UNC CHARLOTTE
The University of North Carolina at Charlotte
9201 University City Boulevard
Charlotte, NC 28223-0001

Office of the Chancellor
Telephone: 704/687-2201
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September 28, 2005

Dr. Gretchen Bataille
Senior Vice President for Academic Affairs
Office of the President
University of North Carolina
Post Office Box 2688
Chapel Hill, North Carolina 27515-2688

Dear Dr. Bataille:

Enclosed is UNC Charlotte's request for authorization to establish a Ph.D. program in Geography and Urban Regional Analysis.

The proposed Geography and Urban Regional Analysis program emerged from a feasibility study conducted by our Department of Geography and Earth Sciences, College of Arts and Sciences, and Graduate School. Our Geography and Earth Sciences faculty have an impressive research record and are major contributors to our complementary Public Policy Ph.D. program and the Infrastructure and Environmental Systems Ph.D. program. The proposed program will build on the department's experience and resources related to those programs, as well as its well known expertise in geographic information science and technology.

Thank you for your consideration of this request. Provost Joan Lorden or I would be pleased to respond to any questions that you may have regarding this request.

Cordially,

Phil

Philip L. Dubois
Chancellor

Enclosure (5 copies of the proposal; 1 copy of faculty curricula vitae)

cc: Provost Joan F. Lorden
Dr. Nancy Gutierrez

The University of North Carolina at Charlotte

College of Arts and Sciences

Doctor of Philosophy in Geography and Urban Regional Analysis

Request for Authorization to Establish

THE UNIVERSITY OF NORTH CAROLINA
Request for Authorization to Establish a New Degree Program

INSTRUCTIONS: Please submit five copies of the proposal to the Senior Vice President for Academic Affairs, UNC Office of the President. Each proposal should include a 2-3 page executive summary. The signature of the Chancellor is required.

Date October 1, 2005

Constituent Institution: The University of North Carolina at Charlotte

CIP Discipline Specialty Title: Geography

CIP Discipline Specialty Number: 45.0701 Level: B ☐ M ☐ 1st Prof ☐ D ☒

Exact Title of Proposed Program: Ph.D. in Geography and Urban Regional Analysis

Exact Degree Abbreviation (e.g. B.S., B.A., M.A., M.S., Ed.D., Ph.D.): Ph.D.

Does the proposed program constitute a substantive change as defined by SACS? Yes ☐ No ☒

a) Is it at a more advanced level than those previously authorized? Yes ☐ No ☒

b) Is the proposed program in a new discipline division? Yes ☐ No ☒

Proposed date to establish degree program (allow at least 3-6 months for proposal review):

month July *year* 2006

Do you plan to offer the proposed program away from campus *during the first year of operation*?

Yes ☐ No ☒

If so, complete the form to be used to request establishment of a distance learning program and submit it along with this request.

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EXECUTIVE SUMMARY

The ability to solve place-specific problems at a number of geographic scales is one of the most significant contributions that geographers make to public policy and the advancement of social science research. Many important societal questions facing communities, regions and states span a myriad of social and economic issues including economic development, technology transfer, demographic and political change, and quality of life. While these issues "play out" locally, they are increasingly linked at regional, national and global scales. Metropolitan regions have become connected to economic, social and political systems at every geographic level and, with their capacity for innovation and response to change, lie at the geographic intersection of these dynamics. As a consequence, metropolitan regions have become the conduit for structural adjustment – social, political and economic – that accompanies change.

The proposed Ph.D. in Geography and Urban Regional Analysis uses the metropolitan region and its interaction with social, political and economic dynamics at multiple spatial scales as a unifying framework for research, instruction and problem-solving. Recognizing that cities are the drivers and results of complex interactions, which require rigorous theoretical, conceptual and empirical study, the proposed program integrates theoretical and empirical analysis of metropolitan areas at multiple scales.

In this proposal, we outline a Ph.D. program that interweaves theory and concepts with current methodological techniques in Geography and Urban Regional Analysis that focuses on two interconnected research emphases:

i. Multiscalar Analysis

ii. Geographic Information Science (GIScience)

Common techniques courses cover several areas of geo-spatial analysis and technology, including Geographic Information Systems (GIS), spatial modeling, spatial econometrics, spatial statistics, and advanced quantitative methods. These courses will engage students with methodologies and skill- building that will enable them to operationalize theory. By pairing technology and theory in the core curriculum, the program seeks to train doctoral graduates who are grounded in a theoretical understanding of metropolitan processes, have the capacity to build scientifically grounded research questions from empirical data, and can answer pressing place-specific societal questions. The proposed program is designed to "cross-train" graduates in theory and technology to better equip them to offer informed research judgments and to make them stronger candidates in seeking employment.

In this pursuit, the objectives of the program are to:

- Train doctoral-level geographers who are well-versed in the latest technologies of geographic analysis, thereby preparing them for employment in the academy, as well as research positions in the public and private sectors,

- Provide students with the opportunity to engage in research that informs local, regional and state public policy, and

- Provide strong theoretical grounding on which research, analysis and decision-making are based.

Societal need for programs emphasizing the application of urban-oriented geographic theory and analysis is increasing in North Carolina and elsewhere. All indications of the market for program graduates suggest that while the academic market for program graduates will be strong, the nonacademic market is expected to grow six-fold before the end of decade, a clear testament to the substantial and growing societal need to combine geospatial analysis to problems facing contemporary urban society.

The proposed Ph.D. in Geography and Urban Regional Analysis at UNC Charlotte builds upon the most successful components of a nationally recognized and highly successful Master of Arts in Geography that emphasizes urban and regional analysis, location analysis, and community and regional planning. Within those programmatic thrusts, the Department has a long-standing track record of integrating teaching, research and service missions that connect its curriculum with the broader community. The Department's performance in the delivery of its master's program and the structure of the proposed Ph.D. program are clearly consistent with the current Mission Statement of the University. Core elements of UNC Charlotte's Institutional Mission Statement are to provide "for the education, economic, social, and cultural development of the people of North Carolina through...continuing personal and professional education opportunities, research, and collaborative relationships with private, public and nonprofit institutions." UNC Charlotte has identified urban and regional development as one of the campus' seven broad areas of concern, seeing the University as playing a critical role in addressing these issues by, "offering intellectual and technical expertise in each of these areas" and "...solving contemporary problems of the region."

As a laboratory for teaching and research, the complexities of the Charlotte metropolitan region and other regions in the state offer vast opportunities for the application of geographical analysis to place-based questions for the betterment of North Carolina and its people. To that end, the proposed Ph.D. in Geography and Urban Regional Analysis at The University of North Carolina at Charlotte can play an important role.

I. DESCRIPTION OF THE PROGRAM

A. Describe the proposed degree program (nature, scope, and intended audience).

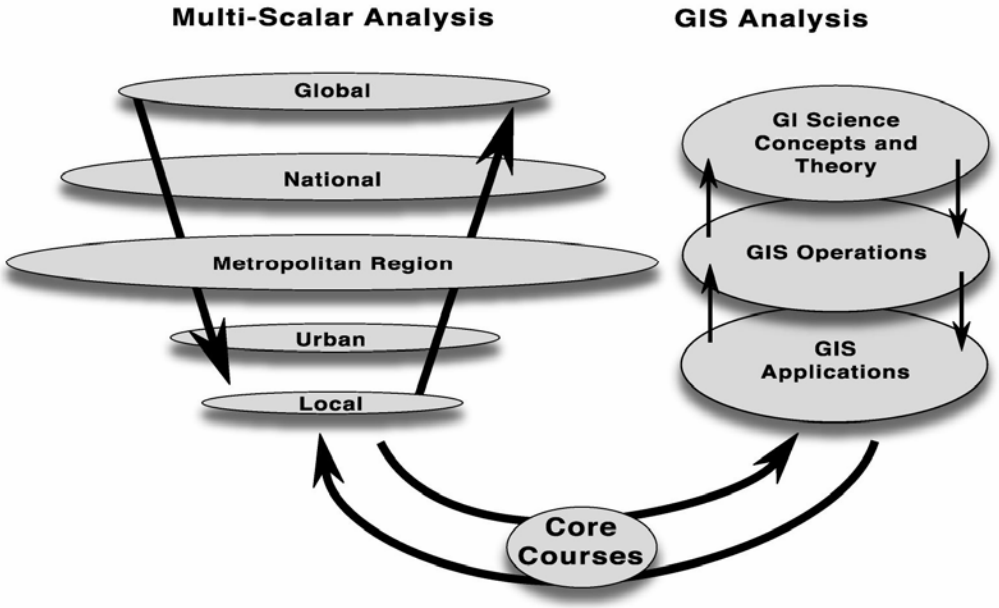
The proposed Ph.D. in Geography and Urban Regional Analysis will be positioned around the theoretical and empirical analysis of metropolitan areas and their broader regional, national and global contexts. At the core of this program is the recognition that cities are engines of growth and products of multiscalar interactions, and that understanding these urban dynamics necessitates rigorous theoretical, conceptual and empirical study. Within the urban framework that underpins the proposed Ph.D., two thematic research clusters will be offered:

i. Multiscalar Analysis

ii. Geographic Information Science

With their focus on urban regional issues and dynamics at multiple and intersecting scales of analysis, these two clusters are intended to complement and cross connect with one another in ways that ensure a clearly defined and integrated programmatic focus. Together, the two clusters provide an analytical, theoretical and pedagogical framework that will underpin the development of the research expertise and technical specialization for students trained in the program. These clusters are described below.

Figure 1. Elements of the Ph.D. in Geography and Urban Regional Analysis



Multiscalar Analysis

The ability to solve place-specific problems at a number of geographic scales is one of the most significant contributions that geographers make to public policy and the advancement of social science research. The Multiscalar Analysis cluster will focus on a broad set of research questions germane to the study of metropolitan areas and the broader regions in which they are embedded. The nature of that contribution is conceptually expressed in Figure 1. The two-directional arrows in Multiscalar Analysis (left side of diagram) indicate connections and influences that operate reciprocally across a continuum from global to local scales. A myriad of societal issues, including economic development, technology transfer, demographic and political change, and quality of life issues are linked across these scales. Metropolitan regions with their connections to economic, social and political systems at every scalar level, and with their capacity for innovation and response to change, lie at the geographic intersection of those dynamics. Indeed, the hierarchy of spatial scales represents a conduit for structural adjustments that accompany change. Spatial issues are critical in economic and social globalization processes and evolving patterns of political restructuring. Metropolitan regions are at the nexus of these processes.

The Multiscalar Analysis concentration will focus on a strong theoretical and methodological grounding in urban and regional economic and population analyses. This concentration will prepare students for careers in the public or private sectors as well as academia. Coursework and specializations will include, but not be limited to, the study of the roles of capital (both financial and human), innovation, race, ethnicity and citizenship, transportation, and government in urban and regional development patterns, housing and labor markets, facility location, and urban and regional analysis techniques. While this concentration will have a strong quantitative and modeling orientation, studies will also pursue more qualitative approaches where appropriate.

Geographic Information Science

The proposed program's companion research cluster, Geographic Information Science, reflects a nested hierarchy of Geographic Information Systems (GIS) elements (Figure 1). They include concepts and theory, operations, and applications. The two-way relationships in the diagram suggest connections among these elements and reflect the ways that conceptual and theoretical constructs translate to GIS operations and applications.

These provide integrative analytical and pedagogical connections with the Multiscalar Analysis component of the proposed doctoral program as indicated at the “core course” intersection of the two programmatic elements. This intersection of GIS technologies and urban regional analysis skills is a critical element of the proposed program. The analytical capacity of GIS informs and provides methodological solutions to research questions that are pursued in the Multiscalar Analysis cluster which comprises the topical thrust of the urban regional analysis Ph.D. program. Among these solutions are regional economic analysis and forecasting, analyses of population and economic issues, land use and transportation modeling, and the rapidly evolving field of homeland security. The latter two issues are logically linked with UNC

Charlotte's Regional Center for Homeland Security and the Center for Transportation Policy Studies, which are affiliated with the Department of Geography and Earth Sciences. Students will be required to attain a minimum competency in both research clusters.

In addition to developing sound technical platforms for spatial analysis, the GIS Analysis cluster creates opportunities for students who wish to develop a GIS specialty within their program of study. Such specialties might include the expansion of technologies via innovations in GIS that improve GIS operations, including the development of GIS coverages, data sets and the ability to store, retrieve and manipulate GIS data and tools in a problem-solving research environment. A broad array of multi-scaled economic, demographic, land use, and environmental data are housed and operationally maintained in the Department-sponsored Center for Applied Geographic Information Science. Other GIS specializations could focus on development and training in technological initiatives such as 3-D visualization, GIS modeling, multi-attribute assessment, and spatial decision support systems.

Research in the GIScience cluster will further the advancement of models, expanded applications, and sophisticated technologies for future GIS architecture and platforms. The symbiotic relationships among the GIScience elements are apparent: each of them addresses the need for more robust GIS tools and the technical solutions that accompany their development.

The University Consortium of Geographic Information Science, comprising a national group of GIS educators, researchers and development specialists, recently extended an invitation of membership. UNC Charlotte therefore joins UNC Chapel Hill, North Carolina State and the University of South Carolina as members of this elite and selective group.

The Department of Geography and Earth Sciences has recently undertaken a substantial revision of the curriculum devoted to training undergraduate and master's-level students in GIScience and Remote Sensing. The new curriculum is designed to provide substantial training for our students that should make them competitive in a rapidly changing field. A model of the new curriculum is provided in Appendix D.

The proposed Ph.D. in Geography and Urban Regional Analysis builds upon the most successful components of the nationally recognized and highly successful Master of Arts in Geography. During the past 33 years, the Department has offered a unique applied geography master's degree program focused on economic and urban related issues in the metropolitan context. The emphasis on applied geography has simultaneously trained hundreds of policy-oriented geographers who work as public and private sector professionals, while enabling the faculty and graduate students to be involved in a broad range of community oriented research issues in the Charlotte metropolitan region. The thrust of the master's curriculum capitalized on the complex economic, spatial, and social characteristics of this region, using it as a laboratory that pedagogically linked teaching, research, and service. As a result, Geography at UNC Charlotte is well positioned as an engaged partner in ongoing and increasingly more sophisticated spatial analyses of the region.

In addition, the UNC Charlotte Graduate Geography faculty is well prepared to extend the current level of graduate training to the doctoral level. The proposed instructional program not only builds upon the accomplishments and infrastructure that have developed around the applied master's program, but also draws upon the current research strengths of the faculty, growing research funding streams, and the technical, structural and theoretical advances in the discipline of geography.

B. List the education objectives of the program.

The proposed doctoral program in Geography and Urban Regional Analysis will bridge the theoretical and empirical realms that are ascribed by modern geographic science. Over the past ten years, the discipline of geography has increasingly moved toward a paradigm that draws together strong theoretic tenets with geo-spatial technologies. Within this framework, the proposed Ph.D. program will focus on a subset of geographic research and graduate training to the extent that the program will examine human processes and interactions in an urban context. In narrowing the specialties of the program to an urban-centered, Multiscalar Analysis and Geographic Information Science, the faculty has chosen to build on the strength of the existing master's program as well as extend their currently active research programs.

The underlying objectives of the proposed program are:

- **To train doctoral-level geographers for employment in the academy, as well as for research positions in the public and private sectors**

  As will be detailed later in this document, the need for university-level faculty in the two research clusters has been extremely strong and sustained over the past several years. Beyond higher education, government and businesses are increasing their share of doctoral trained geographers in the applied areas of spatial analysis and Geographic Information Science. UNC Charlotte's reputation for preparing strong master's degree students in these areas will enhance doctoral student placement following completion of the degree.

- **To provide students with the opportunity to engage in research that informs local, regional and state public policy**

  The research clusters within the program, along with UNC Charlotte's setting in a dynamic metropolitan region and the Department's participation in and commitment to the Ph.D. in Public Policy, will provide rich opportunities for developing doctoral research topics that address geo-spatial, public policy issues. Established and strong linkages between the Geography faculty and public agencies and businesses in the Charlotte region will facilitate student access to resources and data. Past experience suggests that stipends and funded research opportunities are available for doctoral students. The programming activities and resources warehoused in the Center for Applied Geographic Information Science, especially the regional databases, strengthen the opportunities for Charlotte-centered research programs.

- **To provide strong theoretical grounding on which research and analysis are based**

  The theoretic component will provide broad training in the discipline of geography, and will offer particular emphasis on human-economic theory and urban and regional development. Students will be equipped to examine and interpret empirical evidence through the lens of contemporary theory and innovative research paradigms. Students in both research clusters will develop the analytical capabilities necessary to carry out field-based research and understand pedagogical issues around urban/metropolitan data.

- **To train students for careers in academia and the public and private sectors who are well versed in the latest techniques of geographic analysis**

  Common techniques courses will include several areas of geo-spatial analysis and technology. Among these courses are GIS, spatial modeling, spatial econometrics, spatial statistics, and advanced quantitative methods. These courses engage students with methodologies and skill building that enable them to operationalize theory. By pairing technology and theory in the core curriculum, the program will train a doctoral graduate who is both grounded in an understanding of metropolitan processes and who has the capacity to build from empirical data and scientifically grounded answers to research questions. Ultimately, this "cross-trained" graduate is a stronger professional and is better equipped to offer informed research judgments.

C. Describe the relationship of the program to other programs currently offered at the proposing institution, including the common use of: (1) courses, (2) faculty, (3) facilities, and (4) other resources

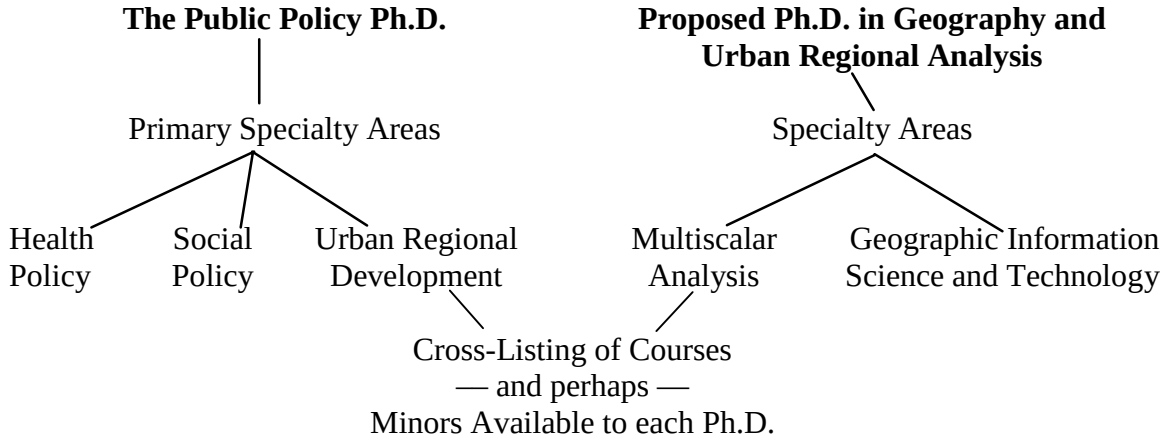
Early in the development of doctoral programming at UNC Charlotte, the decision was made to emphasize interdisciplinary and applied Ph.D. programs. While the earliest doctoral programs were in education and engineering, two of the most recent Ph.D. programs are in Public Policy (PPOL) and Infrastructure and Environmental Systems (INES). The geographers within the Department are heavily engaged in the Public Policy Ph.D.; the Earth Scientists are involved with the INES Ph.D. Both of these programs have had successful starts and cross traditional disciplinary boundaries in the training of applied social and natural scientists.

The proposed Ph.D., with the Multiscalar Analysis and Geographic Information Sciences (GIScience) concentrations, will complement and provide the opportunity for inter-programmatic collaboration between faculty and graduate students. Cross-listing between Geography and Public Policy is expected and indeed encouraged, and the Ph.D. in Geography and Urban Regional Analysis will function especially well with the Ph.D. in Public Policy. The Department of Geography and Earth Sciences has been one of the three cornerstone units supporting the Public Policy Ph.D. In its four-year history, most of the teaching faculty in PPOL have come from Political Science, Sociology and Anthropology, and Geography and Earth Sciences. Of the eleven full-time, doctoral-level, teaching faculty in Geography, six have taught regularly within the dominant specialty area of PPOL -- Urban Regional Development. The Director of the Public Policy Ph.D. from the fall of 2001 to the summer of 2005 also served as Chair of the Department of Geography and Earth Sciences for the past two years. Twenty of the thirty current students in PPOL pursue this specialty area and will benefit from the increased availability of

additional curriculum and increased research and funding opportunities that will accompany the proposed Ph.D. in Geography and Urban Regional Analysis.

As shown in Figure 2, there will be a strong relationship between the Urban Regional Development Specialty Area of PPOL and the Multiscalar Analysis concentration of the proposed Geography Ph.D. While the latter will be more grounded in the tools and techniques of spatial analysis and have a stronger GIScience analytical focus than PPOL's Urban Regional Development Specialty Area, the two will have a common foundation of urban social theory and basic urban regional economic development theory. These common conceptual threads will be shared and represent a strong synergy between the two programs. In fact, students in PPOL will have a much greater opportunity to pursue more spatial statistics and GIScience technical training once the Ph.D. in Geography and Urban Regional Analysis is in place. As both programs mature, it is likely that minor concentrations in each program (GIS or Spatial Analysis in PPOL and/or Policy in Geography) will emerge.

Figure 2. The Relationship Between The Ph.D. in Public Policy and The Proposed Ph.D. in Geography and Urban Regional Analysis



Currently, the Department of Geography and Earth Sciences includes 30 total faculty positions, of which 18 are geographers. One of the geography positions is currently vacant. Of these 18 geographers, 12 (including the vacancy) will be active within the proposed Ph.D. program. An additional four geography faculty currently hold administrative positions and will have limited involvement (student advising, committees, etc).

The Department is well respected and has collaborative relationships across the College of Arts and Sciences, including the Departments of Political Science, Psychology, Sociology and Anthropology, and Criminal Justice. Active, inter-college cooperation, with course cross-listing exists with the College of Architecture, The William States Lee College of Engineering, The Belk College of Business, and the College of Information Technology. These linkages broaden student access to multi-disciplinary research and allow non-geography students the opportunity to apply geographical concepts to diverse research issues that have spatial dimensions.

The proposed Ph.D. program will complement the existing Master of Arts program in Geography and its concentrations in Locational Analysis, Urban Regional Analysis, and the interdisciplinary Community Planning track. Historically, 10-15 percent of students completing their master's in Geography have gone on to study in Ph.D. programs. Every year, there are inquiries from non-UNC Charlotte students expressing interest in pursuing doctoral studies in geography at UNC Charlotte. The Department of Geography and Earth Sciences is well situated to deliver a strong program that will retain master's students and attract doctoral students from in state and beyond North Carolina.

II. JUSTIFICATION FOR THE PROGRAM

A. Describe the proposed program as it relates to:

1. The institutional mission and strategic plan

Over the past three decades, the geography faculty has built a nationally recognized Master of Arts program, with emphases in urban and regional analysis, location analysis, and community and regional planning. Within those programmatic thrusts, the Department's long-standing integration of teaching, research and service missions connected its curriculum with the broader community in a number of demonstrated ways. The Charlotte region's dynamic economic, environmental, institutional, and social landscapes provided abundant opportunities for the Department to translate a real-world problem-solving academic philosophy into practice. That practice also helped shape the University's teaching, research and service missions as the University and its surrounding urban region grew. As a result, Geography at UNC Charlotte remains well positioned and actively engaged on and off campus.

The Department of Geography and Earth Sciences is well positioned in physical space and in access to research funding. The Department expects to increase access to physical space in the near term. The Department will reoccupy a newly renovated building with newly updated communications capacity and upgraded teaching and research laboratory facilities in the spring of 2006. These facilities should carry the Department well into the implementation and first years of operation of the proposed Ph.D. program. The Department also anticipates significant increases in its already substantial grants and contracts activities to supplement existing equipment budgets in the annual update of equipment. The Department has seen a substantial increase (251 percent) in the amount of grants and contracts activity (applications) over the three years from 2002-2003 to 2004-2005. In 2004-2005, awards to Department faculty increased 39 percent over the previous year and 62 percent over the awards in 2002-2003. In 2004-05 the Department received more than $1 million in funding and more than 69 percent of that was from federal sources.

The Department's performance in the delivery of master's programs, and the structure of proposed Ph.D. program are clearly consistent with the current Mission Statement of the University. Core elements of UNC Charlotte's Institutional Mission Statement are to provide "for the education, economic, social, and cultural development of the people of North Carolina

through...continuing personal and professional education opportunities, research, and collaborative relationships with private, public and nonprofit institutions." That statement is pursued further in the campus mission that specifically includes urban and regional development as a key theme. Issues identified in that theme include, but are not limited to, "economic development...urban planning...." The University is seen as playing a critical role in addressing these issues by, "offering intellectual and technical expertise in each of these areas and...solving contemporary problems of the region."

The complexities of the Charlotte metropolitan region and its 1.7 million people offer enormous opportunities for applications of the geographic and analytical perspective that the proposed doctoral program will provide. To elaborate, the turn of the 21st century has been a period of stark developmental contrasts borne of the impacts of the de-industrialization of the national economy and a shift to a service sector economy within the region. The collective Charlotte regional community simultaneously experienced nationally prominent rates of urban growth fueled by economic expansion in knowledge, technology and advanced services while experiencing the disappearance of economic activities and jobs within the traditional textile mill economy. Outsourcing of service sector employment to cost-efficient overseas venues recently has compounded continuing offshore manufacturing job losses. Such processes continue to test the resiliency and sustainability of the economic base, as does the profound cultural change brought by newcomers from Latin America, Southeast Asia and Eastern Europe. The place-specific nature of geographically uneven development immediately lends itself to spatial analysis that comprehends the complexities of change and yields solutions. The regional focus is not idiographic, but comprises processes that operate across a number of places so that theories, methods and skills acquired in the program have broad applicability.

