state are that we have a lot of research institutions in New Mexico such as Sandia National Lab and Kirtland Air Force Lab that may provide a lot of jobs related to geospatial professions. The weaknesses that I can see in the state are that we do not have a lot of openings in recent years, which cannot provide enough positions to fresh graduates. They need to go to other states such as Colorado to start their geospatial careers. I think it is a good idea to initiate a statewide geospatial internship program to help fresh graduates to get training and experience to start their career.

“...students should smartly use their time to learn as much as can while they are in school. The more you do, the more you learn. This is the bottom-line.”

Opinion on Training: I barely know there is available training in New Mexico in the various geospatial professions. I might be incorrect, but I have never had a chance to get information about the training.

Advice to Students: My suggestion is that students should smartly use their time to learn as much as can while they are in school. The more you do, the more you learn. This is the bottom-line. I have been participated in many different research projects and learn a lot from them. Currently I am completing my Ph.D. degree and I feel confident to start a career in geospatial professions. Another suggestion is that students should join professional organization such as New Mexico Geographic Information Council (NMGIC) or American Society of Photogrammetry and Remote Sensing (ASPRS) to develop their professional network.

Advice to Teachers: There is one really important thing I want to suggest, that is, providing more courses that are related to geospatial professions. Currently we do not have a broad range of options and it is always good to add more courses to the curriculum. In addition, teachers should more actively interact with students to know what they want, what they need.

Advice to Employers: I suggest that employers provide more internship opportunities to fresh graduates or students to start developing their skills earlier. Currently most of jobs require applicants to have several years’

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more training prior to hiring a new employee. Another employment pattern seen in the survey is that while a few respondents worked in companies with more than 20 people, often as part of a national organization, most shops are small. This, along with the pattern of training after hiring, suggests that employers seek to tailor their geospatial employees to their specific needs, that the employee may work on more than geospatial technology on the job, and that a well-rounded education, including soft skills, is of prime importance. The primary way toward that education-and experience-is currently through internships. Based upon the survey, dialog between employers and educators are on an ad-hoc basis, often through volunteering to be on an academic committee. An additional concern that should be discussed is that not many employers projected growth in their geospatial workforces. Is this a result of concerns over the current economy or has the impact of technologies that make fewer workers able to accomplish the tasks formerly conducted by many keeping growth potential low?

Lastly, data-production, maintenance, and publication-was the primary focus for what the respondents did for a living. This is not a surprise as this is a data-based field and it is our opinion data represents many new opportunities for future employees. For instance, open, big, and smart data are all becoming increasingly important at all levels of society; positions like a data information officer will become more commonplace. How this should be managed in terms of education-under programming or GIS-and where such positions should be placed within a company-position unto itself, or like the current model, adapted to the overall company mission-will be points of discussion the future.

In summary, a well-rounded employee is desired with a variety of skill sets, particularly the soft skills and, in all likelihood, familiarity with web programming and data management. Jobs are out there, as is training, but this is being communicated on an ad-hoc basis. Data efforts like LiDAR and new imagery are creating needs for data management and analysis, and the every-growing use of the web calls for more geospatial employees in fields like broadband and web design. One of the authors heard a talk by an industry leader lamenting that he had the funds to employ a young professional and found many who had the GIS skills for his broadband initiatives but all of them lacked the speaking skills to deal with the public; another young professional was stuck trying to determine if she should be invest more of her training toward geospatial programming or geospatial analysis in order to land a good job. To overcome such problems dialog is needed between employers, educators, and students. It is our hope that this document and future versions of it will encourage NMGIC members to provide opportunities to make that dialog a reality.

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