To respond better to the complexities of a rapidly changing and globalizing world, geographers with graduate studies in advanced analytical techniques, and the ability to apply these tools to urban and regional problem solving, are uniquely positioned to contribute to research and policy agendas. The demand for applications-oriented Ph.D. geographers in academic, public sector and private sector organizations has grown significantly in recent years. In particular, the expanded use of Geographic Information Sciences (GIScience) for analysis and problem-solving in such public sector issues as urban infrastructure, social service provision, and land use management has been accompanied by private sector and corporate operations. These developments have spurred strong hiring patterns for teaching and research faculty in higher education, as well as Ph.D.-level GIScience specialists in the non-academic environment. The proposed doctorate at UNC Charlotte will prepare students to fill these professional demands.

2. Student demand

Student demand for the program is expected to be strong. From 2000 to 2004, enrollment in all UNC Charlotte graduate programs grew from 2,712 to 3,971 (46%); Ph.D. program enrollment increased from 175 to 410 (134%) over the same period. Within the Geography program at UNC Charlotte, enrollment in the master's program has been about 75 students for more than a decade. Some of the demand for the proposed Ph.D. program will come from students already in the region, while others will be drawn from other parts of the country and other regions of the world. Currently, approximately 10-15 percent of existing master's students

continue Ph.D. studies at other universities or other UNC Charlotte programs. Some of these students will undoubtedly pursue Ph.D.-level studies at UNC Charlotte. Others, who possess backgrounds in geographic analysis and are currently employed in the Charlotte region, see the program as opportunity to resume their graduate education. Over time, these "local" students will likely comprise less than one-quarter of anticipated, long-range enrollment. Nationally, student demand for similar programs has been rising, and we expect student demand to outstrip available openings in the program, enabling the program to be highly selective in its admission process.

Nationally, enrollment and degrees conferred in geography graduate programs has risen steadily since the early 1990s (Pandit, 2004). While precise estimates of student demand for the proposed program are difficult to obtain, Figure 3 provides an indication of growing student demand for geography degrees nationally. For example, membership in the discipline's national organization, the Association of American Geographers (AAG), grew 39 percent from 2000 to 2004. Discussions with the AAG Executive Director, Doug Richardson, indicate that much of the growth came from increasing student participation, a clear indication of growing student demand in the field. Further, the US Department of Labor (Gewin, 2004) recently identified geotechnologies as one of the three most important emerging and evolving fields in the United States (along with nanotechnology and biotechnology) and the proposed program's emphasis on GIScience plays directly into this evolving demand. Given the expanding market for specialists in the proposed field of study (see below), we expect the program to attract more students than can be reasonably accommodated.

Figure 3. Growth in Membership, Association of American Geographers

Year	AAG Membership
2000	6,497
2001	6,731
2002	7,004
2003	8,475
2004	9,041
2005	NA
Rate of Change (%)	39.2

Source: Association of American Geographers.

3. Societal need (For graduate, first professional, and baccalaureate professional programs, cite manpower needs in North Carolina and elsewhere.)

Societal need for programs emphasizing the application of urban-oriented geographic theory and analysis is increasing in North Carolina and elsewhere. The market for graduates of the proposed program lies in the more traditional field of academia (both research and teaching) and the strong development of non-academic positions in both the public and private sectors.

The best indicator of this need is reflected in demand for program graduates. According to Department of Labor projections, the market for highly trained geographers will expand at higher than average rates (U.S. Department of Labor, 2005). Furthermore, according to a Department of Labor official in an article recently appearing in *Nature*, "all indications are that the (US) $5 billion worldwide market [for geospatial technologies] will grow to $30 billion by 2005—a dramatic increase that is sure to create new jobs" (Gewin, p. 376; See Appendix E). Such growth is a clear testament to a substantial and growing societal need to combine geospatial analysis to problems facing contemporary urban society.

In academia, evidence suggests that the post-secondary employment will expand "as the number of 18-to-24-year-olds increases and as more adults return to college" (Hecker, 2004, p. 102). The aging out of the teaching population trained in 1960s and 1970s is likely to further strengthen this market. Geography is no exception. One of the primary sources of job listings for academic positions is *Jobs in Geography*, published monthly in the *Association of American Geographers'* AAG Newsletter. Figure 4 provides data sampled from job listings during the fall and early winter months in each of the last five years. These advertisements were tallied by determining the primary job specialty of all of the ads listed in either November or December. We selected these months because these are the peak times for job advertisement and search activity. Each advertisement we reviewed could be placed in only one category except for Column 5 -- GIS Required -- a job requirement always listed in combination with another primary specialty.

As can be seen in Figure 4, the market has remained consistently strong with a minimum of 75 and a maximum of 113 total listings in each of the two months analyzed for each year. Of the total listings for jobs in the selected months, over 38 percent of the listings were for faculty with GIS, urban, or economic specialties, the specialties on which the proposed Ph.D. in Geography and Urban Regional Analysis will focus. Over 22 percent of the ads for specialties other than GIS made a strong GIS background a desirable or necessary part of the applicant's job experience. Given the level of demand reflected in this table, we estimate that the market for Ph.D. geographers varied from 200 to 350 academic jobs per year from 2001 to 2004.

Figure 4. Selected Listings in Jobs In Geography In November and December, 2000-2004

1 Year	2 Total Listings	3 New Listings	4 GIS Specialty	5 GIS Required	6 Urban	7 Economic
2001 N	95	68	18	16	14	6
2001 D	110	68	15	20	16	7
2002 N	81	39	21	15	16	5
2002 D	74	45	15	16	5	7
2003 N	74	47	11	16	14	9
2003 D	99	56	16	20	8	11
2004 N	102	56	12	25	17	5
2004 D	113	65	17	31	19	3

Source: Computed by authors from *Jobs in Geography, AAG Newsletter, 2001-2004.*

As can be seen in Figure 5, the actual number of Geography Ph.D.s produced during the period from 1999 to 2002 was about 200 per year. Without taking into account an expanding market for Ph.D. geographers in the private sector and non-profits, these data suggest a strong market for Ph.D.s with the specialties proposed in this request.

Figure 5. Geography Ph.D. Degrees Conferred in the United States, 1999-2002

1999-2000	200
2000-2001	201
2001-2002	205

Source: U.S. Department of Education surveys as cited in *Guide to Geography Programs in North America*

The rate of growth in the use of and market for GIScience specialists may be seen in the attendance patterns at the annual user conference of one of the largest firms supplying GIScience technology. Recently, this event attracted over 11,000 individuals representing dozens of countries – only twenty years ago there were just over 100 attendants. The job market for GIScience academia and service professionals has been growing at a rapid yet sustained pace. In the late 1990s, *US News & World Report* twice listed GIScience and Technology as one of the "hottest tracks" for future employment. A more recent Internet survey gives 970,000 entries worldwide under the query "GIS jobs." While this level of job activity is not exclusive to the market for the graduates of a Ph.D. program, it does reflect the level of interest in the field and the demand for programs that produce the university-level instructors who will train the people entering these jobs.

4. Impact on existing undergraduate and/or graduate academic programs of your institution. (e.g., Will the proposed program strengthen other programs? Will it stretch existing resources? How many of your programs at this level currently fail to meet Board of Governors' productivity criteria? Is there a danger of proliferation of low-productivity degree programs at the institution?)

Currently, all Ph.D. programs at UNC Charlotte meet Board of Governors' productivity criteria. The proposed program is expected to have strong demand, and our experiences with a nationally recognized and highly successful Master of Arts in Geography program will help ensure a productive Ph.D. program. Furthermore, the proposed Ph.D. in Geography and Urban Regional Analysis complements other doctoral programs at UNC Charlotte, notably the Public Policy Ph.D., and provides the opportunity for those students to expand coursework to include spatial analysis.

The proposed Geography and Urban Regional Analysis Ph.D. program will complement the strengths of our existing undergraduate and master's programs. Although Department faculty resources will need to be reallocated to the Ph.D. program, both undergraduate and master's students will benefit from the increased opportunities to be involved in internally and externally funded research programs. These research opportunities will both extend and deepen the

academic experience and skill sets of our undergraduate and master's students. In addition, master's students will benefit from an expanded set of graduate courses as a result of the proposed program.

In the process of preparing for the possible approval of this request, the Department worked out a three-year plan (fall 2005 through the spring of 2008) that includes a schedule of courses for both the current programs (B.A./B.S. and M.A.) and the proposed Ph.D. It was clear from this analysis that implementing the proposed program is feasible in the short range. However, in the long term the Department will require additional faculty resources to bolster the existing programs and to prepare for the transition to a research-intensive environment. Additional faculty will be required to maintain the high quality of the Department's existing M.A. and B.A./B.S. degrees. While all courses the Department currently offers could be maintained, the frequency of the rotation/number of sections, particularly for freshman and sophomore level courses, would slip from current levels unless additional resources were available. This is particularly true if teaching loads for tenure-track faculty who are key to the success of the proposed Ph.D. are reduced to levels commensurate with a well-funded, research intensive Ph.D. program.

The four positions we request in this proposal are essential to the maintenance of high quality programming at all levels. It is particularly critical that one of these positions be a permanent lecturer position with a proven ability to provide quality instruction at the introductory level. The Department has a long-standing reputation for quality undergraduate education and takes seriously its commitment to General Education. Over its history, five faculty have won the coveted, annual, campus-wide, Bank of America Teaching Excellence Award. The Department has also won the UNC Charlotte Provost's Award for outstanding teaching. These awards symbolize the Department's commitment to undergraduate programming. With these positions in hand, we are confident that we can maintain our current levels of commitment to high quality programming at all levels from B.A./B.S., through the M.A. and Ph.D. levels.

B. Discuss potential program duplication and program competitiveness

1. Identify similar programs offered elsewhere in North Carolina. Indicate the location and distance from the proposing institution. Include a) public and b) private institutions of higher education.

a) public institutions

UNC Greensboro is 92 miles from Charlotte, the proposing institution

UNC Chapel Hill is 141 miles from Charlotte, the proposing institution.

b) private institutions

There are no similar programs at private institutions in North Carolina.

2. Indicate how the proposed new degree program differs from other programs like it in the University. If the program duplicates other UNC programs, explain a) why is it

necessary or justified and b) why demand (if limited) might not be met through a collaborative arrangement (perhaps using distance education). If the program is a first professional or doctoral degree, compare it with other similar programs in public and private universities in North Carolina, in the region, and in the nation.

At the present time, there are two other campuses in the UNC system offering doctoral programs in geography. The University of North Carolina at Chapel Hill awards a Ph.D. in Geography with programmatic concentrations in biophysical geography and earth systems science; geographic information and analysis; nature-society studies and human-environment interactions; social spaces; and globalization and international development. For the most part, the UNC Chapel Hill program has little overlap in research or instructional specialties with the proposed doctoral program at UNC Charlotte. The one exception is Geographic Information Sciences (GISc). Both programs will have instructional concentrations in this technology. However, while the Chapel Hill program prioritizes the interface between GIScience and ecological analyses, resource management, environmental modeling, landscape change and epidemiology (not areas of focus in the proposed program), the Charlotte program will focus on the nexus between GIS analytics and multiscalar urban regional dynamics.

The doctoral program in geography at UNC Greensboro currently offers applied geography with particular emphases on urban/regional economic development and planning; earth science and natural resource management; and Geographic Information Sciences. In terms of our mutual interests in urban geography with a substantial training in GIS applications, the two Ph.D. Programs would have a degree of overlap. However, there is significant divergence on the remaining themes of the two programs. Greensboro has interests in environmental and physical geography, especially as these relate to GIScience and Remote Sensing applications. The Charlotte program has at its core the intersection of urban, GIScience and policy analysis and the Department has no plans to develop environmental or physical geography themes.

An explicit orientation towards public policy implications, along with theory and application, also sets apart the proposed Charlotte Ph.D. in Geography and Urban Regional Analysis from the programs currently offered at Greensboro and Chapel Hill. Research questions relating to urban regional growth and change across the economic, social, cultural and demographic spectrums have clear public policy contexts and impacts. The multiscalar (examining issues at multiple and interconnecting local to global scales) and integrated GIScience foci of the proposed program offer a unique urban-centered instructional and research context through which the public policy effects and interventions can be critically and comprehensively assessed.

In short, the proposed Ph.D. in Geography at the University of North Carolina at Charlotte does not duplicate the currently established programs at UNC Greensboro and Chapel Hill. The model we will follow differs significantly from these programs and fills a significant need at both the regional, state and national levels.

C. Enrollment (baccalaureate programs should include only upper division majors).

We are proposing to initiate the program in the fall of 2006. We estimate the program will begin its first year with seven to ten students. Over the first five years, we expect to build a

student base at the rate of eight to twelve students per year to a steady state of 35 students. We anticipate a program retention rate of approximately 65 percent overall, with retention slightly lower (nearer 60 percent) among part-time students and higher among full-time students (70 percent). Most of the students (around 85 percent) will be full-time. Our goal is to provide funding for all full-time students. Figure 6 outlines the enrollment estimates for a five-year period.

Figure 6. Annual Enrollment Estimates*

Year	Full-time	Part-time	Total Recruited	Cumulative	Graduation
1	5	3	8	8	
2	11	5	9	14	
3	16	5	10	21	
4	23	6	11	29	3
5	29	7	11	36	4

*****Estimates are based on retention rates of 65 percent for full-time and 60 percent for part-time students.

Headcount enrollment

Show a five-year history of enrollments and degrees awarded in similar programs offered at other UNC institutions (using the format below for each institution with a similar program); indicate which of these institutions you consulted regarding their experience with student demand and (in the case of professional programs) job placement. Indicate how their experiences influenced your enrollment projections.

Proposed Program Title: Ph.D. in Geography and Urban Regional Analysis

Figure 7. Five-Year History of Enrollments at Similar Programs in North Carolina

University	Data	Year				
		2000-01	2001-02	2002-03	2003-04	2004-05
UNC Greensboro	Fall Enrollment	--	--	--	--	12
	Degrees awarded	---	---	---	---	n/a
UNC Chapel Hill	Fall Enrollment	27	25	25	25	32
	Degrees awarded	7	4	2	3	n/a

Source: Data were taken from web-based, institutional statistics at each school.

Use the format in the chart below to project your enrollment in the proposed program for four years and explain the basis for the projections:

Figure 8. Projected Enrollment in Proposed Program, 2006 - 2009.

	Year 1* (2006-07)	Year 2* (2007-08)	Year 3* (2008-09)	Year 4* (2009-10)
Full-time	5	11	16	23
Part-time	3	5	5	6
TOTALS	**8**	**14**	**21**	**29**

Source: Computed by authors.

*Depicts enrollment at the beginning of each year and is corrected for estimated rates of annual attrition and estimates of new recruits.

Please indicate the anticipated steady-state headcount enrollment after four years:

Full-time 23 Part-time 6 Total 29

Note on Figure 8: As suggested in a previous figure (Figure 6 above), we estimate the program will begin its first year with eight students and that over the first four years we will build a student base at the rate of eight to twelve students per year to 29 students by 2009 (4 years later). Eventually, we project a steady state of 35 students. We expect to maintain a retention rate of 70 percent for full-time and 60 percent among part-time students.

SCH production (upper division program majors, juniors and seniors *only*, for baccalaureate programs). Use the format in the chart below to project the SCH production for four years. Explain how projections were derived from enrollment projections (see UNC website for a list of disciplines comprising each of the four categories).

Figure 9. SCH Projections for Proposed Program, 2006-2009

Year 1: 2006-07	**Student Credit Hours (SCH)**		
Program Category	**UG**	**Master's**	**Doctoral**
Category I			108
Category II			
Category III			
Category IV			

Year 2: 2007-8	**Student Credit Hours (SCH)**		
Program Category	**UG**	**Master's**	**Doctoral**
Category I			212
Category II			
Category III			
Category IV			

Year 3: 2008-9	**Student Credit Hours (SCH)**		
Program Category	**UG**	**Master's**	**Doctoral**
Category I			325
Category II			
Category III			
Category IV			

Year 4: 2009-10	**Student Credit Hours (SCH)**		
Program Category	**UG**	**Master's**	**Doctoral**
Category I			451
Category II			
Category III			
Category IV			

Source: Computed by authors.

III. PROGRAM REQUIREMENTS AND CURRICULUM

A. Program Planning

1. List the names of institutions with similar offerings regarded as high quality programs by the developers of the proposed program.

University of Wisconsin – Milwaukee
State University of New York at Buffalo

2. List other institutions visited or consulted in developing this proposal. Also list any consultants' reports, committee findings, and simulations (cost, enrollment shift, induced course load matrix, etc.) generated in planning the proposed program.

UNC Greensboro: A team of geographers including the Chair of Geography and Earth Sciences at UNC Charlotte visited the Department of Geography at UNC Greensboro on August 11, 2005. In part the visit was a consultation and discussion of the UNC Charlotte Request to Establish and in part the visit was a renewal of historically close relationships

between the two departments. The discussion of the Charlotte Request to Establish resulted in a restatement of the characterization of the program at Greensboro offered on page 19, Section IIB4 of this document. With consultation, this section was redrafted to reflect both the current status of the Ph.D. Program at Greensboro and its future goals and objectives.

The discussion during this consultation visit also developed ideas for institutional cooperation, including the sharing of resources such as visiting speaker funding. Recognition of potential areas of cooperation in class scheduling resulted in an agreement to share long-term schedules and to provide for complementary scheduling to extend the choices available to students in each of our programs.

Similar Ph.D. Programs Outside of North Carolina: A brief summary of the two schools outside of North Carolina with similar offerings is provided below:

The Department of Geography at the State University of New York at Buffalo (UB) is somewhat similar to the proposed doctoral program at UNC Charlotte. The main research thrusts at UB are urban/regional, geographic information systems (GIS), international economic/business geographies, and physical geography. In particular, the GIS and economic geography concentrations are quite strong at UB. The economic geography emphasis is very trade-oriented and, by nature, international in scope. In many ways, each of the four specializations at UB stands on its own. The proposed doctoral program at UNC Charlotte is more integrated with the main emphasis on Urban Regional Analysis. For example, the economic geography and GIS research strengths at UNC Charlotte are seen as components of the study of the city and its environs.

The Department of Geography at the University of Wisconsin -- Milwaukee offers a Ph.D. in Geography with some similarity to that proposed at UNC Charlotte. The Milwaukee program is an innovative Ph.D. focused on the urban environment. The main research concentrations are urban development, physical geography/environmental studies, and international interests. At UNC Charlotte, environmental issues, urban or otherwise, are included under the broad umbrella of the innovative Ph.D. in Infrastructure and Environmental Studies. However, in its urban focus the Milwaukee program is quite similar to that proposed in this document. As in the Buffalo example, GIScience is not as strongly integrated into its urban theme.

B. Admission. List the following:

1. Admissions requirements for proposed program (indicate minimum requirements and general requirements).

a. Strong performance (3.5 GPA) in a master's degree in geography or field related to the primary emphases of the Program is required for admission to the Ph.D. in Geography and Urban Regional Analysis. In exceptional cases students with baccalaureate degrees may be admitted if they have an overall undergraduate GPA of at least 3.6 and meet other admission requirements. Students without master's degrees will be required to complete substantial prerequisites necessary to work at a Ph.D. level.

b. Admission to the program will require strong scores on the quantitative, verbal, and analytic sections of the Graduate Record Examination (GRE). An average score of 600 on the verbal and quantitative and a 5.0 on the analytical portions of the GRE should be considered the minimum for admission. A total score of 1200 on the quantitative and verbal is thus required. Note: applicants must have taken the GRE; no other test will be accepted in its place.

c. Three strong, positive letters of recommendation, at least two of which must come from faculty in the student's previous academic programs. All letters should be written by individuals in a position to judge the applicant's likely success in a Ph.D. program. Letters should address the applicant's suitability for a highly analytical Ph.D. program and ability to complete the program in a timely fashion. Letters from the student's master's-level program are preferred.

d. Students who are not native English speakers will be required to score at least 557 on the TOEFL exam, as well as achieve a minimum score of 55 on each of the components of the TOEFL, or a 220 on the computer-based TOEFL, or an 83 on the internet TOEFL, or an 85 percent on the MELAB. In addition, international students who will be teaching assistants will be required to undergo evaluation by the English Language Training Institute at UNC Charlotte prior to beginning their first semester of study.

e. Students entering the program will be expected to remedy any course work deficiencies identified by the program Admissions Committee. The remedial course work required for the program will depend on the background of the student. Possible deficiencies are indicated in the prerequisites for the required core courses of the program. However, it is important to note that this program will emphasize the quantitative, analytical and research design skills necessary to confront the challenges of urban and regional growth and development and that a GIS proficiency at a minimum of the applications level is required.

2. Documents to be submitted for admission (listing or sample).

a. Completed UNC Charlotte Graduate Program application

b. Complete transcripts from all undergraduate and graduate schools ever attended

c. GRE scores

d. Three letters of reference (see above)

e. Evidence of student's ability to perform GIS, research design and quantitative analysis at levels expected of students entering the program (see Minimum Requirements below)

f. Statement of interest in the program, which must include a strong statement of how the applicant intends to use the degree upon completion and a clear statement of their specific research interests.

g. A writing sample in the form of a research paper.

C. Degree requirements. List the following:

1. Total hours required. Major. Minor.

Major: 33 hours of coursework; 18 hours of dissertation units; 51 hours total beyond the master's degree; students entering the Program without a master's will be required to complete additional coursework to prepare for work at the Ph.D. level.

Minor: No minor is required. However, students are encouraged to take related coursework outside the Program.

The Structure of the Proposed Ph.D. in Geography and Urban Regional Analysis

The proposed Ph.D. in Geography and Urban Regional Analysis will be structured around an integrated 15-credit-hour, required, core curriculum and an 18-hour specialty requirement. Figure 10 outlines the proposed curriculum structure.

Preparation: Minimum Requirements to Begin the Program

The curriculum and experiential background of all students accepted into the program will be evaluated upon entry. The Admissions Committee and the faculty who teach the core courses will perform this evaluation prior to the beginning of a student's first semester. At a minimum, students entering the program will be required to demonstrate proficiencies at the level of:

- Intermediate GIS (UNC Charlotte equivalent GEOG 4120 or a minimum of two courses such as basic and intermediate GIS)
- a master's-level research design class (UNC Charlotte equivalent GEOG 6200 or a master's-level research thesis).
- a master's-level quantitative methods class (UNC Charlotte equivalent of GEOG 6100)

Students who fail to meet these minimum requirements will not be permitted to enroll in classes for which they do not have the pre-requisites. Assuming new students meet the minimum preparation requirements, they will follow the program indicated in Figure 10.

Figure 10. Core Requirements and Thematic Concentrations Within the Proposed Ph.D. in Geography and Urban Regional Analysis.

Required Common Core

Unless specified all courses are 3 credit hours.
**Courses to be created. **Existing courses that will be restructured*

*GEOG 8600. Seminar in Geographic Theory and Research Design
*GEOG 8100. Advanced Quantitative Methods: Spatial Statistics
PPOL 8622. Qualitative Methods **- -*or*- -** *GEOG 8632 Advanced Seminar on Spatial Modeling
*GEOG/PPOL 8610. Urban Regional Environment
*GEOG 8630. GIS&T and Urban Regional Analysis

All students will be required to complete a minimum of 18 credit hours beyond the core. We expect that most students will focus on one of the two concentrations elaborated below: Multiscalar Analysis or GIScience. **A minimum of 3 credit hours must come from each concentration.** With approval, a student could take related courses outside the program.

Multiscalar Analysis

PPOL 8642.	Regional Economic Development
PPOL 8616.	Urban Planning Theory/Practice
PPOL 8613.	Transportation Policy
PPOL 8615.	The Restructuring City
**GEOG 8116.	Applied Urban Regional Analysis
**GEOG 8643.	Urban Fringe & Rural Development Issues
**GEOG 8104.	Urban Industrial Geography
**GEOG 8640.	The Urban Knowledge Economy
*GEOG 8621.	Cities and Immigrants
*GEOG 8622.	Urban Labor Markets

GIScience

*GEOG 8632.	Advanced Seminar on Spatial Modeling
**PPOL 8625.	Spatial Decisions Support Systems
*GEOG 8633.	GIS Programming and Customization II
*GEOG 8634.	Multi-Attribute Assessment and Evaluation for Planning & Decision Making
*GEOG 8635.	Advanced Topics in GI S&T Research
*GEOG 8636.	Spatial Database Development (4)
*GEOG 8637.	Three Dimensional Visualization

*New course that must be approved.

**Existing course which must be approved for renumbering, cross listing and/or reformatting.

2. Proportion of courses open only to graduate students to be required in program (graduate programs only).

100 percent

3. Grades required.

Students are expected to do exceptional work which means that grades of *A* are expected in all coursework. A grade of *C* will result in the student being required to *re-take the course*, and being placed on probationary status within the Program, and could potentially mean the loss of funding if the student is receiving departmental funding. Two *C* grades or one *U* will result in termination from the program even if the second *C* is the result of retaking a course.

4. Amount of transfer credit accepted.

The University standard is six credit hours or two courses of Ph.D.-level coursework can be transferred from a Ph.D. at an accredited institution, and this will be the standard for the proposed Ph.D. program. However, in special circumstances and with the approval of the Graduate School, additional transfer credit may be possible. These exceptions will involve only students requesting transfers from other accredited universities and only for courses completed within the previous four years and for work beyond the master's.

5. Other requirements (e.g. residence, comprehensive exams, thesis, dissertation, clinical or field experience, second major, etc.)

Residency: Students must satisfy the residency requirement for the program by completing 21 hours of continuous enrollment, either as coursework or dissertation credits. Residence is considered to be continuous if the student is enrolled in one or more courses in successive semester until 21 hours are earned.

Comprehensive Exams: After completing required course work, students will take a written and oral comprehensive exam. The written portion of the exam is taken first and reflects the student's mastery of their field and its relationship to geographic thought and research methods. An oral component of the exam is scheduled after the written exam has been evaluated. During the oral exam, committee members pose additional questions in response to the written exam and any additional questions as deemed appropriate to assess the student's readiness to develop a dissertation proposal and advance to candidacy. Students whose responses to the written portion of the exam are evaluated as failing will not be permitted to proceed to the oral portion of the exam. Students failing the Comprehensive Exam will be permitted to retake the exam once. Failure on the second try will result in termination from the Program. All students must pass the comprehensive exam before writing a dissertation proposal.

Advisory Committee; Student Advisor; Program of Study: All students in the program will have a graduate advisor approved by the Program Director. The advisor will help a student formulate a *Program of Study* including a potential dissertation topic by no later than the end of the second semester of study (or 12 hours of coursework in the case of part-time students). This *Program of Study* will be reviewed by the student's Advisory Committee and must be approved by the Program Director. The *Advisory Committee* will consist of the student's advisor, a second faculty member selected by the student and the advisor, and a

third faculty member appointed by the program Director. This Advisory Committee may change as the student progresses to the *Dissertation Proposal.* The Graduate Faculty representative appointed by the Graduate School at the dissertation stage should be a member of the student's advisory committee.

Dissertation Proposal and Advancing to Candidacy: Advancing to candidacy requires that the student pass the comprehensive exam and write and successfully defend a dissertation proposal. The proposal must be submitted to the student's Advisory Committee for preliminary approval and then to the Director and the Dean of the Graduate School. The Advisory Committee will by this time, have a fourth member appointed by the Dean of the Graduate School. The fourth member of the Advisory Committee must be involved in the process of approving the dissertation proposal submitted to the program Director and the Dean of the Graduate School. After preliminary approval has been granted, the student must make a public presentation of the proposal and undertake an oral defense of the proposal to the Department and the University community. The presentation should be announced 14 days in advance of the presentation date, at which time a copy of the proposal must be placed on file for inspection by the faculty at large. The defense shall be open to all who wish to attend. Following the presentation, the research proposal must be approved by the Dissertation Committee, which may, but does not have to be, the same composition as the Advisory Committee. Successful defense of the dissertation proposal is followed by advancement to candidacy.

Ph.D. Dissertation: A dissertation is required of all Ph.D. students and should include a substantial research project that constitutes a significant contribution to the body of geographic and scientific knowledge and/or thought. Ph.D. students are required to enroll for a minimum of 18 hours or a maximum of 24 hours of dissertation credits. The dissertation consists of a written document of original research. The format for the dissertation can vary from one comprehensive inclusive document to one where the student is required to complete and submit for publication, to refereed journals, three articles. These articles will still need to be submitted as one comprehensive dissertation/document under the guidelines approved by the UNC Charlotte Graduate School.

Oral Dissertation Defense: Each dissertation will be subject to an oral defense of the dissertation document. The dissertation defense will not be scheduled until each committee member has reviewed and assessed the document.

Time Limits for Completion of the Degree. The student must achieve admission to candidacy within six years after admission to the program. All requirements for the degree must be completed within eight years after first registration as a doctoral student. These time limits are maximums; full-time students will typically be expected to complete the degree requirements in five years.

Financial Assistance. Assuming the availability of sufficient funds, the Ph.D. in Geography and Urban Regional Analysis is committed to the financial support of all full-time students in the program. Most funding will come through teaching or research assistantships. However, funding will be contingent on continuous and acceptable progress through the program and acceptable performance of duties associated with assistantships.

6. Language and/or research requirements.

Language: There is no foreign language requirement for this program.

7. Any time limits for completion.

The student must achieve admission to candidacy within six years after admission to the program. All requirements for the degree must be completed within eight years after first registration as a doctoral student. These time limits are maximums. It is generally expected that full-time students will complete course work within a three-year time frame and the dissertation will be completed one to two years later. However, all students must pass the oral examination in defense of the dissertation within five years after being advanced to candidacy.

D. List existing courses by title and number and indicate (*) those that are required. Include an explanation of numbering system. List (under a heading marked "new") and describe new courses proposed.

Existing Courses

Some of the existing coursework for this program are courses presently taught by Geography faculty for students in the Public Policy Ph.D. program at UNC Charlotte. We propose that all PPOL courses listed below that are taught by geography faculty be cross-listed with the Ph.D. in Geography and Urban Regional Analysis. If a faculty member outside of Geography and Earth Sciences teaches the existing PPOL course, students in the proposed program will take the course under its PPOL designation.

Note 1. Only one of the existing courses (PPOL 8622) listed below will serve as a requirement in the proposed program. However, Geography is committed to sharing the teaching responsibilities for this course in the Ph.D. in Public Policy.

Note 2. All existing courses listed below (except PPOL 8622 and 8613) will be proposed (through the established curriculum approval process) for cross-listing as GEOG. A change in the underscored text involving pre-requisites will be proposed through the normal curriculum approval process. The proposed new text will be: *Permission of the instructor*.

Note 3. The courses in which the title is italicized may require some restructuring.

Existing Course To Be Required Within the Core:

***PPOL 8622. Qualitative Methods in Public Policy (3).** Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the instructor. Advanced qualitative methods as applied to analysis and solution of public problems. Use of qualitative methods to analyze public problems; to devise appropriate, effective, acceptable public policies; to evaluate public programs; and to present the results of qualitative analysis to appropriate audiences. (*Would be an option in required core within the proposed program.)*

Other Existing Courses Available As Electives:

***PPOL 8610. Urban Regional Environment. (3).** Pre-requisite: Prior course work or experience relevant to the nature of urban regions. Examination of the nature of urban regions. The basic factors that shape urban regions as they grow. Impact of: geography; history; social factors; economic factors; concerns about gender, race and ethnicity, and class; and other determinants of the nature of urban regions, their problems, and possible policy solutions. *(Fall)*

PPOL 8613. Transportation Policy. (3). Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the instructor. This course examines surface transportation from a broad public policy perspective with a special focus on its institutional components and the changing role of government in transportation policy-making including the evolution of, and relationships among, various federal, state and local policies that affect investment decisions in transportation infrastructure. *(On demand)*

PPOL 8615. The Restructuring City. (3). Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course places at center stage the causes and consequences of contemporary urban restructuring and evaluates the theoretical, planning, and policy challenges inevitably presented. *(Spring)*

PPOL 8616. Urban Planning Theory and Practice. (3). Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Alternative planning theories and application of theories in urban planning practices. *(Alternate years)*

PPOL 8618. Growth Management Systems. (3). Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Exploration of growth management programs, legal and planning issues, and legislation to determine their merits, weaknesses and abilities to promote more sustainable development patterns. Will emphasize difficulty of changing traditional procedures of development and land use. *(On demand)*

PPOL 8625. Advanced Seminar in Spatial Decisions Support Systems. (3). Pre-requisite: GEOG 5120 or consent of the Instructor. Theoretical aspects of spatial DSS including technical, social, political and psychological considerations; systems design; systems manipulation; and case studies. Three hours of lecture and one two-hour lab per week. *(Fall)*

PPOL 8642. Regional Economic Development. (3). Pre-requisite: Full graduate standing in the Ph.D. in Public Policy; PPOL 8610; Intermediate microeconomics; or permission of the Instructor. Course covers classical, neo-classical and contemporary theories of trade, economic geography, and regional development. Topics include theories of urban and regional growth, location theories, human capital, labor force and entrepreneurial contributions to growth. Policy dimensions of urban growth and development are addressed from theoretical and empirical perspectives. *(Fall)*

PPOL 8643. Rural Development Issues. (3). Pre-requisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course provides research experiences that

focus on policy formulation, and demographic, economic and planning issues in rural areas. *(Fall) (This class will be proposed for restructuring to include a sizeable component on the urban fringe)*

Existing Classes That Will Be Proposed for Cross-listing as GEOG 6xxx/8xxx

GEOG 6104. Industrial Location. (3) Addresses factors influencing the location of industrial and service activities. Classical theories of industrial location are augmented with contemporary interpretations of the economic landscape. Emphasis is placed on theoretical foundations and new developments in industrial location theory, patterns and trends of industrial location, the site selection process, community impacts of locational decision-making, and the role of governments. Patterns and trends are examined in regional, national, and international perspectives. (Fall, Alternate Years)

GEOG 6116. Applied Regional Analysis. (3) Prerequisite: Basic computer skills including spreadsheets. Introduction to methods and techniques used in regional analysis. Topical areas include data sources and collection, regional delineation, community and regional profiles, regional accounts, methods of analysis and impact assessment. Topics are discussed in terms of theory, use, and role in economic geography and regional development. Emphasis is placed on application of economic and demographic methods at the regional level. (Spring, Alternate Years)

New Courses To Be Proposed Through the Established Curriculum Approval Process

Other courses that will be proposed should the program receive approval are listed below. An asterisk designates courses that will be required.

Note on numbering of courses: All courses are identified by a four digit numbering system. The first digit represents level of the course. An 8 or 9 in the first digit identifies Ph.D. work. The second digit designates special types of courses: 0 for topics, 6 for seminars, 8 for independent studies and 9 for research.

***GEOG 8100. Advanced Quantitative Methods: Spatial Statistics (3)** Pre-requisite: GEOG 6100 or its equivalent and permission of the instructor. This course introduces the concepts and analytical tools with which to examine spatial data. Various quantitative methods will be used to analyze geographical phenomena. Emphasis will be placed on using applied methods and on developing skills that can be used in research. The main goal is to become familiar with various techniques to be used in spatial data analysis.

***GEOG 8600. Seminar in Geographic Theory and Research Design. (3)**. Study of the evolution of geographic thought with particular emphasis on contemporary trends in geographic theory, research design and methodology.

***GEOG 8632. Advanced Seminar on Spatial Modeling (3).** Pre-requisite: Permission of the instructor. This class focuses on the theories and practice of spatial modeling with environmental, social and economic applications. Topics include, but are not limited to, (1) simulation models for land use change, smart growth, object movement, and homeland security planning; (2) integrated models—spatial—non-spatial, topological—ontological, deterministic—stochastic; (3) agent-based models. The lab exercises employ various spatial modeling tools. The class is offered once a year in the fall semester.

***GEOG 8630. GIS&T and Urban Regional Analysis. (3)** Pre-requisite: Permission of the instructor. This course focuses on spatial thinking, spatial analytic methods and their GIS applications suited for urban and regional analyses. These methods include spatial interaction models, spatial pattern analysis, spatial optimization methods, space-time modeling of individual behavior, and cartographic geo-visualization. Requirements to take this course include prior experience with computer file and data management in applications of quantitative analysis and GIS in the social sciences.

GEOG 8633. GIS Programming and Customization II (3) Pre-requisite: Permission of the instructor. This course focuses on the theories, techniques, and computer languages for spatial programming. Topics include, but are not limited to, customization of geographic information systems, user-interface building, and system integration environment development.

GEOG 8634. Multi-Attribute Assessment and Evaluation for Planning and Decision-Making (3) Pre-requisite: Permission of the instructor. This seminar provides a survey and comparison of multi-attribute assessment and evaluation methods in land use/environmental planning and decision-making; and discusses the implementation of these methods with the aid of geographic information techniques. Topics include (1) multi-attribute assessment and evaluation methods for land suitability/vulnerability assessment, environmental and social impact assessment, risk assessment, site selection, and plan evaluation; (2) preference elicitation methods.

GEOG 8635. Advanced Topics in GI S&T Research (3) Pre-requisite: Permission of the instructor. This seminar is designed to provide advanced graduate students with cutting-edge development in the theories and practice of GI S&T that may aid in their thesis and dissertation research. A combination of readings, lectures, and student-led seminars.

GEOG 8636. Spatial Database Development (4) Pre-requisite: Permission of the instructor. This course consists of tutorials, readings, projects, and discussions of how geo-technologies can be used to create digital geographic databases: designing conceptual database using entity-relationship approach, transforming GPS data, geo-registering scanned base maps, digitizing vector features, entering attribute data, and developing Mobile GIS applications. (Fall or on demand)

GEOG 8637. Three Dimensional Visualization of Geographic Information (3) Pre-requisite: Permission of the instructor. This course consists of tutorials, readings, projects, and discussions concerned with how geo-visualization techniques can be used to display geographic information driven from spatial analyses in 3D GIS: multi-dimensional data models, virtual reality (VR) and 3D geo-visualization as spatial analytic tools.

GEOG 8640. The Urban Knowledge Economy (3) Pre-requisite: Permission of the instructor. Examination of the factors that influence the inter- and intra-urban location of economic activities in the information age. Discussions and lectures explore the geographic aspects of the transition away from manufacturing to information processing as the primary mode of

production. The transition is examined in terms of technology development, information flows and the location of quaternary industry. (Fall)

GEOG 8621. Cities and Immigrants. (3) Pre-requisite: Permission of the instructor. This course explores the historic evolution and contemporary experience of immigrant settlement and adjustment in North American cities. In addition to its case study approach, comparative examinations of immigration based public policy and theoretical development in the US and Canada will be central components of the course.

GEOG 8622. Urban Labor Markets. (3) Pre-requisite: Permission of the instructor. This course explores the nature and development of metropolitan labor markets, production structure and income distribution in the Western World. We will be looking at the theoretical operation of urban labor markets and how labor markets function in multiracial and multicultural cities. Emphasis will be placed on the changing structure of urban labor markets under the impacts of immigration and the socioeconomic consequences from that transformation in the United States.

GEOG 8801. Dissertation (1-9)

GEOG 8802. Dissertation Residence (1)

IV. FACULTY

A. List the names of the faculty who will be directly involved in the proposed program.

There are eleven, full-time, graduate-level, teaching faculty who will be involved with the proposed Ph.D. program, four faculty whose current duties are primarily administrative who will also be involved in the proposed program, and one position currently vacant.

Figure 11. Faculty In Geography and Earth Sciences Involved in the Proposed Program

Faculty Name	Highest Degree and Institution	Other Degrees and Institutions
Campbell, Harrison	Ph.D. University of Illinois	M.A. University of Illinois
		B.A. Clark University
Chilton, Kenneth	Ph.D. University of Louisville	M.A. University of Louisville
		B.A. Centre College
Graves, Bill	Ph.D. University of Georgia	M.A. UNC Chapel Hill
		B.A. UNC Chapel Hill
Ingalls, Gerald	Ph.D. Michigan State University	M.A. University of Florida
		B.A. Southwestern Louisiana
Kalafsky, Ronald	Ph.D. SUNY Buffalo	M.A. UNC Chapel Hill
		B.A. Pennsylvania State University
Lee, Jiyeong	Ph.D. The Ohio State University	M.E. Pusan National University, Korea
		B.E. Pusan National University, Korea
Meentemeyer, Ross	Ph.D. UNC Chapel Hill	B.S. University of Georgia
Moore, Tyrel	Ph.D. University of Tennessee	M.A. University of Tennessee
		B.A. Western Kentucky University

Faculty Name	Highest Degree and Institution	Other Degrees and Institutions
Smith, Heather	Ph.D. University of British Columbia	M.A. Queen's University
		B.A. University of North Carolina
Wang, Qianfang	Ph.D. University of Georgia	M.A. Central University of Finance & Econ.
		B.S. Tianjin University of Finance & Econ.
Xiang, Wei-Ning	Ph.D. University of California Berkeley	M.R.P. University of Massachusetts Amherst
		B.S. Beijing Normal University

There is currently one vacant, full-time position in Geography: Knight Distinguished Professor of Public Policy

Faculty in Administrative Positions

Furuseth, Owen	Ph.D. Oregon State University	M.A. East Carolina University
		B.A. East Carolina University
Hauser, Edd	Ph.D. North Carolina State University	M.A. UNC Chapel Hill
		B.S. NC State University
Ives, Sallie	Ph.D. University of Illinois	M.A. University of Maryland
		B.A. University of Maryland
Walcott, Wayne	Ph.D. University of Illinois	M.A. University of Illinois at Champaign
		B.S. Western Michigan University

B. Estimate the need for new faculty for the proposed program for the first four years. If the teaching responsibilities for the proposed program will be absorbed in part or in whole by the present faculty, explain how this will be done without weakening existing programs.

In order to develop the new Ph.D. program and sustain its undergraduate and master's programs at their current level of excellence, the Department of Geography and Earth Sciences proposes to add three tenure-track faculty positions, one in each of the first three years of the program. The first should be a more senior faculty member with experience in Ph.D. programs and a record of successful and substantive grant and/or contract activity. The second and third new positions would be faculty at an assistant professor level. All new tenure-track faculty positions will require teaching and research contribution to the proposed doctoral program.

To sustain the undergraduate programming at the current levels, the Department also proposes to recruit a Ph.D.-level, non-tenure-track lecturer. This position will help sustain the Department's sizeable commitment to the University's General Education Programming, especially the Liberal Studies course (LBST 2102, Global Connections) focusing on globalization. Several of the faculty likely to teach in the Ph.D. program also teach this class, and they routinely offer a cumulative four to five sections per year. The Department will need to shift some of these faculty resources to the Ph.D. program and a permanent lecturer position will help accomplish this without adversely affecting the quality of undergraduate programming.

Currently all faculty in Geography and Earth Sciences must teach one introductory level, undergraduate class per year. If the proposed Ph.D. program is approved, we envision this requirement shifting to one introductory, undergraduate class every three or four semesters. This strategy maintains our strong commitment to having faculty of all ranks contribute to

introductory level teaching, while at the same time allowing faculty to devote effort towards Ph.D. development, teaching and student support.

C. If acquisition of new faculty requires additional funds, please explain where and how these funds will be obtained.

The description of funding sources is provided in Appendix C.

D. Explain how the program will affect faculty activity including course load, public service and scholarly research.

Currently the typical teaching load of the average, tenure track faculty member in the Department of Geography and Earth Sciences at UNC Charlotte is five courses per year. Our analysis of teaching loads, class scheduling, program requirements and the impact of the proposed Ph.D. suggests this teaching load can and should be reduced for all faculty who maintain an active research agenda including scholarly publications in high-impact, refereed journals, active pursuit of funding for research and support of graduate students, and active involvement in the proposed Ph.D. program. It is our intent to gradually shift current faculty teaching and research requirements to meet the demands and the impact of the proposed Ph.D. programming. However, reduced teaching loads for tenure-track faculty will be contingent on demonstrated and sustained productivity in research and involvement in or support of the Ph.D. program.

V. LIBRARY

In the text for Section V, the assessment of the UNC Charlotte Library Staff is italicized. The full text of the Library Assessment is included in Appendix E. In both this section (V) and in the full text in Appendix E, the Library Assessment raises issues with our current holdings within the GIScience area. In the non-italicized text below we provide a strategy for coping with the most glaring problems raised by the Library Assessment.

A. Provide a general statement as to the adequacy of present library holdings for the proposed program.

Library Assessment

Overall, library holdings are adequate to support the proposed Ph.D. in Geography and Urban Regional Analysis, although support for the Multiscalar Analysis concentration is much stronger than for the Geographic Information Science concentration. For most of the required common core and the Multiscalar Analysis concentration, library holdings of electronic databases, monographs, journals, and statistical data range from adequate to strong. Library holdings include some high-impact journals and relevant databases to support the Geographic Information Science concentration, but the monographs collection needs to be strengthened and the major journal in the field, the International Journal of Geographical Information Science, needs to be added to the collection.

Department Response

On the advice of the Library Staff, the Department has worked out a short- and long-term strategy to cope with the most important omissions in our holdings. The Department will cancel existing subscriptions to the paper subscriptions of Geographical Abstracts Human and Physical Geography, Geological Abstracts, and Bibliography and Index of Geology. These have been replaced by GEOBASE and GeoRef (electronic) and are, at best, infrequently used. This action will free up approximately $6,500, approximately, one-third of which will be used to purchase some materials including, but not limited to, the *International Journal of Information Sciences*, the leading journal in the field of GISciences and a number of the more important monographs which are missing or require updating. The remaining funds will be used to supplement titles and journal subscriptions in the environmental sciences and remote sensing. The Department will request additional funding to upgrade holdings in both Multiscalar Analysis and GIScience.

B. State how the library will be improved to meet program requirements for the next five years. The explanation should discuss the need for books, periodicals, reference materials, primary source materials, etc. What additional library support must be added to areas supporting the proposed program?

Library Assessment

The library is a member of the Carolina Consortium, a collaboration of approximately 40 university libraries in North and South Carolina that has successfully negotiated purchases of electronic journals and databases. The Consortium is presently trying to negotiate agreements that would provide access to the IJGIS, the SPIE Digital Library, and Inspec, all of which would add significant support to the Geographical Information Science concentration. Present library funding does not allow for additional journal or database purchases; additional funding will be needed to increase monographs purchases.

Department Response

As suggested in Section V, subsection A, the Department of Geography and Earth Sciences will shift existing resources to purchase one major journal in the GISciences. The Department will request additional funding to upgrade holdings in both Multiscalar Analysis and GIScience.

C. Discuss the use of other institutional libraries.

Library Assessment
Libraries have long shared resources through Interlibrary Loan. In addition, students will have borrowing privileges at the other UNC System libraries. The University of South Carolina is also within driving distance.

N/A.

VI. FACILITIES AND EQUIPMENT

A. Describe facilities available for the proposed program.

By the fall of 2006, the Department of Geography and Earth Sciences will have seven major teaching labs and 23 research labs/facilities. Every full-time faculty member in the Department will have access to his or her own, dedicated research facility/lab.

Particularly important to the success of the proposed Ph.D. in Geography and Urban Regional Analysis are the GIS and computer analysis facilities. The GIS teaching lab is currently being expanded from 22 to 35 seats. Three other computer labs are also being reconstructed. By the fall of 2006 all Geography and Earth Science students and faculty will have access to four teaching and research computer labs equipped with networked, state-of-the-art Apple Macintosh (one lab) and PC microcomputers (three labs), file servers, and printers, including two large-format plotters for mapping and GIS analysis.

A separate Geographic Information System (GIS) and remote sensing lab houses newly updated (2005) PC workstations, digitizers, and two large-format color electrostatic plotters. Arc/Info and Erdas software packages run on the workstations and are used to support classes in GIS, remote sensing and image processing, and spatial decision support systems. The Department also maintains a large collection of geographically referenced data for use by students and staff in the lab. These data sets include satellite imagery, U.S. Census Bureau files, and U.S. Geological Survey map data, as well as locally developed data sets.

The Department, in collaboration with the UNC Charlotte Urban Institute and the Center for Applied Geographic Information Science (CAGIS), maintains a state of the art facility equipped with the latest GIS software and hardware including a Global Positioning System base station and receivers, mobile GIS, scanning, digitizing and plotting services, and a large capacity, high speed GIS database server with internet map serving capabilities. Equipment and software licenses maintained by CAGIS include:

- 6 high-end PC workstations
- 1 HP 1055 color plotter
- 1 Sun Fire V480 server with 2 CPUs, 4GB RAM, 436GB RAID disk.
- ArcIMS
- Oracle
- ArcSDE
- Trimble GPS equipment
- GeoCEr XT
- GeoCE XM
- ProXR field kit
- Pathfinder Office
- Terrasync Professional
- Trimble Reference
- Large Format Scanner
- CalComp 60x48 inch digitizer
- 4 Pocket PC GIS data collection units

- ESRI site license
- Trimble 100 seat license for Pathfinder Office, Terrasync Pro
- Erdas Imagine lab kit

Also housed in the Department is the UNC Charlotte Cartography Lab, which has earned a national reputation for its high quality production cartography. It has a fully equipped darkroom with process cameras, contact frames, plate makers and color proof exposure units. Two finishing rooms house cartographic equipment such as high-end, Macintosh computer workstations, laser printers and scanners, and a high-resolution electronic image setter.

B. Describe the effect of this new program on existing facilities and indicate whether they will be adequate, both at the commencement of the program and during the next decade.

As a consequence of the University's capital construction and renovation program, the Department of Geography and Earth Sciences will be moving into a newly refurbished McEniry building. This four-story classroom and research facility has been the home of the Department since it was completed in 1976, but until now was shared with the Department of Biology.

When the reconstruction of McEniry is completed, Geography and Earth Sciences will reoccupy McEniry and share the facility with CAGIS, the Homeland Security and Transportation Policy Studies centers, and the Public Policy Ph.D. program. This represents a dramatic improvement in the level of access to quality research and teaching space.

C. Discuss any information technology services needed and/or available.

The Department of Geography and Earth Sciences has been particularly fortunate to receive excellent support for its information technology needs. As a consequence, the Department is well positioned with state-of-the-art equipment and facilities necessary to sustain the Ph.D. in Geography and Urban Regional Analysis.

D. Discuss sources of financial support for any new facilities and equipment.

The Department of Geography and Earth Sciences expects to reoccupy a newly renovated building in the spring of 2006. This facility will have updated communications capacity and upgraded teaching and research laboratory facilities. These facilities should serve the Department well into the first years of operation of the proposed Ph.D. program.

The Department anticipates significant increases in its grants and contracts activities to supplement existing equipment budgets in the annual update of equipment. As Figure 12 demonstrates, the Department has already seen a substantial increase in grants and contracts activity over the past three years, in direct response to its current graduate programming and research commitments. The total dollar amount of proposals written by Geography and Earth Sciences faculty increased by 251 percent from 2002-03 to 2004-05. In 2004-05 the Department received more than $1 million in funding – an increase of 62 percent over the 2002-03 – and more than 69 percent of that was from federal sources. This funding activity

was widely distributed over current faculty; 19 of the 24 faculty submitted proposals or received funding or awards during 2004-2005.

Figure 12. Grants and Contracts Activities Within the Department of Geography and Earth Sciences, 2002-03 to 2004-05.*

Year	*Proposals*		*Awards***		*Annual Increase*
	Number	*Amount*	*Number*	*Amount*	*in Awards(%)*
2002-03	22	$970,614	24	$654,203	
2003-04	38	$2,347,048	33	$761,710	16%
2004-05*	34	$3,405,875	20	$1,062,303	39%

***** Source: Computed by authors using data provided by UNC Charlotte, Office of Research Services.

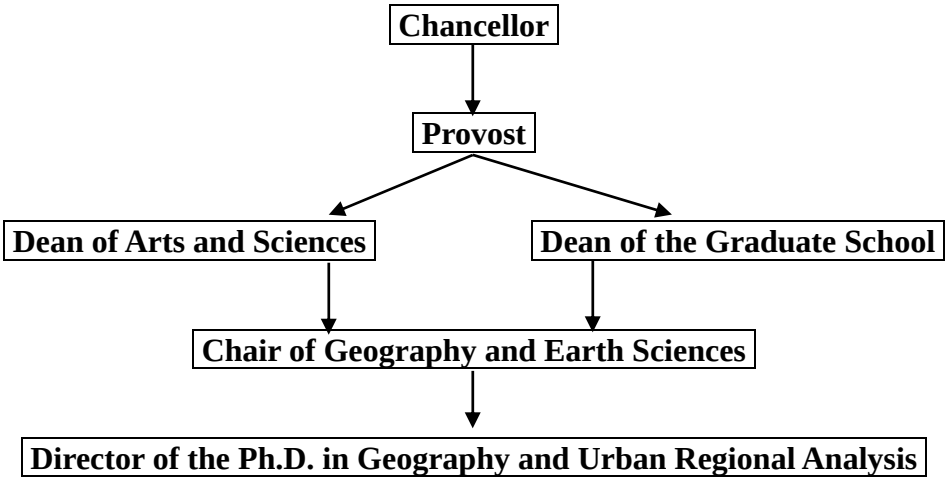
** Some awards are made without a formal proposal. These involve funding for students from local agencies in which the entire award is directed to the student in the form of a stipend.

VII. ADMINISTRATION

Describe how the proposed program will be administered giving the responsibilities of each department, division, school, or college. Explain any inter-disciplinary or inter-unit administrative plans. Include an organizational chart showing the "location" of the proposed program.

If the proposed program is approved, the Dean of the College of Arts and Sciences will appoint a Program Director in consultation with the Dean of the Graduate School and the Chair and Faculty of the Department of Geography and Earth Sciences. The Director will move to create an Advisory Committee under the Governance System of the Department of Geography and Earth Sciences. This Advisory Committee will consist of two additional, tenure-track faculty from among the faculty listed in Figures 9 and 10 of this document. The Director and the two other faculty will be responsible for operation and maintenance of the program and will advise the Chair on all major operational aspects of the program. Figure 13 outlines the organizational and reporting lines for the operation of the proposed program.

Figure 13. Organization Chart for Ph.D. in Geography and Urban Regional Analysis



VIII. ACCREDITATION

Indicate the names of all accrediting agencies normally concerned with programs similar to the one proposed. Describe plans to request professional accreditation. If the proposed new degree program is at a more advanced level than those previously authorized or if it is in a new discipline division, was SACS notified of a potential "substantive change" during the planning process? If so, describe the response from SACS and the steps that have been taken to date with reference to the applicable procedure.

There are currently no existing accrediting agencies for programs of the type proposed in this document, and there are no plans to seek professional accreditation.

IX. SUPPORTING FIELDS

Are other subject-matter fields at the proposing institution necessary or valuable in support of the proposed program? Is there needed improvement or expansion of these fields? To what extent will such improvement or expansion be necessary for the proposed program?

It is important that other Ph.D. programs at UNC Charlotte such as those within the College of Information Technology (GIS related coursework) and the Public Policy Ph.D. with the College of Arts and Sciences continue to grow and expand their programming. Such supporting curriculum and collaborative research opportunities will contribute much to the success of the Ph.D. in Geography and Urban Regional Analysis. To our knowledge, these programs are sustaining healthy, vibrant rates of growth and expansion and will continue to

receive all of the support necessary to assure that opportunities for collaboration exist for students of the proposed program.

X. ADDITIONAL INFORMATION

Include any additional information deemed pertinent to the review of this new degree program proposal.

Not applicable.

XI. BUDGET

Provide estimates (using the attached form) of the <u>additional costs</u> required to implement the program and identify the proposed sources of the additional required funds. *Use SCH projections (section II.C.) to estimate new state appropriations through enrollment increase funds.* Prepare a budget schedule for each of the first three years of the program, indicating the account number and name for all additional amounts required. Identify EPA and SPA positions immediately below the account listing. New SPA positions should be listed at the first step in the salary range using the SPA classification rates currently in effect. Identify any larger or specialized equipment and any <u>unusual</u> supplies requirements.

For the purposes of the second and third year estimates, project faculty and SPA position rates and fringe benefits rates at first year levels. *Include the continuation of previous year(s) costs in second and third year estimates.*

Additional state-appropriated funds for new programs may be limited. Except in exceptional circumstances, institutions should request such funds for no more than three years (e.g., for start-up equipment, new faculty positions, etc.), at which time enrollment increase funds should be adequate to support the new program. Therefore it will be assumed that requests (in the "New Allocations" columns of the following worksheet) are for one, two, or three years unless the institution indicates a continuing need and attaches a compelling justification. However, funds for new programs are more likely to be allocated for limited periods of time.

See Appendix A for the materials that respond directly to these requirements.

In order to develop the new Ph.D. program and sustain its undergraduate and master's programs at their current levels of excellence, the Department of Geography and Earth Sciences proposes to add three tenure-track faculty positions, one in each of the first three years of the program. The first should be a more senior faculty member with experience in Ph.D. programs and a record of successful and substantive grant and/or contract activity. The second and third new positions would be faculty at an assistant professor level. All new tenure-

track, faculty positions will require teaching and research contribution to the proposed doctoral program.

To sustain the undergraduate programming at the current levels, the Department also proposes to recruit a Ph.D.-level, non-tenure-track lecturer. This position would help sustain the Department's sizeable commitment to the University's General Education Programming, especially the Liberal Studies course (LBST 2102, Global Connections) focusing on globalization.

The Department also proposes that six new graduate teaching assistantships be provided over a period of the first three years of the Program: three in the first year; two in the second; and one in the third. These assistantships should be funded at a level that is competitive with other programs in the U.S.

XII. EVALUATION PLANS

All new degree program proposals and degree program track descriptions must include an evaluation plan which includes: (a) the criteria to be used to evaluate the quality and effectiveness of the program, (b) measures to be used to evaluate the program, (c) expected levels of productivity of the proposed program/track for the first four years of the program (numbers of graduates), (d) the names, addresses, and telephone numbers of at least three persons…qualified to review this proposal and to evaluate the program once operational, and (e) the plan and schedule to evaluate the proposed new degree program prior to the completion of its fifth year of operation once fully established.

A. Criteria to be used to evaluate the proposed program (not in an order of priority).

The proposed program would be evaluated in several broad areas:

1. How well is the Program recruiting students?

The Department should be able to recruit to the levels specified in Figure 6.

2. Training Students and Meeting Educational Objectives.

The success of the program in meeting its Educational Objectives will be evaluated on how well its students are able to demonstrate:

- A strong theoretical grounding on which research and analysis are based.
- A broad training in and an understanding of the discipline of geography
- A theoretical and functional understanding of human-economic theory and the theory of urban and regional development.
- An ability to examine and interpret empirical evidence through the lens of contemporary theory and innovative research paradigms.

- An ability to carry out field-based research and understand pedagogical issues around urban/metropolitan data.
- A firm grounding in and an understanding of metropolitan processes
- A capacity to build from empirical data and scientifically grounded answers to research questions.

3. Placement of Program Graduates.

The Program should demonstrate that its students are successful in finding placement and in following careers in academia and the public and private sectors.

4. Faculty and Student Research Productivity.

Faculty productivity will be evaluated on success in:

- producing research that makes an impact on their individual fields of research
- obtaining grants and contracts that support students in the program
- participation in the administration and operation of the program.

Student productivity will be evaluated on their success in:

- student publications in refereed journals
- student publication of dissertation research

B. Measures to be used to evaluate the program:

As with most Ph.D. programs, the Department will evaluate both the progress of its students and the success of its programming. A combination of Comprehensive Exams, Dissertation Proposal Examination, and Defense of the Dissertation will provide the measures of success for the program. We anticipate maintaining a retention rate of at least 70 percent among full-time students and 60 percent among part-timers. With a steady state of 35 students actively pursuing their degrees, we will graduate four to five students per year

The Program's ultimate effectiveness will be measured by students' success in entering and sustaining careers in academia or private or public sectors.

C. Projected productivity levels (numbers of graduates):

Figure 14. Productivity Projections.

	Year 1 (2006-2007)	Year 2 (2007-2008)	Year 3 (2008-2009)	Year 4 (2009-2010)	TOTALS
B					
M					
I/P					
D	**0**	**0**	**0**	**3**	**3**

D. Recommended consultants/reviewers: Names, titles, addresses, e-mail addresses, and telephone numbers. May not be employees of the University of North Carolina.

Dr. Ed Malecki
Department of Geography
The Ohio State University
Columbus, Ohio 43210
malecki@osu.edu
(614) 985-6858

Dr. Elvin Wyly
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University of British Columbia
Vancouver, British Columbia
V6T 1Z2 Canada
ewyly@geog.ubc.ca
(604) 822-4653

Dr. Alan MacPherson
Department of Geography
State University of New York Buffalo
Buffalo, NY 14260-0001
geoadm@acsu.buffalo.edu
(716) 645-2328

Dr. Lynn Usery
Department of Geography
University of Georgia
Athens, Georgia 30602-7401
usery@uga.edu
(706) 542-2345

E. Plan for evaluation prior to sixth operational year.

The Program would be evaluated on an ongoing/annual basis. Each year the Program will collect and evaluate data on the following:

- success in meeting recruiting projections
- success of admission criteria (minimums) in providing students that meet the expectations of the Program
- student evaluations of teaching faculty
- faculty evaluation of program administrative procedures
- faculty subjective evaluation of every student in the program
- input from the program advisory committee
- meeting student retention goals
- success of students in the comprehensive exams, dissertation proposal defense, and final defense of the dissertation
- success in placing the students in academic and/or private or public sector positions
- publications by students in refereed journals
- participation of students in professional organizations and meetings including presentation of research findings

These data will be used to make adjustments in the operational procedures of the program.

XIII. REPORTING REQUIREMENTS

Institutions will be expected to report on program productivity after one year and three years of operation. This information will be solicited as a part of the biennial long-range planning revision.

Proposed date of initiation of proposed degree program: August 15, 2006

This proposal to establish a new program has been reviewed and approved by the appropriate campus committees and authorities.

Chancellor Philip Nelson **Date** 9/28/05

A Selected Bibliography

Gewin, V. 2004. Mapping Opportunities. *Nature,* 427: 376-377.

Hecker, D. Occupational Employment Projections to 2112. *Monthly Labor Review.* February: 80-105.

Pandit, K. 2004. Geography's Human Resources Over the Past Half-Century. *The Professional Geographer.* 56 (1): 12-21.

U.S. Department of Labor. 2005. Geography Jobs. *Occupational Outlook Quarterly.* Spring.

APPENDIX A: Summary of Estimated Additional Costs for First Three Years of Program Operation

Projected Funding for New Degree Program
Doctor of Philosophy in Geography and Urban Regional Analysis
Regular Term 2006-2007
(Based on 2005-2006 Change in Student Credit Hours)

Program Category	Change in Student Credit Hours			Instructional - Position Funding Factors			Instructional Positions Required		
	Undergrad	Masters	Doctoral	Undergrad	Masters	Doctoral	Undergrad	Masters	Doctoral
Category I			0	643.72	171.44	138.41	0.000	0.000	0.000
Category II				487.37	249.94	146.74	0.000	0.000	0.000
Category III				364.88	160.93	122.95	0.000	0.000	0.000
Category IV				230.52	102.45	70.71	0.000	0.000	0.000

Fringe rates for staff
FICA @ 7.65%
Retirement @ 06.82%
Medical @ $3,748

Fringes for faculty salaries

FICA @ 7.65%	*$0*
Retirement @ 11.16%	*$0*
Medical @ $3,748	*$0*
	$0

	Total Positions Required		**0.000**
	Instructional - Position Salary Rate	(FY 02)	$67,481
101-1310	Instructional Salary Amount		$0
	Other Academic Costs	44.89300%	0
Purpose 101	Total Academic Requirements		$0
Purpose 151	Library	11.48462%	0
Purposes 152, 160, 170 180	General Instit Support	54.04980%	0
	Neg Adj Factor	50.00000%	n/a
	In-state SCHs	0	
	Financial Aid (in-state)	67.99800%	0
	Total Requirements		**$0**

SUMMARY OF ESTIMATED ADDITIONAL COSTS FOR PROPOSED PROGRAM/TRACK

Institution **UNC Charlotte** *Date* **September 28, 2005**

Program (API#, Name, Level) **45.0701 Geography**

Degree(s) to be Granted **Ph.D.** *Program Year* **2006-07**

	ADDITIONAL FUNDING REQUIRED - BY SOURCE				
	Reallocation of Present Institutional Resources	Enrollment Increase Funds	Federal/State or Other Non-state Funds (Identify)	New Allocations	Total
101 Regular Term Instruction					
1210 SPA Regular Salaries					$0
1110 EPA Non-teaching Salaries					0
1310 EPA Academic Salaries	157,000	0	0		157,000
Director Stipend	15,000				
New Lecturer	38,000				
New Associate/Full Professor	65,000				
Graduate Assistants	39,000				
1810 Social Security	12,011		0		12,011
1820 State Retirement	13,169				13,169
1830 Medical Insurance (3432*X)	6,864				6,864
2000 Supplies and Materials					0
2300 Educational Supplies					0
2600 Office Supplies					0
3000 Current Services					0
3100 Travel					
3200 Communications					
3400 Printing & Binding					
4000 Fixed Charges					0
5000 Capital Outlay (Equipment)					0
5100 Office Equipment					
5200 EDP Equipment					
TOTAL Regular Term Instruction	**$189,043**	**$0**	**$0**	**$0**	**$189,043**
151 Libraries					
5000 Capital Outlay (Equipment)		0			0
5600 Library Book/Journal					
TOTAL Libraries	**$0**	**$0**	**$0**	**$0**	**$0**
189 General Institutional Support					
2000 Supplies and Materials					0
2600 Office Supplies					
3000 Current Services					0
3200 Communications					
3400 Printing & Binding					
5000 Capital Outlay (Equipment)					0
5100 Office Equipment					
5200 EDP Equipment					
TOTAL General Inst. Support	**$0**	**$0**	**$0**	**$0**	**$0**
TOTAL ADDITIONAL COSTS	**$189,043**	**$0**	**$0**	**$0**	**$189,043**

NOTE: Accounts may be added or deleted as required.

Projected Funding for New Degree Program
Doctor of Philosophy in Geography and Urban Regional Analysis
Regular Term 2007-2008
(Based on 2006-2007 Change in Student Credit Hours)

Program Category	Change in Student Credit Hours			Instructional - Position Funding Factors			Instructional Positions Required		
	Undergrad	Masters	Doctoral	Undergrad	Masters	Doctoral	Undergrad	Masters	Doctoral
Category I			108	643.72	171.44	138.41	0.000	0.000	0.780
Category II				487.37	249.94	146.74	0.000	0.000	0.000
Category III				364.88	160.93	122.95	0.000	0.000	0.000
Category IV				230.52	102.45	70.71	0.000	0.000	0.000

Fringe rates for staff
FICA @ 7.65%
Retirement @ 06.82%
Medical @ $3,748

Fringes for faculty salaries

FICA @ 7.65%	*$3,891*
Retirement @ 11.16%	*$5,677*
Medical @ $3,748	*$2,925*
	$12,493

	Total Positions Required		**0.780**
	Instructional - Position Salary Rate	(FY 02)	$65,191
101-1310	Instructional Salary Amount		$50,868
	Other Academic Costs	44.89300%	22,836
Purpose 101	Total Academic Requirements		$73,704
Purpose 151	Library	11.48462%	8,465
Purposes 152, 160, 170 180	General Instit Support	54.04980%	39,837
	Neg Adj Factor	50.00000%	n/a
	In-state SCHs	0	
	Financial Aid (in-state)	67.99800%	0
	Total Requirements		**$122,006**

SUMMARY OF ESTIMATED ADDITIONAL COSTS FOR PROPOSED PROGRAM/TRACK

Institution **UNC Charlotte** *Date* **September 28, 2005**

Program (API#, Name, Level) **45.0701 Geography**

Degree(s) to be Granted **Ph.D.** *Program Year* **2007-08**

	ADDITIONAL FUNDING REQUIRED - BY SOURCE				
	Reallocation of Present Institutional Resources	Enrollment Increase Funds	Federal/State or Other Non-state Funds (Identify)	New Allocations	Total
101 Regular Term Instruction					
1210 SPA Regular Salaries					$0
1110 EPA Non-teaching Salaries					0
1310 EPA Academic Salaries	26,000	50,868	0		76,868
New Assistant Professor		50,868			
Graduate Assistants (2@ $13,000)	26,000				
1810 Social Security	1,989	3,891	0		5,880
1820 State Retirement		5,677			5,677
1830 Medical Insurance		2,925			2,925
2000 Supplies and Materials		2,500			2,500
2300 Educational Supplies		1,500			
2600 Office Supplies		1,000			
3000 Current Services		4,000			4,000
3100 Travel		2,000			
3200 Communications		1,000			
3400 Printing & Binding		1,000			
5000 Capital Outlay (Equipment)		3,843			3,843
5100 Office Equipment		1,000			
5200 EDP Equipment		2,843			
TOTAL Regular Term Instruction	**$27,989**	**$73,704**	**$0**	**$0**	**$101,693**
151 Libraries					
5000 Capital Outlay (Equipment)		8,465			8,465
5600 Library Book/Journal		8,465			
TOTAL Libraries	**$0**	**$8,465**	**$0**	**$0**	**$8,465**
189 General Institutional Support					
2000 Supplies and Materials		13,300			13,300
2600 Office Supplies		13,300			
3000 Current Services		13,300			13,300
3200 Communications		6,650			
3400 Printing & Binding		6,650			
5000 Capital Outlay (Equipment)		13,237			13,237
5100 Office Equipment		6,600			
5200 EDP Equipment		6,637			
TOTAL General Inst. Support	**$0**	**$39,837**	**$0**	**$0**	**$39,837**
TOTAL ADDITIONAL COSTS	**$27,989**	**$122,006**	**$0**	**$0**	**$149,995**

NOTE: Accounts may be added or deleted as required.

Projected Funding for New Degree Program
Doctor of Philosophy in Geography and Urban Regional Analysis
Regular Term 2008-2009
(Based on 2007-2008 Change in Student Credit Hours)

Program Category	Change in Student Credit Hours			Instructional - Position Funding Factors			Instructional Positions Required		
	Undergrad	Masters	Doctoral	Undergrad	Masters	Doctoral	Undergrad	Masters	Doctoral
Category I			104	643.72	171.44	138.41	0.000	0.000	0.751
Category II				487.37	249.94	146.74	0.000	0.000	0.000
Category III				364.88	160.93	122.95	0.000	0.000	0.000
Category IV				230.52	102.45	70.71	0.000	0.000	0.000

Fringe rates for staff
FICA @ 7.65%
Retirement @ 06.82%
Medical @ $3,748

Fringes for faculty salaries

FICA @ 7.65%	*$3,747*
Retirement @ 11.16%	*$5,467*
Medical @ $3,748	*$2,816*
	$12,030

	Total Positions Required		**0.751**
	Instructional - Position Salary Rate	(FY 02)	$65,191
101-1310	Instructional Salary Amount		$48,984
	Other Academic Costs	44.89300%	21,990
Purpose 101	Total Academic Requirements		$70,974
Purpose 151	Library	11.48462%	8,151
Purposes 152, 160, 170 180	General Instit Support	54.04980%	38,361
	Neg Adj Factor	50.00000%	n/a
	In-state SCHs	0	
	Financial Aid (in-state)	67.99800%	0
	Total Requirements		**$117,486**

SUMMARY OF ESTIMATED ADDITIONAL COSTS FOR PROPOSED PROGRAM/TRACK

Institution **UNC Charlotte** *Date* **September 28, 2005**

Program (API#, Name, Level) **45.0701 Geography**

Degree(s) to be Granted **Ph.D.** *Program Year* **2008-09**

	ADDITIONAL FUNDING REQUIRED - BY SOURCE				
	Reallocation of Present Institutional Resources	Enrollment Increase Funds	Federal/State or Other Non-state Funds (Identify)	New Allocations	Total
101 Regular Term Instruction					
1210 SPA Regular Salaries					$0
1110 EPA Non-teaching Salaries					0
1310 EPA Academic Salaries	14,884	48,984	0		63,868
New Assistant Professors	1,884	48,984			
Graduate Assistant (1 @ 13,000)	13,000				
1810 Social Security	1,139	3,747	0		4,886
1820 State Retirement	198	5,467			5,665
1830 Medical Insurance		2,816			2,816
2000 Supplies and Materials		2,500			2,500
2300 Educational Supplies		1,500			
2600 Office Supplies		1,000			
3000 Current Services		4,000			4,000
3100 Travel		2,000			
3200 Communications		1,000			
3400 Printing & Binding		1,000			
5000 Capital Outlay (Equipment)		3,460			3,460
5100 Office Equipment		1,000			
5200 EDP Equipment		2,460			
TOTAL Regular Term Instruction	**$16,220**	**$70,974**	**$0**	**$0**	**$87,194**
151 Libraries					
5000 Capital Outlay (Equipment)		8,151			8,151
5600 Library Book/Journal		8,151			
TOTAL Libraries	**$0**	**$8,151**	**$0**	**$0**	**$8,151**
189 General Institutional Support					
2000 Supplies and Materials		12,800			12,800
2600 Office Supplies		12,800			
3000 Current Services		12,800			12,800
3200 Communications		6,400			
3400 Printing & Binding		6,400			
5000 Capital Outlay (Equipment)		12,761			12,761
5100 Office Equipment		6,400			
5200 EDP Equipment		6,361			
TOTAL General Inst. Support	**$0**	**$38,361**	**$0**	**$0**	**$38,361**
TOTAL ADDITIONAL COSTS	**$16,220**	**$117,486**	**$0**	**$0**	**$133,706**

NOTE: Accounts may be added or deleted as required.

APPENDIX B: Letters of Support

Campus Letters

Dr. David Pugalee, Director, Ph.D. in Curriculum and Instruction

Dr. Ted Arrington, Chair, Department of Political Science

Dr. David Swindell, Director of the Ph.D. in Public Policy

Dr. Bill Chu, Chair, Department of Software and Information Systems,
College of Information Technology

Off Campus Letters

Dr. Douglas Richardson, Executive Director, Association of American Geographers

Dr. Steve Walsh, Professor of Geography, UNC Chapel Hill, and President of the Southeastern Division of the Association of American Geographers

Dr. Leo Zonn, Professor of Geography, University of Texas Austin, and former Chair, Department of Geography, UNC Chapel Hill

Letters of Support
Campus Letters

Dr. Ingalls,
I have reviewed the proposed Ph.D. in Geography and Urban Regional Analysis. The proposed program of study will be a complement to the growing doctoral level studies at UNC Charlotte. There are some courses that could be of interest to our students in urban education (i.e. Cities and Immigrants) and there is potential in the Curriculum and Instruction Ph.D. to add specializations in science and social studies that could also draw from several of the listings. I support the Ph.D. in Geography and Urban Regional Analysis and see the program and providing a substantive lead in UNC Charlotte's position as a major urban university.

Dr. David Pugalee

Dr. David K. Pugalee

Curriculum & Instruction Ph.D. Coordinator

Dept. MDSK

University of North Carolina Charlotte

9201 University City Blvd.

Charlotte, NC 28223-0001

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The Department of Political Science fully supports the Geography Ph.d. Proposal. Please print out this email and use it as your evidence that you consulted with us.

On 8/10/05 5:34 PM, "gingalls" <gingalls@email.uncc.edu> wrote:

-- Theodore S. Arrington, Ph.D.
Professor and Chair
Department of Political Science
University of North Carolina at Charlotte
9201 University-City Blvd
Charlotte, North Carolina 28223-0001
Voice: (704)687-2574
Fax: (704)687-3497
Email: tarrngtn@uncc.edu
http://www.politicalscience.uncc.edu/tarrington/index.html

Letters of Support
Campus Letters

Jerry,

Having reviewed the proposal, I support its establishment. We should talk about the ways we can insure that it will be synergistic with PPOL so we can avoid them becoming cannibalistic. But that's administrative work we can do when the proposal moves forward. As stated in the proposal, the two programs should be good complements to one another.

David

Dr. David Swindell, Assoc. Professor & Director
Ph.D in Public Policy Program
3040 Colvard Bldg.
9201 University City Blvd.
University of North Carolina-Charlotte
Charlotte, NC 28223
(704) 687-4532 (Office)
(704) 687-3497 (Fax)

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Jerry,

The Software and Information Systems Department fully supports the Geography Ph.D. proposal. It is a well thought out proposal and I look forward to continued collaborations between our two departments.

--Bill Chu
Professor and Chairman
Department of Software and Information Systems.

Letters of Support

Off Campus Letters

Association of American Geographers

1710 Sixteenth Street Northwest
Washington, DC 20009-3198
Voice 202-234-1450
Fax 202-234-2744
gaia@aag.org
http://www.aag.org

August 9, 2005

Dr. Gerald L. Ingalls, Chair
Department of Geography and Earth Sciences
University of North Carolina at Charlotte
9201 University City Blvd.
Charlotte, NC 28223

Dear Dr. Ingalls:

Congratulations on designing a comprehensive and well-supported proposal for a Ph.D. program in Geography and Urban Regional Analysis. As Executive Director of geography's largest professional association, I am excited by the prospect of a new program dedicated to training a new generation of researchers in urban and regional analysis, with emphasis on the theory and application of geographic information technologies.

As envisioned, your program will build on the existing strengths of your department while providing important programmatic connections to other departments at the University of North Carolina at Charlotte. Let me summarize why this is important and necessary. In recent years, many state, federal, and foundation funding sources have begun to base funding decisions in part upon whether institutions have strong multidisciplinary and partnership components. Geographers routinely make significant contributions to interdisciplinary research through the use of geographic information systems (GIS), global positioning systems (GPS), satellite imagery, and other technologies for acquiring and analyzing data referenced to physical and human phenomena on the earth's surface. As you note, geospatial technology is also used to support spatial analysis in an extraordinary number of fields, including transportation, environmental science, business, engineering, public works, health, criminology, and archeology. Clearly, the benefits of a doctoral program in Geography and Urban Regional Analysis will yield benefits across the UNC campus and state of North Carolina.

Your proposal recognizes the rising demand for scientists and professionals with advanced expertise in geography. As geographers, you and I are well aware of this demand, but perhaps a more persuasive case is being made by individuals and organizations outside of the discipline who recognize the value of geography for solving critical problems and reaching understanding of pressing issues. For example, the scientific and

practical value of geography figures prominently in the recent NSF report, *Complex Environmental Systems: Synthesis for Earth, Life, and Society in the 21st Century*. With their analytical perspective in human-environment interaction, location, and place, geographic scientists are leaders in basic and applied research on urban and natural systems.

There is also a need for professionals who can apply theoretical knowledge and advanced training aimed at responding to the social and economic issues facing America and the world in the 21st Century. The AAG's research project, "The Geographical Dimensions of Terrorism: A Research Agenda for the Discipline," highlighted the contributions of geographers with expertise in urban regional analysis and how geographic research and technologies can lead to new insights into the nature of terrorism and how communities and governments can effectively plan for and respond to terrorist events.

The rising opportunity for geography graduates is also reflected in the job market. A recent article in *Nature* magazine forecasts a dramatic increase in the need for geographically-skilled workers as the worldwide geospatial market grows to $30 billion by 2005, a trend that prompted the U.S. Departments of Education and Labor to release a joint statement citing geographic information systems (GIS) and related technologies as one of the three most important emerging and evolving career fields, along with nanotechnology and biotechnology. As this need grows, so too does the importance of preparing graduates as researchers, educators, and analysts who will ultimately bear the responsibility of training future GIS and geography professionals. Your proposed program, with an emphasis on multiscalar analysis and GIS, will contribute to meeting a national need for individuals with advanced credentials in geography and geographic information science.

I commend you for your attention to professional development issues of fundamental importance to graduate students and their employers. I am mindful of a recent national survey, initiated by the Pew Charitable Trusts, that found a majority of students in arts and sciences doctoral programs to be dissatisfied with their professional training and unprepared for their careers. The same survey revealed that many students enter programs without a clear understanding of the nature of graduate education and what they can do to enhance their own abilities and prospects for success in their programs and future careers. Your proposed curriculum will result in graduates with the ability to apply their knowledge and skills to serve a broad range of societal needs. A particular strength is the emphasis on career development and preparing graduates for a broad range of academic and non-academic professional careers. As you know, graduate education has been criticized in recent years for the incongruity between academic training and the needs of the modern workplace. To cite one example, a report by the Renewable Natural Resources Foundation warns of imminent retirements of large numbers of senior grade personnel in federal agencies and private research firms, and the current lack of orientation in graduate schools to prepare and encourage graduates to consider careers in these sectors. PhD graduates from your program will enter the job market equipped with the theoretical and practical knowledge required for success in academia or research positions in other public or private sectors.

In sum, I am fully confident in the capacity of your department to administer a high-quality, nationally competitive graduate program. Your proposed program will build on the prior work of establishing a vibrant Master's degree, provides an innovative curriculum that exemplifies instructional excellence, is supported by faculty with internationally recognized credentials, and establishes a research agenda that will appeal strongly to funding agencies. The AAG stands ready to support the successful implementation of your program and we will continue to offer assistance in many areas, from mentoring resources for graduates to workshops for chairpersons of PhD programs.

I look forward to welcoming the addition of your new PhD program.

Sincerely,

Douglas Richardson

Douglas Richardson, PhD
Executive Director

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

Stephen J. Walsh
Professor of Geography
swalsh@email.unc.edu (internet)

Director, Landscape Characterization &
Spatial Analysis Lab, Department of Geography
Chapel Hill, NC 27599-3220
Phone: (919) 962-3867
Fax: (919) 962-1537

Fellow, Carolina Pop. Center
Chapel Hill, NC 27599-8120
Phone: (919) 966-2153
Fax: (919) 966-6638

August 19, 2005

Dr. Gerald L. Ingalls
Professor & Chair
Department of Geography and Earth Sciences
University of North Carolina at Charlotte
9201 University City Blvd.
Charlotte, NC 28223

Dear Dr. Ingalls:

I am very appreciative of the opportunity to review the excellent proposal crafted by the Department of Geography and Earth Sciences, University of North Carolina at Charlotte to develop a PhD program in Geography and Urban and Regional Analysis with an emphasis on Multiscalar Analysis and Geographic Information Science. I have reviewed the program description with considerable interest, partly as a Professor of Geography at the University of North Carolina at Chapel Hill; as a teacher and researcher who studies Geographic Information Science, the environment, and coupled human-natural systems using geospatial data and digital technologies; and as President of the Southeastern Division of the Association of American Geographers, a 10-state region including North Carolina. So my interests in the proposed PhD program have a number of interrelated contexts. Let me begin by commenting on the proposed PhD program, first, with a brief description of how I see the proposed program aligning with a selected national and international agenda using my work in coupled human-natural systems as a point of intersection. Second, I'll comment on the areas of emphasis selected for the PhD program – Multiscalar Analysis & Geographic Information Science – and my particular view from the "trenches." Finally, I'll offer some thoughts on the Department's faculty, students, and alumnus from my many years as a member of the Association of American Geographers (AAG) and my nearly 20-years as a member of the Southeastern Division of theAAG, and now its current President.

From a programmatic point of view, the proposed PhD program is well positioned to address fundamental and applied issues in what is being called *Land Change Science* and the study of coupled human-natural systems. Within this context, the scientific community is

increasingly recognizing that human behavior and agency and the feedbacks between population and the environment, particularly focused at metropolitan areas, are among the most critical drivers of land use/land cover (LULC) change and system dynamics. As a result, various branches of science and policy are requesting realistic characterizations and models of LULC change at multiple and interacting spatial and temporal scales. The most important feedbacks considered are those related to the pattern and spatial structure of how population and environment interact. Also well recognized by the Land Change Science community is that at local, regional, and global scales land use changes are significantly altering land cover, perhaps at an accelerating pace. This transformation of the Earth's surface, particularly through urbanization, is linked to a variety of scientific and policy issues that revolve around the human dimensions of landscape change and the causes and consequences of such changes.

With the above as context, the *Grand Challenges in Environmental Sciences* was published in 2000 by the US National Research Council that identified a human and environmental research agenda for the next decade that has important implications for science, technology, policy, and education. Central to the recommendations of the Council were the interactions of people, place, and environment and the multiscalar space-time linkages to landscape dynamics. Also cited was the importance of the continued development of Geographic Information Science technologies for integrating scientific theory and information systems appropriate to the study of highly mobilized (and mobilizing) human systems – i.e., metropolitan areas and frontier environments. This "challenge" was built upon several international- and US-based initiatives (e.g., International Geosphere-Biosphere Program-IGBP, the International Human Dimensions Program-IHDP, NASA's Land Cover/Land Use Change Program, and NSF's Biocomplexity Program and the Program on Human and Social Dynamics) that defined the role of land change, first, within global Land Change Science, and, subsequently, in regard to biodiversity and ecosystem initiatives, urban services and quality of life, human environmental health, and the emergence of sustainability science and its links to policy.

My sense of the above scientific "landscape" together with my interpretation of the proposed PhD program is that the match between science, policy, GISc, and education within Land Change Science and the proposed PhD program just couldn't be better. The timing and content of the proposed PhD program is highly related to the "Challenge" made by the National Research Council in 2000 that still resonates with the scientific community, as well as with educational programs at UNC-Chapel Hill, throughout the US, and abroad. While the above describes a single point of contact of the proposed PhD program with an international scientific and educational agenda, clearly, there are many more areas of intersection and relevance to important scientific questions, societal concerns, and educational needs that the program also addresses.

From my point of view, the proposed PhD program will make a considerable impact on science, policy, spatial digital technologies, and education and training in North Carolina, the Southeast, and beyond. By emphasizing metropolitan processes, their space-time signatures, pathways to the integration of people, place, and environment, and the convergence of Geographic Information Science on the study of Geography and Urban and Regional Analysis, the proposed PhD program combines talents, energies, and a pronounced learning environment to create a unique and thoughtful research paradigm, but so too, a highly interesting, attractive, and highly applicable educational program. The diffusion of

geospatial data and technologies is rapidly occurring, partly due to the pronounced spatial perspectives in science and policy, but also, because of the significant employment opportunities and interests of students, industry, and governments alike. The emphasis on urban and metropolitan patterns and processes within the proposed program, as viewed through the lens of geographic information systems, remote sensing, data visualizations, spatial models, etc., offers a unique opportunity for student training at the PhD level, and grows from considerable strengths and reputation of the Department's faculty and program.

Finally, over the many years that I have been in North Carolina and affiliated with the Southeastern Division of the AAG, formerly as the Division's Secretary, Vice-President, and now President, it has been a considerable pleasure for me to work with the faculty and students of the Department of Geography and Earth Sciences at UNCC. Their presentations at SEDAAG and the written papers that are examined through discussants are consistently insightful, well conceived, solidly based in the important literatures, creative in their design, and thorough in their analyses. In short, the faculty are extremely talented, and they train exceptional students that are well versed in the theories and practices of our discipline. In my estimation, the Geography and Earth Sciences' faculty at UNCC have intellectually-functioned as a PhD program for many years. To have it officially designated would be a just reward and would address a need in the discipline and in the state.

In conclusion, it has been a pleasure and an education for me to review the proposal. My thanks for the opportunity, and good luck with a fine document and a strong and needed initiative.

Sincerely,

Stephen J. Walsh

Stephen J. Walsh
Professor of Geography &
President of SEDAAG

CC: Dr. Tyrel G. Moore, Professor of Geography

August 28, 2005

Dr. Gerald Ingalls, Chair
Department of Geography and Earth Science
University of North Carolina at Charlotte
Charlotte, NC 28223

Dear Dr. Ingalls:

The purpose of this letter is to provide my support for the proposed Ph.D. in Geography and Urban Regional Analysis at the University of North Carolina at Charlotte. Your staff has provided me a copy of the full proposal and so I have had the luxury of being able to examine all aspects of the proposal, down to the minutia of specific courses and faculty resumes. My overview of the proposed program is colored to a considerable extent by my long-term administrative experience in the North Carolina system. I served as a department chair for sixteen consecutive years in that system, eleven at East Carolina University and five more at the University of North Carolina at Chapel Hill, while at UNC I was a member of the Administrative Board and Academic Policy Committee of the Graduate School. Further, I am quite active in administration at the University of Texas, including membership of a Graduate School Board. I think that these experiences provide me unique and particularly valuable insight into the nature of your proposal.

Let me say at the outset that I support this proposal unequivocally and I do so without any qualms and with pleasure. The proposed program is well-conceived, is timely in terms of the discipline and associated academic areas, is clearly consistent with the mission of UNCC, and is supported by a faculty of qualities appropriate to a substantive Ph.D. program. The University of North Carolina system and the University of North Carolina at Charlotte should be pleased and proud to support such a program.

There is a special coherence in this proposal's structure, intent and direction that reflects an acute awareness of the many ingredients that are essential to a program's success. To begin, it has identified the appropriate and substantive long-term trends within Geography (and beyond), including contemporary theories, practices, subjects, research emphases, and employment opportunities, and it has framed these ideas in terms of academe and professional settings. Further, it has taken the next and all important step of designing a plan whereby demands of these trends are met. The ways in which this proposal has integrated GIS and Multiscalar theories and methodologies in the study of urban and regional analysis is nothing short of brilliant. I am confident that this program will readily carve out its own niche nationwide. Finally, the proposal engages the primary missions of the university, which of course the department has been doing for years anyhow, but it also provides an admirable complementary with several other programs. The university and state can only benefit from such a carefully conceived dynamic.

Another element that is at the foundation of this program's prospective success is the quality of its faculty. I have carefully examined the abbreviated resumes provided me, although I should

say that I have long-been familiar with the achievements of most of the department's faculty. It is clear to me that this is a faculty that individually and collectively has the credentials and drive to support a viable Ph.D. program and, quite important, to be competitive at the national scale in terms of grants, research, prestige, and the all important placing of graduates of the program. When the quality of faculty is seen within the frames of the proposal's careful delineation of the disciplinary trends and demands, then, the potential for success becomes clear; the department knows what it wants to do, how to do, and it has the personnel to do it. The request for three additional positions to buttress this case, then, is quite reasonable and should become a high priority for the university.

Clearly, this proposal was not devised at the last moment or as a lark, but instead is the result of a focused, deliberate, and long-term plan. I have watched this department evolve for over a decade, and this proposal is a logical point on its growth curve. I am comfortable in saying that a successful program will be yet another point. But this long-term evolution cannot be attributed to one or two people, as is so often the case in this type of plan, but instead reflects the collective input of a number of talented faculty, from the more administratively inclined to all others. The fact that this group of teacher-scholars has been able to cooperatively develop such a program over the long run is a subtext of the document; the fact that they can work together as a community toward a common goal should not be ignored.

In conclusion, I have examined all facets of this proposal as it relates to the department, university, region (including the UNC System), Geography and related disciplines, the realms of technology and urban and regional studies, and the state of technology in terms of contemporary American society. I feel strongly that it has a great potential to be a highly effective and valuable program, from neighborhoods of Charlotte to national academic circles to planning and business agencies at all scales throughout the country. I give the program my strongest possible endorsement, therefore, which I do without hesitation.

Sincerely,

Dr. Leo Zonn
Professor
Department of Geography and the Environment
The University of Texas at Austin

APPENDIX C: Faculty Curriculum Vitae (abbreviated)

CURRICULUM VITAE
Harrison S. Campbell, Jr., Ph.D.

EDUCATION

Ph.D., 1994, Economic Geography / Regional Science, University of Illinois at Urbana-Champaign
M.A., 1987, Geography, University of Illinois at Urbana-Champaign
B.A., 1985, Economics and Geography, Clark University, Worcester, MA

PROFESSIONAL EMPLOYMENT

Associate Professor, Department of Geography and Earth Sciences, University of North Carolina at Charlotte, 2002 to present.

Assistant Professor, Department of Geography and Earth Sciences, University of North Carolina at Charlotte, 1996-2002

Research Assistant Professor, The Institute of Public Policy, George Mason University, Fairfax, VA, 1993 to 1996.

Program and Policy Analyst, Institute of Government and Public Affairs, University of Illinois, Urbana-Champaign, 1987 to 1993.

TEACHING

Graduate Committees
John Gargiulo "*Fortune* 500 Headquarter Relocation, 1995-2002: An Empirical Analysis," Defended June, 12, 2002.
Lori Quinn "Redeveloping Underutilized or Vacant Commercial Structures: Determining the Optimal Land Use for Changing Markets," Completed May10, 2002.
Kevin White "The Effects of Architectural Design on Occupancy Rates for Neighborhood Shopping Centers in Mecklenburg, North Carolina," Completed May 12, 2002.
Casey Hartl, "Assessing the Effects of Changing Land Use on Property Values," Department of Geography and Earth Sciences, UNC Charlotte, Defended April, 2001.
Graduate Courses
GEOG 5108 Sport, Place and Development
GEOG 6116 Applied Regional Analysis
GEOG 6104 Industrial Location and Regional Development
PPOL 8610 Urban Regional Environment
PPOL 8642 Regional Economic Development

PUBLICATIONS AND RESEARCH

CAMPBELL, HS. Jr. and Pool, K.E. (Under review) "A Practical Approach to Analyzing Industry Clusters: An Illustration for the *Future Foreward* Region, *Applied Research in Economic Development*.

CAMPBELL, H.S. Jr. and A.W. Stuart (Forthcoming) "Industrial Regions," in *Encyclopedia of Southern Culture*, Chapel Hill: University of North Carolina Press.

CAMPBELL, H.S. Jr. (2003) "Unearned Income and Local Employment Growth in North Carolina: An Economic Base Analysis," *Southeastern Geographer*, 43(1): 89-103.

Graves, B. and CAMPBELL, H.S. JR. (2001) "Paying for the New Economy: The Geography of Equity Finance in North Carolina," *The North Carolina Geographer*, 9, p 24-41.

CAMPBELL, H.S., JR. (2000). "Education, Training and Regional Development: A Policy-Relevant Agenda for Regional Science," *The Review of Regional Studies*, 30(1): 85-91.

CAMPBELL, H.S., JR. (2000). "The Economy," Chapter 6 in *The North Carolina Atlas: Portrait for a New Century*, D. Orr and A. Stuart, editors, University of North Carolina Press: Chapel Hill, p. 123-148.

CAMPBELL, H.S., JR. (1999). "Professional Sports and Urban Development: A Brief Review of Issues and Studies," *The Review of Regional Studies*, 29(3): 272-292.

CAMPBELL, H.S., JR., K. Elmquist, B. Evans, M. Meyer and D. Wrubel (1999). "Assessing the Costs and Benefits of Incentives in a Carolina County," *Economic Development Review*, 16(3): 21-26

CAMPBELL, H.S., JR. and Stuart, A.W. (1998). "Foreign Direct Investment in North Carolina," *The North Carolina Geographer*, 6: 37-49.

Stough, R., Haynes, K. and CAMPBELL, H.S., JR. (1998). "Small Business Entrepreneurship in the High Technology Services Sector: An Assessment for the Edge Cities of the U.S. National Capital Regional," *Small Business Economics*, 10(1): 61-74

Grants and Contracts

CAMPBELL, H.S. JR. and Munroe, D. (2004) "The Economic Impact of the Catawba Regional Trail, Voices and Choices of the Central Carolinas, June 2004, $28,112.

CAMPBELL, H.S., JR. (2001). "A Regional Adjustment Model of North Carolina Counties," University of North Carolina at Charlotte, June, 2001, $3,500.

CAMPBELL, H.S., JR. and Furuseth, O.J. (2000). "Evaluation of the Neighborhood Improvement Program: Phase II," City of Charlotte, Department of Budget and Evaluation, April 2000, $7,000

D. Hartgen, P.I., CAMPBELL, H.S., JR. (1998). "Economic Impact of Michael J. Smith Airfield," Carteret County Economic Development Council, September 1998, $36,000.

CAMPBELL, H.S., JR. and Furuseth, O.J. (1997). "Evaluation of the Neighborhood Improvement Program: Phase I," City of Charlotte, Department of Budget and Evaluation, March, 1997, $23,000.

Curriculum Vitae
Kenneth Matthew Chilton

Education

- University of Louisville, Louisville, KY.
  PhD: Urban & Public Affairs, 1999.
  MPA: (1991). Specialization in Community Development.
- Centre College, Danville, KY.
  BA: Economics (1987).

Professional Experience

- University of North Carolina at Charlotte (8/2002 – present). Assistant Professor, Department of Geography and Earth Sciences.
- Jackson State University, Jackson, Mississippi (8/2000 – 5/2002). Assistant Professor, Department of Urban and Regional Planning.
- Schiller International University, Heidelberg, Germany (Spring 2000). Instructor.
- Industrie Handelskammer, Heilbronn (2/99 – 4/2000). Business English Instructor.
- University of Louisville (8/97-5/98). Instructor, Departments of Sociology and Political Science.

Teaching

Graduate Committees (Director)

- Dervin Spell (co-chair with Dr. Tyrel Moore). The Role of Inclusionary Zoning in Affordable Housing Policy: Comparing Raleigh and Davidson, NC. Expected completion, Spring 2005.
- Kirk Erikson. The Politics of Planning: The Rowan County Land Use Plan Update. Expected completion, Summer 2005.
- Shane Stewart. “Brownfields Development in Small Towns: Lessons from Statesville.” Completed August 2004.

Committees

- Ashley Askew. “An Examination of the Impacts of HOPE VI Funding: Charlotte’s First Ward.” March 2005.
- Curley, Daniel, "The Geography and Principles of New Urbanism: Evaluating current Projects in the Charlotte, NC Metropolitan Area.” May 2005.
- Jeremy Fisher. Spaces of…/movement…/pause…/abandonment …/action.” College of Architecture. May 2005.
- Wear, Johnny, "The Grant's Creek Project: A Land Conservation Case Study." May 2005.
- Hargreaves, Frances Todoro, "An Affordable Housing Plan for Ann Arbor, MI.” May 2004.
- Erin Burris. “The Town of Cornelius Historic Survey: Historic Preservation in a Centennial Town.” March 2004.
- Maggie Collister. “Cherryville’s New Hope.” How Can Cherryville Take Advantage of the Opportunities Offered by the New Piedmont Equestrian Center?” April 2004.
- Elizabeth Presutti. “Walk Distances to Access Bus Rapid Transit.” May 2004.
- Beven Harris. “The Newell Area Plan: A Case Study in the Collaborative Planning Process.” June 2004.
- Zonn, Jacob, “Smart Growth Communicated Through GIS Analysis (Charlotte, NC– A Case Study).” August 2003.

Graduate Courses

UNC Charlotte	*Jackson State University*
Housing Policy	Environmental Planning
Community Planning Workshop	Research Methods
Planning Theory	Environmental Impact Analysis
	Regional Planning

Publications and Research

K. Chilton. (Forthcoming). "Integrating Smart Growth Principles in Class Projects." Prepared for The Environmental Protection Agency, Development, Community & Environment Division.

K. Chilton. "Planning for the Unplanned." **Submitted** to *Planning* (Magazine of the American Planning Association), March 2005.

K. Chilton. "Patterns of Middle- and Upper-Income African American Suburbanization: A Case Study of Charlotte." **Submitted** to *Opolis*, May 2005.

K. Chilton, 2003. *Greyfields Redevelopment: Best Practices in the Field*. Prepared for The Environmental Planning Agency, Region 4. December, 2003.

K. Chilton, 2003. Chapter 2, "Ohio's Growth in Context", in *The Impact of Highways and Other Major Road Improvements on Urban Growth in Ohio*. The Buckeye Institute: pp. 4-9.

K. Chilton, K.M. 2003. Chapter 2, "State and County Growth Trends", in *Highways and Sprawl in North Carolina*. The John Locke Institute: pp. 14-25.

K. Chilton and M. Dalbey. 2002. *The State of the Jackson Metro Area: A Regional Planning Perspective*. Mississippi Economic Review and Outlook, vol. 16, no. 2: pp. 22-35.

K. Chilton. 2001. "Community Reinvestment in Jackson: Analysis of Lending Programs from 1997-2000." The Urban Researcher.

K. Chilton. 1998. "The Myth of the 'Environmental Problem': Cleanup Costs and Brownfield Redevelopment." *Public Works Management & Policy*, vol. 3, no. 8: 220-230.

Meyer, P.B., and K. Chilton. 1998. *Environmental Insurance for Urban Redevelopment: A Feasibility Study*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

K. Chilton. 1998. *Kentucky Buys Recycled: An Implementation Manual for a Buy Recycled Program*. Manual prepared for Kentucky Natural Resources and Environmental Protection Cabinet. Louisville, KY: Center for Environmental Management, University of Louisville.

Research Grants

K. Chilton (Principal Investigator), with Hunter Bacot and Peter Schwarz. "Verifying the Social, Environmental, and Economic Promise of Brownfield Programs." US Environmental Protection Agency, Brownfields Training, Research, and Technical Assistance Grants and Cooperative Agreements Program, BFRES-04-02. July 2005, $200,000.

D. Walters and K. Chilton. "Development of a Land Use Planning Vision for Mineral Springs, NC." July 2005, $10,000.

K. Chilton. "Aging in place: Planning communities to promote quality of life in retirement." TIAA-CREF John H. Biggs Faculty Fellows Program, $7,000. May 2005.

K. Chilton. "Residential Choices of Middle- and Upper-income African Americans: A Case Study of Charlotte. UNCC Faculty Fellows Grant. May 2003.

K. Chilton. "The Allocation of Credit in Jackson, MS Low-to-moderate Income Neighborhoods." Mississippi Urban Research Council. June 2001, $5,000.

P. B. Meyer and K. Chilton *Feasibility Study of Environmental Insurance for Urban Redevelopment* for US HUD Office of Policy

Curriculum Vita

OWEN J. FURUSETH

Associate Provost, Metropolitan Studies and Extended Academic Programs
Professor, Department of Geography and Earth Sciences
The University of North Carolina at Charlotte

I. EDUCATION

B.A. Geography, Urban and Regional Planning	1971	East Carolina University
M.A. Geography	1973	East Carolina University
Ph.D. Geography and Resource Planning	1978	Oregon State University
NATO Postdoctoral Fellowship Natural Resources Management Program	1980–1981	Simon Fraser University Burnaby, British Columbia, Canada

II. RECENT PUBLICATIONS AND RESEARCH

Books

Furuseth, Owen J. and Mark Lapping (eds.), "Contested Countryside: The Rural-Urban Fringe in North America," Avebury, Ashgate Publishing Ltd., Aldershot, England, 1999.

Lapping, Mark and Owen J. Furuseth (eds.), "Big Places, Big Plans," Avebury, Ashgate Publishing Ltd., Aldershot, England, 2004.

Smith, Heather and Owen J. Furuseth (eds.), "The New South: Latinos and the Transformation of Place," Avebury, Ashgate Publishing Ltd., Aldershot, England, Forthcoming 2005.

Journal Articles

Thomas, Deborah S.K. and Owen J. Furuseth, "The Realities of Incorporating Sustainable Development into Local-Level Planning: A Case Study of Davidson, North Carolina, USA," *Cities*, Vol. 14, 1997, No. 4, pp. 219–226.

Furuseth, Owen J., J. Dennis Lord, and Holly Barcus, "Defining and Measuring Neighborhood Sustainability in Charlotte, NC," *Applied Geographical Studies*, Vol. 3, No. 1, 1999, pp. 1–22.

Furuseth, Owen J., "New Urbanism, Pedestrianism, and Inner City Charlotte Neighborhoods," *Southeastern Geographer*, Vol. XXXIX, No. 2, 1999, pp. 145–160.

Furuseth, Owen J., "Charlotte Neighborhood Quality of Life Project," *Urban Quality Indicators*, Issue 19, Fall 2000, pp. 8–10.

Furuseth, Owen J., "Tarheel Hog Farming: New Geographical Evidence," *Southeastern Geographer*, Vol. XXXXI, No. 1, 2001, pp. 53–64.

Smith, Heather A. and Owen J. Furuseth, "Housing, Hispanics, and Transitioning Geographies in Charlotte, NC," *Southeastern Geographer*, Vol. 44, No. 2, 2004, pp. 216–235.

Furuseth, Owen J. and Heather A. Smith, "Providing Services in a New Latino Gateway City: Lessons from Charlotte, North Carolina, U.S.A.," *Applied Geography,* under review.

III. GRANTS AND CONTRACTS

Strategic Planning & Analysis for Project Safe Neighborhoods, Western North Carolina U.S. Department of Justice $149,700, October 2002–September 2005.

Chesapeake Neighborhood Quality of Life Project, 2005, City of Chesapeake $50,000, September 2004–June 2005.

Chesapeake Neighborhood Quality of Life Project, 2006, City of Chesapeake $65,000, July 2005–June 2006.

Charlotte Neighborhood Quality of Life Study, 2006, Charlotte Neighborhood Development and Charlotte-Mecklenburg Planning Commission, $77,900, August, 2005–September, 2006.

IV. HONORS AND AWARDS

June–October 1993, Fulbright Senior Research Scholar, University of Auckland, New Zealand.

1997 First Citizens Research Medal winner.

1998 NationsBank Teaching Excellence Award winner.

1998 Association of American Geographers, Southeastern Division, Research Honors Award.

William W. Graves, Ph.D. Revised 7/05

Assistant Professor of Geography
Department of Geography and Earth Sciences
The University of North Carolina at Charlotte
Charlotte, NC 28223-0001
Phone: (704) 687-3266 • Fax: (704) 687-3182 • E-mail: *bgraves@uncc.edu*

EDUCATION

- **Ph.D. in Geography,** The University of Georgia at Athens, 2000
- **M.A. in Geography,** The University of Georgia at Athens, 1994
- **B.A. in Geography, B.A. in Physics**, The University of North Carolina at Chapel Hill, 1990

CURRENT PROFESSIONAL EMPLOYMENT

- **Assistant Professor of Geography,** Department of Geography and Earth Sciences, The University of North Carolina at Charlotte (August 2001 - Present)
    - **GlaxoSmithKline Faculty Fellow**, NC State University Institute for Emerging Issues Appointed July 2005
    - **John H. Biggs Faculty Fellow**, Appointed May 2004

PUBLICATIONS – REFEREED

- William Graves and Christopher Woody, (forthcoming). "Risk, Finance and North Carolina's Post-Industrial Future." ***Southeastern Geographer***.
- William Graves, (forthcoming) "Discounting Northern Capital: Financing the World's Largest Retailer from the Periphery." In ***From Bentonville to Beijing: Wal-Mart's Footprint on the Global Economy***, edited by Stanley D. Brunn. New York: Routledge.
- Heather Smith and William Graves, (2005) "Gentrification as Corporate Growth Strategy: The Strange Case of Charlotte, North Carolina and the Bank of America." ***Journal of Urban Affairs.*** 27(4): 403-417**.**
- Heather Smith and William Graves, (2003) "'Great Banks Need Great Cities.' The Corporate (Re) Construction of a New South City." ***Southeastern Geographer***, Vol. 43(2): 213-234.
- William Graves, (2003) "Financing Flexibility in a Global Market: The Metropolitan Distribution of Equity Investment." ***Urban Geography***, 24(7): 611-635.
- William Graves, (2002) "Corporate Command Status in the Nonmetropolitan South, 1990-2001." ***Southeastern Geographer,*** Vol. 42 (2): 302-310.
- William Graves and Harrison Campbell, (2001) "Paying for the New Economy: The Geography of Equity Finance in North Carolina." ***The North Carolina Geographer***, Vol. 9: 24-41.
- William Graves, (2001) "Charlotte's Role as a Financial Center: Looking Beyond Bank Assets." ***Southeastern Geographer***, Vol. 41 (2): 230-245.
- William Graves, (1998) "The Geography of Mutual Fund Assets." ***The Professional Geographer***, Vol. 50 (2): 243-255.
- William Graves, (1996) "The Intra-Urban Distribution of Corporate Activities: A Case Study of Atlanta." ***Southeastern Geographer***, Vol. 36 (1): 70-81.

PUBLICATIONS – NON-REFEREED (SELECTED)

- William Graves (forthcoming) "Capital," "Commodity," "Core-Periphery Models." ***Encyclopedia of Human Geography***. Barney Warf, Altha Cravey eds. Sage Publications.
- William Graves (2004) "The North Carolina Economy***" North Carolina Atlas Revisited***. Al Stuart, ed. *http://www.ncatlasrevisited.org/*
- William Graves (2004) "Editorial – The Geography of Finance and Financial Services" ***The Industrial Geographer.*** Vol 2, No. 1.

EDITORIAL DUTIES

- **Guest Editor** of two special issues of *The Industrial Geographer* on "**The Geography of Finance**." (Volume 2, numbers 1 and 2. Fall 2004)
- **Editorial Board**: *The Southeastern Geographer* (2004-2006)
- **Editorial Board**: *The Industrial Geographer* (2005-2007)

CONFERENCE PARTICIPATION (SELECTED) (more than 20 scholarly presentations made since 1994)

- William Graves and Heather Smith (2005) "Manufacturing a New Image for the Urban South: The Production of a Global City in the Carolina Piedmont." **Conference on the Globalization of the American South** at the University of North Carolina at Chapel Hill. March.
- William Graves, and Christopher Woodey (2004) "Risk, Finance and North Carolina's Post-Industrial Future." **Southeastern Division of the Association of American Geographers**, Annual Meeting, Biloxi, MS. November.
- William Graves, (2004) "Financing Flexibility and Innovation: Market Based Measures of Corporate Intangible Assets." **Fulbright Summer Institute**, Chapel Hill, NC. June.
- William Graves and Heather Smith, (2003) "From Mills to Multinationals: The Reconfiguration of a Southern Company Town." **Southeastern Division of the Association of American Geographers**, Annual Meeting, Charlotte, NC. November. (only paper in conference to receive unanimous rating of 'excellent' from peer reviewers)
- Heather Smith and William Graves, (2003) "Shaping Charlotte's Global Urban Future?" **Urban Affairs Association**, Annual Meeting, Cleveland, OH. March.
- William Graves and Heather Smith, (2003) "Emergence of a Global City? The Mechanisms of Charlotte's Ascent Through the Urban System." **Association of American Geographers**, Annual Meeting, New Orleans, LA. March.
- William Graves, (2001) "Paying for the New Economy: The Geography of Equity Finance in North Carolina." **Southeastern Division of the Association of American Geographers**, Annual Meeting, Lexington, KY. November.
- William Graves, (1999) "Beyond Bank Assets: Charlotte's Role as a National Financial Center." **Southeastern Division of the Association of American Geographers**, Annual Meeting, Tampa, FL. November.

GRANTS AND AWARDS (SELECTED)

- **Fannie Mae Foundation** (under review) "Corporate-Municipal Image Building as an Agent of Center City Revitalization" William Graves and Heather Smith co-PIs. ($80,000)
- **GlaxoSmithKline Faculty Fellowship in Public Policy** (2005) Institute for Emerging Issues, NC State University. (awarded after statewide multi-disciplinary competition)
- **John H. Biggs Faculty Fellowship** (2004) The University of North Carolina at Charlotte ($7,000)
- **Junior Faculty Research Grant** (2003). "From Mills to Multinationals: Charlotte as a Global City in Ascendance" The University of North Carolina at Charlotte ($5,400)
- **Junior Faculty Research Grant** (2001). "Paying for the New Economy: Identifying Linkages Between Equity Finance and Regional Economic Development." The University of North Carolina at Charlotte ($3,800)
- **Junior Faculty Research Grant** (2000). "Identifying the Elements of the Metropolitan Innovation Infrastructure." The University of North Carolina at Charlotte ($3,500)

CURRICULUM VITAE
April 2003
Edd Hauser, P.E., PhD

EDUCATION
– North Carolina State University, Transportation Engineering, PhD, 1975
– North Carolina State University, Transportation Engineering, MS, 1966
– UNC Chapel Hill, City& Regional Plng., Master of Regional Planning, 1965
– North Carolina State University Bachelor of Science, Civil Engineering, 1963

PROFESSIONAL EMPLOYMENT
– Director, Center for Transportation Policy Studies, UNC Charlotte (Academic appointments as Professor of Geography and Earth Sciences, and Professor of Civil Engineering)
– Consultant, Kimley-Horn and Associates, Raleigh, North Carolina, 1994-2000
– Assistant to the State Highway Administrator, North Carolina Department of Transportation, 1991-94
– Director, Center for Advanced Transportation Systems Research, Arizona State University, College of Engineering and Applied Sciences, 1990-91
– Associate Professor of Civil Engineering, Arizona State University, 1990-91
– Director, Institute for Transportation Research and Education, University of North Carolina at Chapel Hill, 1984-89
– Executive Director, Southeastern Consortium of University Transportation Centers, 1987-89
– Deputy Director, Institute for Transportation Research and Education, 1979-84
– Adjunct Associate Professor of Civil Engineering, North Carolina State University, 1980-89
– Senior Transportation Systems Planner, Research Triangle Institute, 1969-79
– Visiting Lecturer in Civil Engineering, Duke University, 1973-79
– Assistant Operations Officer, U.S. Army, 815th Battalion (Construction), Army Corps of Engineers, 1967-68
– Post Engineer, Lieutenant, USAR, Corps of Engineers, U.S. Army, 1966-67
– Transportation Planner, Harland Bartholomew and Associates, 1966

TEACHING
– Taught Graduate Courses in Transportation Systems Engineering at Duke University (1975-1979) and at Arizona State University (1990 – 1991)
– Preparing to teach Graduate Course in Transportation Policy in the PhD Program in Public Policy, UNC Charlotte, 2003 -

PUBLICATIONS AND RESEARCH
– "ITS Programs in the North Carolina DOT," Annual Meeting of the IVHS Consortium, Greensboro, NC, 1994
– "An Approach to Developing Integrated, Multimodal Transportation Partnerships," Transportation Research Record , 1997
– "ITS Deployment Program for Metropolitan Nashville and Downtown Parking and Traffic Guidance System," presented at the Southern Section of the Institute for Transportation Engineers, Greenville, South Carolina, April 17, 2000.

– "Application of Best Management Practices and ITS Technologies for the Ohio DOT," presented at the ASCE (American Society of Civil Engineers) Specialty Conference on Advanced Technologies at the Volpe National Transportation Center, Cambridge, Massachusetts, August 2002.
– "Development of Regional Transportation Authorities: Case Studies in Three Regions in North Carolina;" Presented at the Regional Transportation and Economic Development Conference in Scottsdale, Arizona July 2002.
– "ITS Technologies' Deployment," Presented at the ASCE Specialty Conference in Cambridge, Massachusetts, August 2002.
– "Impact of Terrorism on the Travel Industry," Presented at the Annual MISA Meeting in Charleston, SC, November 2002.

GRANTS AND CONTRACTS

– ITS Best Management Practices and Technologies for Ohio, Ohio Department of Transportation, $49,976, October 11, 2000.
– Advanced Traveler Information Kiosks for Regional Traveler Information Systems, Touch Information, Inc., $43,500, November 1, 2000.
– Developing and Conduct of a Training Program for Rural Planning Organizations, North Carolina Department of Transportation, $42,400, December 2001.

OTHER RELEVANT PROFESSIONAL EXPERIENCES

Associations:

– American Road and Transportation Builders Association (President, Educator's Division, 1989-91, Board of Directors, 1991-93)
– Council of University Transportation Centers (President, 1985-86)
– Institute of Transportation Engineers
– ITS America
– National Society of Professional Engineers
– North Carolina Public Transit Association
– Professional Engineers of North Carolina (President, Education Division, 1988-89)
– Transportation Research Board
– Transportation Research Forum
– World Council on Transportation Research

OTHER SPECIALIZED TRAINING

– Transportation and Highway Management Conference, American Association of State Highway and Transportation Officials, Coeur d'Alene, ID, 1987
– Leadership Development Institute, Human Resources Development, Inc., Winston-Salem, NC, 1989
– Leadership Institute, Arizona State University, Executive Education Program, College of Business, Tempe, AZ, 1990
– Transportation Finance, Transportation Research Board, Dallas, TX, 1997

VITA

GERALD LYNN INGALLS
Professor of Geography
Chair, Department of Geography and Earth Sciences

I. PERSONAL INFORMATION

Department of Geography and Earth Sciences
Charlotte, N.C. 28223
Birthplace: Jennings, Louisiana

University of North Carolina at Charlotte
Phone: 704-687-4260
Birthdate: July 10, 1943

II. EDUCATION

	DATE	INSTITUTION
Ph.D.-Geography	1973	Michigan State University
Dissertation: Spatial Change in Post-War Southern Voting Responses		
M.A.-Latin American Studies/Geography	1970	University of Florida
Thesis: A Geographical Analysis of Costa Rican Presidential Elections: ('58-66)		
B.A.-History--Latin America Concentration	1968	University of Southwestern Louisiana

III. PROFESSIONAL EXPERIENCE

A. Service at Academic Institutions Other than UNCC

Institution	Appointment	Years Served
Michigan State University	Instructor	1
Lansing Community College	Instructor	1

B. Service at UNCC

Date/Level Present Appt.	Professor, August 1988	15
Date/Level Initial Appt.	Assistant, August 1973	15
	Total Teaching Experience	32

C. Thesis/Internship Advisor

2002	Severn Stovall	Education: Charlotte Mecklenburg's Assembly Line
2002	Barbara John	Predicting School Choice
2001	Joe Young	The Effects of Public Policy on Adaptive Reuse Real Estate Development
1999	Gail Sieger	A Study to Define Workplace Issues for Business Retention
1998	Danny Swicegood	An Analysis of Alcohol Related Offenses, Matthews, NC
1996	Dominic Thomas	Local Level Redistricting for a Consolidated Charlotte-Mecklenburg, NC
1995	Toby Moore	White, Male and Democrat: Change, Continuity and the Southern Sheriff
	Tim Lesser	Characterizing Cities Using Visual Techniques: A Comparison of Alternative Snowflake Diagrams
1984	Tom Sanders	The Geography of Airspace Boundaries
1983	Pamela Price	Electoral Targeting for Female Candidates
1978	Mary G. Neely	Electoral Redistricting in Newly Annexed Areas
1976	William Houghton	Course Design for World Regional Geography

D. Dissertation, Thesis/Internship Committees

PhD Committees

1999	Grace Farris	Retrospective Analyses of State Assistance Teams Assigned to Designated Low-Performing Middle Schools in North Carolina, Education. University appointed member.

IV. UNIVERSITY AND COMMUNITY SERVICE

A. UNIVERSITY SERVICE

Administrative Duties

2001-2005 Graduate Program Director, Ph.D. in Public Policy
1987-2001 Graduate Coordinator, MA in Geography

V. PUBLICATIONS AND RESEARCH

A. Refereed Publications

Chapters in Books or Journal Articles. (Chapters in books indicated by year underlined.)

2003 "A Visual Resources Inventory Methodology for Small Town and Rural Preservation," in *The New Countryside: Critical Questions for the Future of Rural Regions and Communities*. Beesley, K. and Millward, H., eds. , Rural Research Centre, Brandon University, Manitoba, CA and St. Mary's University, Nova Scotia, CA. (In press). With Tyrel Moore

2001 "Old But New: An Inventory of Textile Mill Reuse in the Charlotte Urban Region." Southeastern Geographer, forthcoming in May 2001 issue.

2000 "Urbanization in North Carolina," in *The North Carolina Atlas: Portrait for a New Century*. Chapel Hill: University of North Carolina Press.

1999 "The Future of Racial Gerrymandering: Evidence From North Carolina's 12th Congressional District," invited chapter in Representation, Community and Redistricting in the 1990's: A Geographical Perspective, Shelley, Leib and Webster, eds., Syracuse University Press.

1998 "The Limited Vote Alternative To Affirmative Districting," Political Geography, Volume 17, Number 6, 701-728. With Ted Arrington.

1997 "Fifty Years of Political Change in the South: Electing African Americans and Women to Public Office." Southeastern Geographer, Volume XXXVII, Number 2. With Leib and Webster

1997 "Money Politics in the 'Year of the Woman': US Senate Campaign Financing in Comparative Political Contexts. Part 1. Comparative State Politics, Volume 18, Number 5,. With Jan Kodras and Stan Brunn.

1997 "Money Politics in The 'Year of the Woman': US Senate Campaign Financing in Comparative Political Contexts. Part 2. Comparative State Politics, Volume 18, Number 6. With Jan Kodras and Stan Brunn.

1995 "The Present and Future of Racial Gerrymanding: Evidence from North Carolina's 12th Congressional District," The Southeastern Geographer, Vol. 35, No. 1, with Toby Moore.

1994 "Public Fear of Crime and its Role in Bus Transit Use," Transportation Research Board, of the NRC, in press, with D. Hartgen and Tim Owens.

1992 "No Blurred Edges, No Crowded Middle: Votes for Jesse Helms in 1984 and 1990," The North Carolina Geographer, Vol. 1. Co-Author: Jamie Strickland.

1991 "The Role of Gender in Local Campaign Financing: The Case of Charlotte, North Carolina," Women and Politics, Vol 11(2), pp. 61-89.

1990 "Measuring Electoral Change in the South: The Case of Jesse Helms," The Southeastern Geographer, Summer, 1990.

1989 "The Location of Noxious Facilities: Legal and Equity Considerations," Research in Contemporary and Applied Geography: A Discussion Series. Department of Geography, State University of New York at Binghamton, Volume XIII.

1988 "Voting Patterns in the U.N. General Assembly on Uses of the Seas," Ocean Yearbook 7 , 1989. Co-Author: Stan Brunn.

1987 "Defining and Identifying NICs," in The Third World, edited by James Norwine and Alfonso Gonzalas (Allen and Ungwin).

1987 "Remnants of Prohibition in the United States", Southeastern Geographer, Volume XXVII, Number 2, 101-114.

1986 "Buffer States: Outlining and Expanding Existing Theory," in Buffer Systems in World Politics, John Chay and Tom Ross, editors, (Boulder: Westrow).

1984 "Effects of Campaign Spending on Local Elections: The Charlotte Case," American Politics Quarterly, Vol. 12, No. 1, January 1984, 117-127. Co-Author: Ted Arrington.

1984 "Race and Campaign Finance in Charlotte, N.C.: A Research Note," Western Political Quarterly. December 1984. Co-Author: Ted Arrington.

1983 "U.N. Voting Records to Assess the Political Behavior of Nations: Israel, A Case Study," in People, Territory and State-Pluralism in Political Geography, London: Croom Helm, Spring. Co-Author: Stanley Brunn.

1982 "Financing Local Election Campaigns," Proceedings of Third Annual Urban Affairs Conference of University of North Carolina: Winter, 1982.

1980 "Patrolling High-Crime Neighborhoods: Changing Citizen Attitudes and Crime Experience Through a Mini-Team Policing Model," Law Enforcement Assistance Administration,

National Criminal Justice Reference Service, Number: NCJ #61788, January, 1980. Co-Authors: John Hayes and Wayne Walcott.

1980 "Dalton Village (NC) High Crime Neighborhood Project: An Evaluation of Mini-Team Policing," Law Enforcement Assistance Administration, National Criminal Justice Reference Service, Number: NCJ #61790, January, 1980, Co-Authors: John Hayes and Wayne Walcott.

1979 "Patrolling High Crime Neighborhoods: Changing Attitudes and Crime Experiences through a Mini-Police Team Model," Proceedings of First Annual Urban Affairs Conference, Vol. 1. Co-Authors: Wayne Walcott, John Hayes.

1979 "Electoral Change in the American South: The Influence of Population Size," The Southeastern Geographer, November, Co-Author, Stanley Brunn.

1977 "The Optometrists' View of Site Selection," Journal of American Optometric Association, Vol. 48, August , pp. 1005-1015. Co-Author, Lola Olsen.

1973 "Cities of the United States: The View from the Junior High School," Iowa Geographer, No. 32, Spring 1973, pp. 21-30. Co-Author, Gary Manson.

1972 "The Emergence of Republicanism in the Urban South," Southeastern Geographer, XII, No. 2, November, 133-144. Co-Author, Stanley Brunn.

E. Grants and Contracts (2000 to present)

Research:

2003 "Developing and Implementing a Growth Projection Model for MUMPO,"
Funding Agency: Charlotte DOT With: Paul Smith
$250,000

2003 "Developing a Governance Structure for CATS,"
Funding Agency: CATS With: Suzanne Leland and Gary Johnson
$97,400

2002 Developing a Model to Predict Student Population Growth
Charlotte Mecklenburg School System With: Ike Heard and Cheryl Roberts
$25,000

Educational Funding (since 2000):

Off-campus or non-state funded graduate assistantships. Entire amount to Research Assistantships.

2001 $25,600
2000 $184,000

VI. PROFESSIONAL AFFILIATIONS

Current Membership:

Association of Public Policy and Management (APPAM)
Association of American Geographers (AAG)
Southeastern Division of Association of American Geographers (SEDAAG)
North Carolina Geographical Society (NCGS)
Political Geography Special Interest Group of Association of American Geographers
Middle East Institute
International Studies Association-South
Phi Beta Delta, National Honor Society for International Scholars
North Carolina Data Network. Academics/consultants engaged in election analysis.

Ronald V. Kalafsky, Ph.D.

University of North Carolina - Charlotte
Department of Geography and Earth Sciences
Charlotte NC 28223

Telephone: 704.687.3451
Fax: 704.687.3182
rvkalafs@email.uncc.edu

Education

Ph.D., Geography
State University of New York at Buffalo, 2002
Dissertation: The role of location in a mature manufacturing sector: An examination of the US machine tool industry

M.A., Geography
University of North Carolina at Chapel Hill, 1999
Research centered on maquiladoras and economic development in Tijuana, Mexico. Fieldwork conducted in Tijuana and Mexico City.

B.A., Economics
Pennsylvania State University, 1990

Recent Research and Professional Experience

University of North Carolina at Charlotte — Charlotte, NC
Department of Geography and Earth Sciences — 2004 to present

ASSISTANT PROFESSOR

Daemen College — Amherst, NY
Business Administration Department — 2002 to 2004

ASSISTANT PROFESSOR

Selected Publications

Kalafsky, R.V. (in press). Performance and practice: examining the machine tool industries of Japan and the United States. *Tijdschrift voor economische en sociale geografie*.

Kalafsky, R.V. and A.D. MacPherson. (in press). The post-1990 rebirth of the US machine tool industry: a temporary recovery? *Technovation*.

Kalafsky, R.V. (accepted pending revisions). The manufacturing sector in the South: status and recent trends. *Southeastern Geographer*.

Kalafsky, R.V. (2004). Firm size and export activity: an examination of the US machine tool sector. *Journal of Small Business and Enterprise Development* 11(2): 159-165.

MacPherson, A.D. and R.V. Kalafsky. (2003). The technological revitalization of a mature US industry: the case of machine tools. *Industrial Geographer* 1(1): 16-34.

Kalafsky, R.V. and A.D. MacPherson. (2003). Input/output ranges and performance: an examination of US machine tool producers. *Entrepreneurship and Regional Development* 15(1): 69-82.

Kalafsky, R.V. (2002). International alliances, market information, and export performance in a mature manufacturing sector. *Proceedings of the International Business and Economics Research Conference.*

Kalafsky, R.V. and A.D. MacPherson. (2002). Regional differences in the competitive characteristics of US machine tool companies. *Growth and Change* 33(3): 269-290.

Kalafsky, R.V. and A.D. MacPherson. (2002). The competitive characteristics of US manufacturers in the machine tool industry. *Small Business Economics* 19(4): 355-369.

Kalafsky, R.V. and A.D. MacPherson. (2001). Recent trends in the export performance of US machine tool companies. *Technovation* 21(11): 709-717.

Instructional Experience

University of North Carolina at Charlotte (2004 to present)
- Industrial Geography
- Spatial Analysis
- The Location of Human Activity

Daemen College (2002 to 2004)
- Economic Geography
- International Economics
- Economics of Sustainable Development
- Regional Business in the Pacific Rim
- Regional Business in the European Union
- Regional Economic of Latin America
- Cultural Dimensions of International Business
- Principles of Microeconomics
- Principles of Macroeconomics
- Comparative Management
- Global Competitive Framework
- Regional Economics of Latin America
- Intermediate Statistics

State University of New York at Buffalo (2001 to 2002)
- International Cultural Environments and Commercial Problems
- Maps and Mapping

Presentations at Recent Professional Meetings

"Manufacturing performance and situation: the case of two machine tool sectors." Southeastern Division of the Association of American Geographers, Biloxi, 2004.

"Manufacturing in the South: status and recent trends." North American Meetings of the Regional Science Association International, Seattle, 2004

"Different manufacturing trajectories: comparing the Japanese and US machine tool sectors." Association of American Geographers, Philadelphia, 2004.

"The post-1990 rebirth of the US machine tool industry: a temporary recovery?" New York State Economics Association, New York, 2003.

"Firm size and export activity: an examination of the US machine tool sector." International Business and Economics Research Conference, Las Vegas, 2003.

"International alliances, market information, and export performance in a mature manufacturing sector." International Business and Economics Research Conference, Las Vegas, 2002.

"Challenges for machine tool producers in the Manufacturing Belt." Great Lakes Economic Development Conference, Buffalo, 2002.

Selected Awards

- Urban Institute Grant. 2005. University of North Carolina at Charlotte
  Innovation and human capital in manufacturing: Performance and challenges within the Charlotte region
- Junior Faculty Research Grant. 2005. University of North Carolina at Charlotte
  Examining human capital issues and company performance within the Japanese manufacturing sector
- Faculty Research Grant. 2003. Daemen College

CURRICULUM VITAE **JIYEONG LEE, PH.D.**

EDUCATION

Ph.D. in Geography, The Ohio State University, Columbus, Ohio, 2001
M.C&RP in City and Regional Planning, The Ohio State University, Columbus, Ohio, 1994
M.E. in Architecture, Pusan National University, South Korea, 1987
B.E. in Architecture, Pusan National University, South Korea, 1984

PROFESSIONAL EMPLOYMENT

- *Assistant Professor*, Department of Geography and Earth Sciences, The University of North Carolina at Charlotte, Charlotte, NC: 2004-Present (Appointed to the Graduate Faculty: 2005)
- *Assistant Professor*, Department of Geography, Minnesota State University, Mankato, MN: 2001-2004
- *Teaching/Research Assistant*, Department of Geography, The Ohio State University, Columbus, OH: 2000-2001
- *GIS Manager/Analyst*, Delaware County Regional Planning Commission, Delaware, OH: 1994-2001
- *GIS Intern*, Delaware County Regional Planning Commission, Ohio: 1993-1994
- *Research Fellow and Lecturer*, Department of Engineering Graphics, Korean Military Academy, Seoul, South Korea: 1987-1990
- *Research Assistant*, Urban Affair Research Institute, Pusan National University, South Korea: 1984-1987

GRADUATE TEACHING

Courses Taught

- GEOG 4/5120: Introduction to Geographic Information Systems (GIS)
- GEOG 8000: Three Dimensional Visualization of Geographic Information
- GEOG 4/5000: Spatial Database Development with GPS and GIS
- GEOG 4/5000: GIS and Spatial Analysis
- GEOG 4/5000: Programming and Customization in GIS

Graduate Thesis Supervision

- Richard Moore, Department of Geography, MSU-Mankato (2004)
  Thesis: *Taking the Process of Finding a Home to the Next Level – The Geographic Level*

PUBLICATIONS

- Jiyeong Lee and Mei-Po Kwan, (Forthcoming) A Combinatorial Data Model for Representing Topological Relationships between 3-D Geographic Entities, *International Journal of Geographical Information Sciences*. (Accepted, June 2005)
- Mei-Po Kwan and Jiyeong Lee, (2005) Emergency response after 9/11: the potential of real-time 3D GIS for quick emergency response in micro-spatial environments, *Computers, Environment and Urban Systems*, 29, pp 93-113.
- Mei-Po Kwan and Jiyeong Lee, (2004) Geovisualization of human activity patterns using 3D GIS: A time-geographic approach. In Michael Goodchild and Donald Janelle, eds., *Spatially Integrated Social Science: Examples in Best Practice*. Oxford: Oxford University Press: p48-66.
- Jiyeong Lee, (2004) A Spatial Access Oriented Implementation of a Topological Data Model for 3D Urban Entities, *GeoInformatica*. 8:3, p235-262.

- Jiyeong Lee, (2004) 3-D GIS for Geo-coding Human Activity in Micro-scale Urban Environments, in M. Egenhofer, C. Freksa and H. Miller, eds., *Geographic Information Sciences: Springer's Lecture Notes in Computer Science Computers* (LNCS 3234). New York: Springer, p. 162-178.
- Jiyeong Lee and Joong-Hi Ryu, (under review) A Geo-coding Method Implemented for Korean Addressing Systems in Urban Environments, submitted to *Journal of Korean GIS*.
- Jiyeong Lee, (under review) A GIS-based Geo-Coding Middleware for Locating Human Activities in Urban Areas, submitted to *Environment and Planning B*.
- Jiyeong Lee and Hamid Yunus, (2004) 3D Cadastre System using the Node-Relation Structure in GIS. In *Proceeding of 24th Annual ESRI International User Conferenc*e, San Diego, CA.
- Jiyeong Lee, (2003) A GIS-based Model for Evaluating Agricultural Land based on Crop Equivalent Rate (CER). In *Proceeding of 23rd Annual ESRI International User Conference*, San Diego, CA.
- Jiyeong Lee, (2001) 3D Data Model for Representing Topological Relations of Urban Features, In *Proceeding of 21st Annual ESRI International User Conferenc*e, San Diego, CA.
- Jiyeong Lee, (1997) An Object-Oriented Approach to the Analysis of Land Information System, In *Proceeding of '97 GIS/LIS Conference*, Cincinnati, Ohio.
- Young Song & Jiyeong Lee, (1989) *Engineering Graphics*, Dong-Myung press, Korea.

RESEARCH GRANTS

- Jiyeong Lee, "A 3D Geo-information for Disaster and Emergency Management", Faculty Research Grant funded by The University of North Carolina at Charlotte, NC. $5,750.00: 2005-2006
- Jiyeong Lee, "3D Cadastre System using the Node-Relation Structure in GIS", funded by College of Social and Behavioral Sciences, Minnesota State University-Mankato, MN. $4,350.00: 2003
- Jiyeong Lee, "3-D GIS Visualization Using VRML", funded by College of Social and Behavioral Sciences, Minnesota State University-Mankato, MN. $500.00: 2003
- Jiyeong Lee and Martin Mitchell, "The Value of Farm Programs for Providing Winter Cover and Food for Midwestern Pheasants". Farmland Wildlife Populations and Research Group, Minnesota Department of Natural Resource. $19,000: 2003-2004
- Jiyeong Lee, Faculty Improvement Grant (FIG), Minnesota State University – Mankato. $2,000: 2003
- Jiyeong Lee, Cindy Miller and Martin Mitchell, "The Wireless Campus Initiative". Minnesota State University (Gutknecht Grant). 18 Compaq iPAQ 3650 units and $1,000 (total $11,800): 2002
- Jiyeong Lee and Martin Mitchell, "The Value of Farm Programs for Providing Winter Cover and Food for Midwestern Pheasants". Farmland Wildlife Populations and Research Group, Minnesota Department of Natural Resource. $25,500: 2002-2003
- Jiyeong Lee. "Building a Geospatial Data Hub of the Southern Minnesota Region – Community Wide Access to GIS Data". Center for Applied Social Science, Minnesota State University. $3,000: 2001
- Frances Veverka, Paul Rosile and Jiyeong Lee. "Spatial Relations of Indoor Radon Level to Geological and Environmental Factors". Ohio Department of Health, Bureau of Radiation Protection. Funded by US EPA. $100,000 ($10,000 for GIS Analysis by Jiyeong Lee): 1996-2000
- Jiyeong Lee. ESRI Local Government GIS Start-Up Grant, Environmental Systems Research Institute, INC., $15,973: 1999

AWARDS

- Best Oral Paper Presentation Award, Sponsored by Intergraph at 2001 University Consortium for Geographic Information Science (UCGIS) Summer Assembly, Buffalo, NY. (2001)
- Certificate for Excellent Oral Paper Presentation, 2001 UCGIS Student Poster Competition, Buffalo, NY. (2001)
- The Best Paper Award, 2001 GISSG Student Paper Competition at 97th AAG, New York, NY. (2001)
- Map Gallery 3rd Place, Map Title: Orange Township Comprehensive Plan. Awarded by OGRIP at 10th Ohio GIS Conference. (2000)

- Faculty Prize, in Department of City & Regional Planning, The Ohio State University. (1993)
- Award for Best Graduate Student Project, The Ohio Conference a Chapter of American Planning Association. (1993)
- Faculty Prize, in Department of City & Regional Planning, The Ohio State University. (1992)

Ross K. Meentemeyer

Department of Geography & Earth Sciences
University of North Carolina at Charlotte
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ph: 704.687.2397
fax: 704.687.3182

EDUCATION

2000 Ph.D., Geography, University of North Carolina at Chapel Hill
1993 B.Sc., Physical Geography, University of Georgia

PROFESSIONAL EXPERIENCE

2005 to present *Associate Professor*, Dept. of Geography & Earth Sciences, UNC Charlotte
2005 to present *Director*, Center for Applied Geographic Information Science, UNC Charlotte
2000 to 2005 *Assistant Professor*, Department of Geography, Sonoma State University
2000 to 2005 *Director*, Geographic Information Center, Sonoma State University
2000 to present *Adjunct Faculty*, Department of Biology, Sonoma State University

CURRENT GRANTS

2005-07 USDA Forest Service. $160,000. Early detection ground survey of *Phytophthora ramorum* and assessment of central coast tree mortality and habitat suitability. (PIs: R. Meentemeyer and W. Mark).

2005-07 USDA Forest Service. $128,000. Adaptive management of *Phytophthora ramorum* in the Big Sur Ecoregion. (PIs: D. Rizzo and M. Garbelotto, co-PIs: R. Meentemeyer ($24,333), F. Davis, and M. Moritz).

2005-07 USDA Forest Service. $57,660. Determination of the incidence and impacts of *Phytophthora ramorum* in coastal forests of California. PI: R. Meentemeyer, co-PIs: D. Rizzo and H. Cushman).

2004-06 U.S. Department of the Interior. $285,000. Early-detection, monitoring, and risk modeling of *Phytophthora ramorum* in California (PIs: R. Meentemeyer and W. Mark).

2004-06 USDA Forest Service. $151,000. Vertebrates as dispersal agents of *Phytophthora ramorum*. (PIs: H. Cushman and R. Meentemeyer)

2003-05 USDA Forest Service and California Department of Forestry. $156,448. Influence of land-use history and vertebrates on the occurrence and spread of *Phytophthora ramorum*. (PIs: H. Cushman and R. Meentemeyer)

2004-06 Nielsen Engineering and U.S. Army Corps of Engineers. $42,000. Spatial association rule discovery (PI: R. Meentemeyer).

2004-05 California Department of Parks and Recreation. $95,000. Watershed assessment planning of Sonoma and Santa Rosa Creek watersheds (PI: R. Meentemeyer)

2002-06 National Science Foundation. $810,657 (DBI-0217064). Spatial modeling of a biological invasion: the spread of Sudden Oak Death and the importance of host genetics, environmental forcings, and community structure (PI: R. Meentemeyer, co-PIs: H. Cushman, N. Rank, D. Rizzo, R. Whitkus)

PUBLICATIONS

Journal Articles

Hunter, R. and **Meentemeyer, R.K. (**In press). Climatologically-aided interpolation mapping of daily temperature and precipitation. *Journal of Applied Meteorology.*

Rodman, L. and **Meentemeyer, R.K.** (in press) Geographical analysis of optimal wind turbine placement in northern California. *Energy Policy*.

Meentemeyer, R.K., Rizzo, D., Mark, W., and Lotz., E. (2004) Mapping the risk of establishment and spread of Sudden Oak Death in California. *Forest Ecology and Management*. 200: 195-214.

Kelly, N.M. and **Meentemeyer, R.K.** (2003). Landscape Dynamics of the Spread of Sudden Oak Death. *Photogrammetric Engineering and Remote Sensing*. 68: 1001-1010.

Meentemeyer, R.K. and Moody, A. (2002). Distribution of plant life history types in California chaparral: The role of topographically-determined drought severity. *Journal of Vegetation Science*. 13: 67-78.

Meentemeyer, R.K., Moody, A. and Franklin, J. (2001). Landscape-scale patterns of chaparral shrub-species abundance: The role of topographically mediated resource gradients. *Plant Ecology* 156; 19-41.

Moody, A. and **Meentemeyer, R.K.** (2001). Environmental factors influencing spatial patterns of woody plant diversity in chaparral, Santa Ynez Mountains, CA. *Journal of Vegetation Science* 12: 41-52.

Meentemeyer, R.K. and Moody, A. (2000). Rapid sampling of plant species composition for assessing vegetation patterns in rugged terrain. *Landscape Ecology* 15(8): 697-711.

Meentemeyer, R.K. and Moody, A. (2000). Automated mapping of conformity between topographic and geological surfaces. *Computers & Geosciences.* 26: 815-829.

Meentemeyer, R.K. and Butler, D.R. (1999). Hydrogeomorphic effects of beaver ponds in Glacier National Park, Montana. *Physical Geography.* 20(5): 435-446.

Meentemeyer, R.K., Vogler, J.B., and Butler, D.R. (1998). The geomorphic influences of burrowing beavers, Bolin Creek, North Carolina. *Zeitschrift fur Geomorphologie* 42(4): 453-468.

Meentemeyer, R.K. and Butler, D.R. (1996). Temporal and spatial changes in beaver pond locations, eastern Glacier National Park, Montana, USA. *The Geographical Bulletin*, 37(2): 97-104.

Papers in Review and Near Submission

Meentemeyer, R.K., D.M. Rizzo, E. Lotz, and Mark, W. Early-Detection of *Phytophthora ramorum* in California using risk modeling and ground surveys. (In review with *Plant Disease*)

Cushman, J.H. and **Meentemeyer, R.K.** Humans as dispersal agents of an invasive pathogen that causes Sudden Oak Death. (In preparation for *Science*)

Gordon, E. and **Meentemeyer, R.K.** Effects of dam operation and land use on stream channel morphology and riparian vegetation. (In preparation for *Water Resources Research*)

Meentemeyer, R.K.. and Gordon, E. A comparison of methods for mapping the abundance of an invasive rangeland weed. (In preparation for *Journal of Range Management*)

Davenport, R. and **Meentemeyer, R.K.** Spatial modeling of vehicle-bicycle collision risk for transportation planning. (In preparation for *Applied Geography*).

TEACHING

UNC Charlotte

Intro to Geographic Information Systems. Fall 2005

Sonoma State University

Geographic Information Systems
Advanced Geographic Information Systems
The Global Positioning System
Biogeography and Landscape Ecology
Physical Geography
Map Reading and Interpretation

EXTERNAL SERVICE

UNC Charlotte Delegate, *University Consortium for GIS*
Ecology Panel, Doctoral Dissertation Improvement Grants, *National Science Foundation* (2004 and 2005)
Monitoring Committee, *California Oak Mortality Task Force*
Research Committee, *California Oak Mortality Task Force*
Board Member, SSU representative for the *CSU GIS Specialty Group*
Manuscript Reviewer: *National Science Foundation*, *International Journal of Geographic Information Science*, *Journal of Vegetation Science*, *Landscape Ecology*, *Plant Ecology*, *Ecological Indicators*, *U.S. Forest Service*

VITA
Tyrel G. Moore
Professor

Education
Ph.D., Geography (1984) The University of Tennessee, Knoxville
M.S., Geography (1975) The University of Tennessee, Knoxville
B.S., Geography and History (1968) Western Kentucky University

Professional Experience
The University of North Carolina at Charlotte, July 2005 - present, Professor
The University of North Carolina at Charlotte, 1994-2004, Associate Professor
The University of North Carolina at Charlotte, 1989-1994, Assistant Professor
The University of North Carolina at Charlotte, 1982-1989, Lecturer
Western Kentucky University, 1977-1982, Instructor

Courses Taught at Graduate Level
Rural Development and Planning
Urban Planning Methods
Regional Planning
Urban Field Geography
Small Town Planning

Thesis/Capstone research committee Chair (Total of 21 completed to summer, 2005: recent projects listed)
Askew, Ashley, "An Examination of the Impacts of Hope VI Funding, A Case Study of Charlotte's First Ward" (Completed, May, 2005)
Wear, Johnny, "The Grant's Creek and Denson's Creek Projects: A Land Conservation Case Study" (Completed, May, 2005)
Curley, Daniel, "The Geography and Principles of New Urbanism: Evaluating current Projects in the Charlotte, NC Metropolitan Area" (Completed, May, 2005)
Harris, Beven, "Newell Area Planning Process Evaluation" (Completed, May, 2004)
Burris, Erin, "The Town of Cornelius Historic Survey: Historic Preservation in a Centennial Town," (Completed, May, 2004)
Todoro, Frances, "An Affordable Housing Plan for Ann Arbor, MI" (Completed, May, 2004)

Thesis/Capstone research committee Member (Total of 44 completed to summer, 2005: recent projects listed)
Hafeman, Lori, "The Effect of Store Characteristics on the Sales Performance of Family Dollar Stores," (Completed May, 2005)
Chambers, John, "The Economic Impact of Biological Agent Release in a Multi-State. Multi-Hazard Context: Development of a Framework for Analyzing the Economic Impact of a Biological Disaster and its Application to Operation Summer Breeze in Charlotte, North Carolina" (Completed, December, 2004)
Rice, Scott, "A Public Information Transportation ArcIMS web site for US 54 in Kansas" (Completed, December, 2004)

Refereed Publications
Selected Books
Ross, Thomas E. , Tyrel G. Moore, and Laura King, eds. *A Cultural Geography of North American Indians, Second Edition.* Southern Pines, NC: Cairo Hollow Press, 1995.
Selected Chapters in Books
Ingalls, Gerald L. and Moore, Tyrel G. "A Visual Resource Methodology for Small Town and Rural Preservation," pp. 441-454 in: Beesley, K.B., Millward, H., Ilbery, B. and Harrington, L., eds. *The New Countryside: Geographic Perspectives on Rural Change.* Brandon University (Manitoba) and Saint Mary's University (Nova Scotia), 2003.
Moore, Tyrel G., "Deindustrialization and Rural Restructuring in Southern West Virginia," pp. 123-133 in Walford, Nigel, and Napton, Darrell, eds. *Reshaping the Countryside: Perceptions and Processes of Rural Change*. CAB International, Wallingford, UK. 1999.
Moore, Tyrel G. and Thomas E. Ross, "Native Americans in the Carolinas," pp. 47-51.in D. Gordon Bennett, ed. *Snapshots of the Carolinas*, Association of American Geographers, 1996.

Selected Articles

Moore, Tyrel G, "Defining Appalachia: Public Policy and Regional Dynamics in Appalachia's Low-income Counties,1965-2000," Invited for publication in a special 2004 issue of the *Journal of Geography*. (Vol. 104, No. 2, (March/April 2005) pp. 49-58).

Ingalls, Gerald L. and Moore, Tyrel G, "Old But New: An Inventory of Textile Mill Reuse in the Charlotte Urban Region, the*Southeastern Geographer*, Vol. 41, No.1 (May, 2001), pp. 74-88.

Moore, Tyrel G., "A Southern West Virginia Mining Community, Revisited" *Southeastern Geographer*, Vol. 38, No. 1 (May, 1998), pp. 1-21.

Moore, Tyrel G. and Donald L. Mitchell, "Strange Worlds and Familiar Places: The National Geography Standards and Rethinking Geographic Education," *The North Carolina Geographer*, Volume 3, (1994), pp. 47-56.

Moore, Tyrel G., "Core-Periphery Models, Regional Planning Theory, and Appalachian Development" *The Professional Geographer*, Volume 46, Number 3 (August, 1994) pp. 316-331.

Moore, Tyrel G., "Rural Planning Progress in a Persistent Problem Area: the Central Appalachian Example" *Progress in Rural Policy and Planning* Volume IV (1994) pp. 17-32.

Papers Presented at Professional Meetings: (35 presentations : examples from Fall, 2004)

Moore, Tyrel G., and Strickland, Jamie, "Continuity and Change in a Rural Region: Economic Structures in Central Appalachia's Distress Counties,"poster presented at the 59th Meeting of the Southeastern Division of the Association of American Geographers, Biloxi, MS, November 21- 23, 2004.

Moore, Tyrel G , Invited panelist, "Planning Education and Practice in North Carolina" 47th Annual North Carolina Planning Conference, Asheville, NC, Sept. 24, 2004

Moore, Tyrel G., Ingalls, Gerald L., and Ives, Sallie M., "Rural and Small Town Planning via Service-Based learning," paper presented at the 100th Meeting of the Association of American Geographers, Philadelphia, PA, March 19, 2004.

Research Grants

Town of Matthews Planning Department, "Site Design and Development Plan for Crestdale Station" Spring 2004, $4,800

Town of Matthews Planning Department, "Downtown Redevelopment Plan Standards" Spring 2003, $4,800.

Research team member, Charlotte Department of Transportation, Mecklenburg-Union County Metropolitan Planning Organization (MUMPO) Regional Employment, Land Use and Population Data Collection and Projections, Phases I and II (Paul Smith, P.I.) January, 2003. $45,000.

Research team member, Charlotte Department of Transportation, Mecklenburg-Union County Metropolitan Planning Organization (MUMPO) Regional Employment, Land Use and Population Data Collection and Projections, Phase III (Jerry Ingalls, P.I.) March, 2003. $200,000.

Advisory team member, Charlotte Department of Transportation, Regional Land Use Technical Advisory Team (Vicki Bowman, P.I.) December 2002, $145,000.

Town of Harrisburg, "User's Guide for Town of Harrisburg Unified Development Ordinance," Town of Harrisburg, Fall 2002, $5,000.

Highway 49 Corridor Study, Town of Harrisburg, Summer-Fall 2000, $8,100.

Plans for Parkwood and Matheson Avenue Corridors, section of "Community Outreach Partnership Centers Program," US Department of Housing and Urban Development, $400,000, awarded September 1998. James Cook and Sondra Fogle , Principal Investigators. The Community Planning component that I conducted was written into the grant for a total of $39,399 including matching funds. Class projects, stipulated in the program, began in the summer of 1999.

Professional Service

Member, Editorial Board, *The Journal of Geography*

Regional Councilor, Southeastern Division of the Association of American Geographers, 2005-2008

Southeastern Division of the Association of American Geographers: Co-chair, Local Arrangements Committee, SEDAAG 2003; Chair, Southern Studies Committee, 2002-present: Past President, 2002-2003; President 2000-2001; Vice President and Program Chair, 1997-1998

Member, Editorial Board, *The North Carolina Geographer*

Manuscript reviews for: *The Journal of Geography, The Journal of Geography, The Journal of Rural Studies, The Professional Geographer, The North Carolina Geographer,* and *Southeastern Geographer.* NSF research proposals.

Honors and Awards

Gamma Theta Upsilon 2005 Outstanding Mentor Award, Honor Awarded by Students at the University of North Carolina at Charlotte, May 6, 2005

University of North Carolina University of North Carolina Board of Governors Award for Excellence in Teaching,, 2004

Bank of America Award for Excellence in Teaching,, 2003

Faculty Honors Outstanding Service Award, Southeastern Division of the Association of American Geographers, 2003

Distinguished Teaching Achievement Award, National Council for GeographicEducation, 2001 (one of 10 granted in the U. S. and Canada)

CURRICULUM VITAE **HEATHER ANNE SMITH, PH.D.**

EDUCATION
Ph.D. in Geography, University of British Columbia, Vancouver, Canada, 2000
M.A. in Geography, Queen's University, Kingston, Ontario, Canada, 1993
B.A. Highest Honors in Geography, University of North Carolina at Chapel Hill, USA, 1989
Junior Year Abroad, University of Bristol, England, 1987-1988

PROFESSIONAL EMPLOYMENT
Assistant Professor of Geography and Coordinator of Urban Studies Minor, Department of Geography and Earth Sciences, University of North Carolina at Charlotte: 2000-Present
- Appointed to the Graduate Faculty: 1999, 2005
- Maternity Leave of Absence: May 2001-July 2002

Lecturer, Department of Geography and Earth Sciences, University of North Carolina at Charlotte, 1999-2000
Sessional Lecturer, Department of Geography, University of British Columbia, 1997
Summer Session Instructor, Department of Geography, University of British Columbia**,**1994, 1995, 1996

GRADUATE TEACHING
Courses Taught
GEOG 5310: Urban Social Geography
GEOG 6005/ PPOL 8615: The Restructuring City
PPOL 8000: Directed Readings in Public Policy (Topics have included Measuring Segregation with Locally Derived Data and the Trajectory of US Immigration Policy since 1900)

Graduate Thesis Supervision
Alexis Baker, *The multi-scalar use of the internet to organize protest*. Thesis research in progress.
Pamela Notar, *A geographical assessment of the relationship between crime and gentrification*. Thesis research in progress.
Penelope Karagounis, *'Ellis Island Detour': A Case Study of Hispanic Immigrants in Charlotte, NC*. Defended, December 2004
W. Scott Whitlock, *"We other Christians" Gays and Lesbians in the Episcopal Church*. Defended, June 2004
Berry Farrington, *Gentrification and the Commercial Landscape: Reaching Beyond the Residential*. Defended, August 2003

PUBLICATIONS
Heather A. Smith and Owen J. Furuseth, Eds., Forthcoming Latinos in the New South: The Transformation of Place Ashgate Press, Burlington VT, Publication anticipated Fall 2005.
Heather Smith, Forthcoming *The Unexpected Geography of Hispanic Settlement in a New South City: Charlotte, NC.* In Immigrants Outside Megalopolis: Ethnic Transformation in the Heartland, Richard C. Jones, Ed. Altamira Press, Lanham MD. Publication anticipated 2005/2006
Heather Smith and William Graves, 2005 *Gentrification as Corporate Growth Strategy: The Strange Case of Charlotte, North Carolina and the Bank of America.* Journal of Urban Affairs, Vol. 27, No. 4, Pages to be determined.
Heather Smith and Owen Furuseth, 2004 *Hispanics, Housing and the Transformation of Charlotte's Ethnic Geographies* Southeastern Geographer, Vol. 44, No. 2, pp. 216-235. * Article re-printed in Apartment Times, Spring 2005*
Heather Smith, 2004 The Evolving Relationship between Immigrant Settlement and Neighbourhood Disadvantage in Canadian Cities, 1991-2001. Working Paper 04-20, Vancouver Centre of Excellence, Research on Immigration and Integration in the Metropolis (RIIM).
Heather A. Smith, 2003 *Planning, Policy and Polarisation in Vancouver's Downtown Eastside* Tijdschrift voor Economische en Sociale Geografie, Vol. 94, No. 4, pp. 496-509.
Heather Smith and William Graves, 2003 *The Corporate (Re)Construction of a New South City: Great Banks Need Great Cities.* Southeastern Geographer, Vol. XXXXIII, No. 2, 213-234.

Heather A. Smith and Owen J. Furuseth, 2003 *Housing and the Transformation of Charlotte's Ethnic Geographies* The State of African-Americans and Hispanics/Latinos in the Charlotte Region The Urban League of the Central Carolinas

David Ley and Heather Smith, 2000 *Relations between Deprivation and Immigrant Groups in Large Canadian Cities* Urban Studies, Vol. 37, No. 1, 37-62.

David Ley and Heather Smith, 2000 *Immigration and Deprivation in Canadian Cities* Socio-cultural problems in the metropolis: comparative analyses, 57-78 Dirk Hoerder and Ranier-Olaf Schultze, Eds. ISL-Verlag, Hagen, Germany

Heather Anne Smith, 1998 *Spatial Concentration: Residential Patterns and Marginalization* Vancouver Centre of Excellence, Research on Immigration and Integration in the Metropolis, Commentary Series 98-03, 24 pages

David Ley and Heather Smith, 1997 *Immigration and Poverty in Canadian Cities, 1971-1991* Canadian Journal of Regional Science, Vol. 30, 29-48.

David Ley and Heather Smith, 1997 Is there an Immigrant "Underclass" in Canadian Cities? Working Paper 97-08, Vancouver Centre of Excellence, Research on Immigration and Integration in the Metropolis (RIIM).

RESEARCH GRANTS

Analysis of Healthcare Delivery to the Transitioning Hispanic Community in Charlotte, NC. Michael Dulin, Principal Investigator, Heather Smith , Irene Zink, Owen Furuseth Co-investigators, Awarded June 2005, Project Ongoing Funding Agency: Charlotte Mecklenburg Health Services Foundation, Inc. *US $29,525.00*

Neighborhood Poverty and Latino Settlement in Charlotte, North Carolina. Heather Smith, Principal Investigator, Awarded March 2005, Project ongoing Funding Agency: Junior Faculty Research Grant, University of North Carolina at Charlotte, *US $5,970.00*

Revisiting Immigrant Settlement and Neighborhood Deprivation in Canadian Cities 1991-2001. David Ley and Heather Smith, Co-Principal Researchers, Awarded March 2004, Project ongoing. Funding Agency: Vancouver Centre of Excellence, Research on Immigration and Integration in the Metropolis, *CAN $38,500.00*

Exploring the Geography of Hispanic Settlement in Charlotte, North Carolina, Heather Smith, Completed Spring 2004. Funding Agency: University of North Carolina at Charlotte Junior Faculty Research Grant, *US $5,984.00*

Exploring the Evolving Relationship between Immigrant Settlement and Neighborhood Disadvantage in Canadian Cities, 1991-2001. Heather Smith, Principal Investigator, Completed Summer 2004. Funding Agency: Canadian Embassy Washington, D.C., Canadian Studies Faculty Research Grant Program, US $8,000.Heather Smith, Principal Investigator, Completed Summer 2002, pilot study for external grant application. Funding Agency: The University of North Carolina at Charlotte, Junior Faculty Summer Fellowship Grant, *US $3,500.00*

Where Worlds Collide: Social Polarization at the Community Level in Vancouver's Gastown/Downtown Eastside. Heather Smith, Principal Investigator, Completed March 2000. Funding Agency: Social Science and Humanities Research Council of Canada, Doctoral Research Fellowship, *CAN $26,000.00*

Spatial Concentration: Residential Patterns and Marginalization Heather Smith, Contract Researcher, Completed Fall 1998 Funding Agency: Social Science and Humanities Research Council of Canada, Vancouver Centre of Excellence, Research on Immigration and Integration in the Metropolis, *CAN $5,000.00*

An Immigrant Underclass in Canadian Cities. David Ley and Heather Smith, Co-Principal Researchers, Completed Fall 1997. Funding Agency: Social Science and Humanities Research Council of Canada, Vancouver Centre of Excellence, Research on Immigration and Integration in the Metropolis, *CAN $45,000.00*

CURRICULUM VITAE

Qingfang Wang zoewang@uga.edu

EDUCATION

2005 Ph.D. (expected), Geography, University of Georgia.
Dissertation: *How Does Space Matter in Ethnic Labor Market Segmentation? A Case Study of Chinese in the San Francisco CMSA*
1997 M. A., Economics, Central University of Finance and Economics, China.
Thesis: *Analysis on the Volume and Structure of State Public Debts, 1978-1996.*
1994 B.S., Public Finance, Tianjin University of Finance and Economics, China.

WORK EXPERIENCE

2004 – Pre. Research Fellow, Triangle Census Research Data Center (TCRDC), Department of Economics, Duke University
2004 – 2005 Graduate Research Fellow, Graduate School, University of Georgia.
2002 – 2004 Graduate Teaching Assistant, Department of Geography, University of Georgia.
2000 – 2002 Graduate Research Fellow, Graduate School, University of Georgia.
1997 - 2000 Research Scholar, Chinese Academy of Social Sciences, China.

RESEARCH GRANTS

Triangle Census Research Data Center (TCRDC) Dissertation Fellowship, Duke University, 2004-2005, $37,500.

The U.S. Department of Housing and Urban Development (HUD), Doctoral Dissertation Research Grant, 2003-2005, $25,000.

National Science Foundation (NSF) Doctoral Dissertation Research Improvement Awards, Grant No. BCS 033375, 2003-2005, $12,000.

Graduate School Travel Awards, University of Georgia, 2003 and 2004, $1,200.

Clarke County Geographical Society, Travel Grant for AAG Meetings, 2004 and 2005, $1,000

AWARDS/HONORS

Student Paper Competition Award (Second Place), Ethnic Geography Specialty Group, Population Geography Specialty Group, Association of American Geographers, 2005.

Doctoral Dissertation Completion Award, Graduate School, University of Georgia, 2004-2005.

Best Student Paper Award (First Place), Ethnic Geography Specialty Group, Association of American Geographers, 2004.

Finalist, John Fraser Hart Student Paper Award, Southeastern Division of the Association of American Geographers, 2002 and 2003.

Graduate School Research Award, University of Georgia, 2000-2002.

PUBLICATIONS

Wang, Q. 2004. Asians' Concentration in the U.S. Urban Labor Market: A Disaggregated Study, ***Population, Space and Place*** 10: 479-494.

Wang, Q. and Pandit, K. 2003. The Emergence of Ethnic Niches in New Immigrant Destinations: An Examination of Atlanta's Labor Market, 1980-1990. ***Southeastern Geographer*** 63(2): 159-180.

Under Review

Wang, Q. 2004. Linking Home to Work: Ethnic Labor Market Concentration in the San Francisco CMSA. Manuscript revised and resubmitted to ***Urban Geography***.

Wang, Q. 2004. Measuring Ethnic Labor Market Segmentation and Concentration. Manuscript under revision at ***Journal of Ethnic and Migration Studies***.

CONFERENCE PRESENTATIONS

Wang, Q. 2005. "Complement or Competition? A Multilevel Analysis on Race/Ethnicity, Gender and Job Earnings across US Metropolitan Areas." Association of American Geographers, March 2005.

Wang, Q. 2004. "Effects of Residential Locations on Ethnic Labor Market Concentration: A Case Study of the San Francisco CMSA." Conference on Race/Ethnicity and Place, Washington, D.C., September 2004.

Wang, Q. 2004. "Linking Home to Work: Ethnic Labor Market Segmentation in the San Francisco Bay Area." Association of American Geographers, March 2004.

Wang, Q. 2003. "The Segmentation of Asians in the U.S. Labor Market: A Disaggregated Study." Southeastern Division of the Association of American Geographers, November 2003. Paper selected for inclusion in the Fraser Hart Student Paper competition.

Wang, Q. and Pandit, K. 2003 "Ethnic Concentration, Labor Market Opportunities, and Job Earnings in Atlanta MSA 1980-1990." Association of American Geographers, March 2003.

Wang, Q. 2002. "Ethnic Segmentation of Atlanta's Labor Market, 1980-1990." Southeastern Division of the Association of American Geographers, November 2002. Paper selected for inclusion in the Fraser Hart Student Paper competition.

PROFESSIONAL ACTIVITIES

Participant, Workshop of "Effective Teaching for Graduate Students and Early Career Faculty". Department of Geography, University of Georgia, January 2005.

Participant (competitively selected), Workshop on Spatial Pattern Analysis in a GIS Environment. Center for Spatially Integrated Social Science, University of California at Santa Barbara, July 2004.

Participant, Summer Workshop for Early Career Faculty organized by the Geography Faculty Development Alliance. Department of Geography, University of Colorado at Boulder, June 2004.

Participant, Summer Institute in Advanced Statistics and Methods Workshop. Department of Sociology, State University of New York at Buffalo, May 2004.

Manuscript Reviewer for ***Southeastern Geographer***, 2004.

Wei-Ning Xiang

Professor of Geographic Information Science
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University of North Carolina at Charlotte
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1. Professional Preparation

BS (Geography), 1982, Beijing Normal University, Beijing, China.
MRP (Regional Planning), 1986, University of Massachusetts at Amherst.
PhD (City and Regional Planning), 1989, University of California at Berkeley.
Postdoctoral Fellow, 1990, Institute of Urban and Regional Development, University of California at Berkeley.

2. Appointments

Professor of Geography and Earth Sciences, University of North Carolina at Charlotte, July 2001 to present;

Visiting Professor of Geography, University of California at Santa Barbara, January 2002 to June 2002;

Research Fellow, National Center for Geographic Information and Analysis, University of California at Santa Barbara, January 2002 to June 2002.

3. Publications (selected)

Xiang, W. -N., Clarke, K.C. (2003). The Use of Scenarios in Land Use Planning. Environment and Planning B: Planning and Design 30(6), 885 – 909.

Xiang, W. -N. (1998). Assessment of the Buffer-Induced Setback Effects on Riparian Scenic Quality by Digital Tools. Environment and Planning B: Planning and Design, (25)6, pp.881-894.

Xiang, W. -N. (1997). Knowledge-Based Decision Support by CRITIC. Environment and Planning B: Planning and Design, (24)1, pp.69-79.

Xiang, W. -N. (1996a). A GIS Based Method for Trail Alignment Planning. Landscape and Urban Planning, 35(1), pp.11-23.

Xiang, W. -N. (1996b). Making Better, Quicker, and Wiser Decisions with a Decision Facilitating and Advising System. Environment and Planning B: Planning and Design, 23(4), pp.401-419.

Xiang, W. -N. (1996c). GIS-Based Riparian Buffer Analysis: Injecting Geographic Information Into Landscape Planning. Landscape and Urban Planning, 34(1), pp.1-10.

Xiang, W. -N., Stratton, W.L. (1996). The *b*-Function and Variable Stream Buffer Mapping: A Note on "A GIS Method for Riparian Water Quality Buffer Generation". International Journal of Geographical Information Systems, 10(4), pp.499-510.

Xiang, W. -N. and Whitley, D.L. (1994). Weighting Land Suitability Factors by the PLUS Method. Environment and Planning B: Planning and Design, 21(3), pp.273-304.

Xiang, W. -N. (1993). A GIS Method for Riparian Water Quality Buffer Generation. International Journal of Geographical Information Systems, 7(1), pp.57-70.

Xiang, W. -N., Gross, M., Fabos, J.G., MacDougall, E.B. (1992). A Fuzzy Group Multicriteria Decision Making Model and its Application to Land Use Planning. Environment and Planning B: Planning and Design, 19(1), pp.61-84.

Tolone, W.J., Wilson, D,, Raja, A., Xiang, W.N., Hao, H.L., Phelps, S., Johnson, E.W. (2004). Critical infrastructure integration modeling and simulation. Intelligence and Security Informatics, Proceedings Lecture Notes in Computer Science. 3073: 214-225.

4. Synergistic Activities

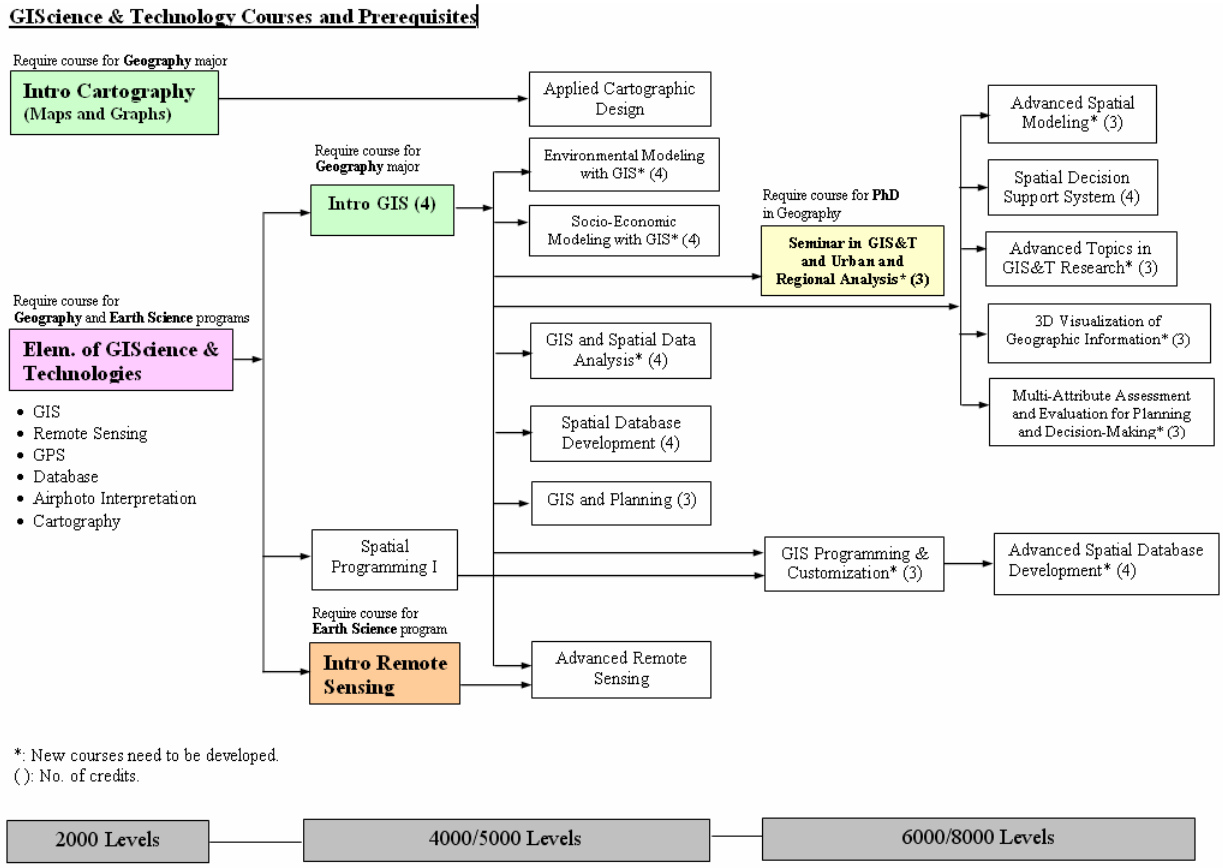
Since joined the Geography and Earth Sciences faculty at UNCC in 1990, Dr. Xiang has conducted teaching, research, and service activities in the areas of geographic information science, spatial modeling, spatial decision support systems, and land use/environmental planning. He was PI or Co-PI of over 30 funded research projects with a total of 4 million dollars. His scholarly publications appeared in International Journal of Geographic Information Science, Environment and Planning B, Lecture Notes in Computer Science, Journal of Environmental Management, and Landscape and Urban Planning. He served on the editorial board of Environment and Planning B. In 2002, he was a visiting professor and research fellow at National Center for Geographic Information and Analysis, University of California at Santa Barbara.

5. Collaborators & Other Affiliations

Diao, Y., Tolone, W., Ahn, G.J., Wilson, D., Raja, A., Lee, S.K. (UNC Charlotte)

Clarke, K.C. (UC-Santa Barbara)

APPENDIX D: Proposed New GIS Curriculum



APPENDIX E: Full Text of Assessment of Library Holdings

TO: Gerald Ingalls, Chair, Department of Geography and Earth Sciences

FR: Dawn Hubbs, Library

DATE: July 29, 2005

RE: Ph.D. in Geography and Urban Regional Analysis/Library Resources

Library resources overall are adequate to support the proposed Ph.D. in Geography and Urban Regional Analysis, although strengths vary considerably within the concentrations.

Library resources to support the Multiscalar Analysis concentration of the program are strong. In the area of electronic databases, the library has access to most of the major databases covering the field—Web of Science (Social Science Citation Index), GEOBASE, PAIS International, EconLit, Business Source Elite, and the general databases of Academic Search Elite and Masterfile Premier. Dissertation Abstracts Online has recently been added to the library's collection, providing full-text access to recently published dissertations. Library journal holdings have increased tremendously over the last few years due to the negotiation of some consortial agreements with publishers. The table below is the results of a search of the 2003 Journal Citation Reports, of the titles listed in representative relevant categories.

Journal Citation Reports 2003				
Category	Total # of titles in category	Atkins owns	Atkins owns % of total	Top half of high impact--percent owned
Geography	35	22	62.9	66.7
Planning and Development	39	26	66.7	75
Demography	18	15	83.3	88.9
Urban Studies	28	25	89.3	78.6
Public Administration	24	19	79.2	75
Social Sciences, Mathematical Methodology	29	25	86.2	80
Transportation	12	11	91.7	83.3
Economics	169	144	85.2	89.4

While not all journals in the categories are relevant to the program, the high percentages are an indication that the library will have a substantial number of relevant, high-impact research journals. Of course, the above table represents journals included in ISI's citation indexing.

There are some journals that are needed, such as Environment and Planning B—Planning and Design. It may be possible to reallocate resources (cancel Environment and Planning D—Society and Space?); or the department may wish to request additional funding.

Library resources are also strong in governmentally produced statistical data. Due to being a U.S. federal depository and a member of the N.C. State Data Center program, census data holdings are almost complete. In addition the library has purchased in machine-readable format all of the available decennial census data. In addition, more and more statistical data is becoming available free on the Internet. The library's membership in the Interuniversity Consortium for Political and Social Research will also support this program.

From our experience with the Public Policy Ph.D. program, some researchers will need proprietary data—examples are the International City/County Management Association, the National Technical Information Service, and the Medicare Current Beneficiaries Survey. While in the future the library may have adequate discretionary funding to purchase data for our collection, we do not have the funds available at this time. The College of Business has a subscription to Compustat, which may be of use to researchers in locational analysis.

The library's weakest area is in recent monographs, especially in the area of spatial statistics, spatial modeling. A check of Blackwell's Collection Manager listing what has been available through their service lists several titles we should purchase.

As mentioned earlier, the library's holdings are not as strong for the Geographic Information Science concentration. The Library's databases Web of Science, GEOBASE, and Compendex will support the area, although Compendex is much stronger in GISc as it relates to the natural environment, as is GeoRef. Again, Dissertation Abstracts Online will support the program. The library is trying to negotiate the purchase of the SPIE Digital Library (International Society for Optical Engineering) and the Inspec database. Both would provide substantial support for the program.

In the area of journals, there is no relevant category in Journal Citation Reports for Geographic Information Science—it is included in Physical Geography. Of the journals listed, the library has electronic access to GeoInformatica and the Journal of Geographical Systems. The International Journal of Geographical Information Science/IJGIS is the highest-rated (impact) and is recognized as the leading journal in the field. We do not have a subscription at this time.

Monographs holdings are a weak area; a check again of a Blackwell's Collection Manager listing of recently published monographs indicated several titles we should purchase.

APPENDIX F: Copy of Article in Journal *Nature*

http://www.npg.nature.com/news/2004/040119/full/nj6972-376a.html

Nature **427**, 376 - 377 (2004)
doi:10.1038/nj6972-376a

Mapping opportunities

Virginia Gewin

Virginia Gewin is a freelance science writer in Corvallis, Oregon.

Scientists who can combine geographic information systems with satellite data are in demand in a variety of disciplines. Virginia Gewin gets her bearings.

Forest fires ravaging southern California, foot-and-mouth disease devastating the British livestock industry, the recent outbreak of severe acute respiratory syndrome (SARS) — all of these disasters have at least one thing in common: the role played by geospatial analysts, mining satellite images for information to help authorities make crucial decisions. By combining layers of spatially referenced data called geographic information systems (GIS) with remotely sensed aerial or satellite images, these high-tech geographers have turned computer mapping into a powerful decision-making tool.

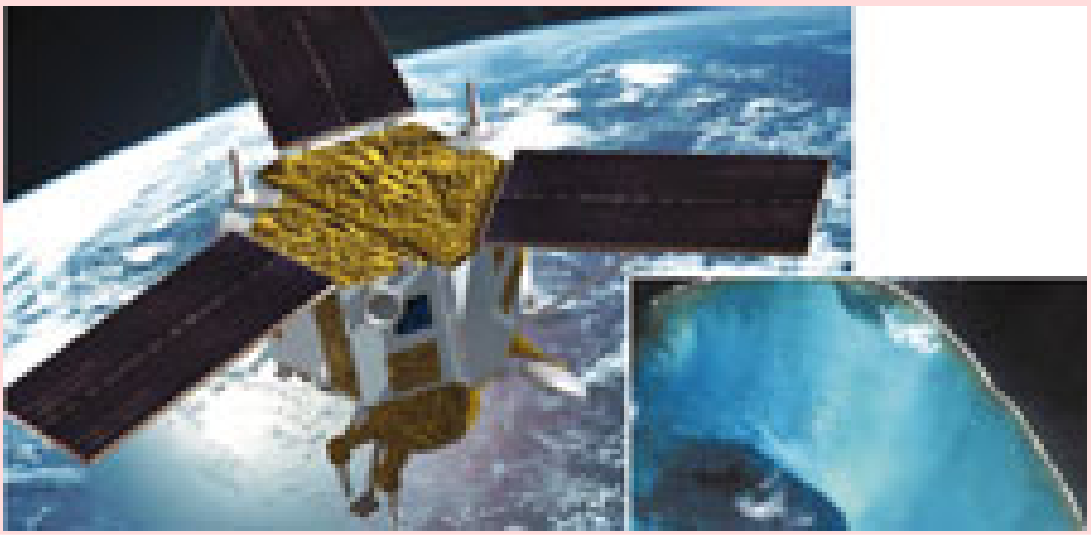
Natural-resource managers aren't the only ones to take notice. From military planning to real estate, geospatial technologies have changed the face of geography and broadened job prospects across public and private sectors.

Earlier this year, the US Department of Labor identified geotechnology as one of the three most important emerging and evolving fields, along with nanotechnology and biotechnology. Job opportunities are growing and diversifying as geospatial technologies prove their value in ever more areas.

The demand for geospatial skills is growing worldwide, but the job prospects reflect a country's geography, mapping history and even political agenda. In the United States, the focus on homeland security has been one of many factors driving the job market. Another is its vast, unmapped landscape. While European countries are integrating GIS into government decision-making, their well-charted lands give them little need for expensive satellite imagery.

AN EXPANDING MARKET

All indications are that the US$5-billion worldwide geospatial market will grow to $30 billion by 2005 — a dramatic increase that is sure to create new jobs, according to Emily DeRocco, assistant secretary at the US Department of Labor's employment and training division. NASA says that 26% of its most highly trained geotech staff are due to retire in the next decade, and the National Imagery and Mapping Agency is expected to need 7,000 people trained in GIS in the next three years.



A fresh view: high-resolution imaging satellites such as IKONOS are providing researchers with unparalleled insight and information about the world (inset).

Of the 140,000 organizations globally that use GIS, most are government agencies — local, national and international. A ten-year industry forecast put together last year by the American Society for Photogrammetry & Remote Sensing (ASPRS) identified environmental, civil government, defence and security, and transportation as the most active market segments.

Business at the Earth-imagery provider Space Imaging, of Thornton, Colorado, increased by 70% last year, says Gene Colabatistto, executive vice-president of the company's consulting service. To keep up momentum, the company plans to hire more recruits with a combination of technical and business skills. Colabatistto cites the increased adoption of GIS technologies by governments as a reason for the rise. He adds that the US military, the first industry to adopt GIS and remote sensing on a large scale, has spent more than $1 billion on commercial remote sensing and GIS in the past two years.

LOOKING DOWN IS LOOKING UP

The private sector hasn't traditionally offered many jobs for geographers, but location-based services and mapping — or 'geographic management systems' — are changing the field. "The business of looking down is looking up," says Thomas Lillesand, director of the University of Wisconsin's Environmental Remote Sensing Center in Madison, Wisconsin.

Imagery providers such as Digital Globe of Longmont, Colorado, also need more GIS-trained workers as markets continue to emerge. Spokesman Chuck Herring says that the company has identified 54 markets in which spatial data are starting to play a role.

The Environmental Systems Research Institute (ESRI), in Redlands, California, sets the industry standards for geospatial software. Most of its 2,500 employees have undergraduate training in geography or information technology, although PhDs are sought after to fill the software-development positions. Many private companies, including the ESRI and Space Imaging, offer valuable work experience to both graduate and final-year undergraduate students.

Graduates in natural-resource management note that GIS and remote-sensing skills are becoming as important as fieldwork. GIS platforms, which manipulate all forms of image data, are transforming disciplines such as ecology, marine biology and forestry.

"Science has discovered geography," says Doug Richardson, executive director of the Association of American Geographers (AAG). Many of the National Science Foundation's multidisciplinary research programmes now include a geospatial component.

SKILLED LABOUR

Some universities are offering two-year non-thesis master's programmes in geospatial technologies, including communication and business courses — perfect for professionals who want to build on existing skills or move into a new field. The non-profit Sloan Foundation has funded several geospatially related professional master's programmes. In addition, numerous short courses are available to bring professionals up to speed. Indeed, the ESRI alone trains over 200,000 people a year. AAG and ASPRS conferences also offer training sessions.

Doug Richardson sees a combination of technological skills and an understanding of geographical concepts as important.

Although technical skills are important, Richardson stresses that employees need a deep understanding of underlying geographic concepts. "It's a mistake to think that these technologies require only technician-oriented functions," he says.

Throughout the European Union (EU), the many top-quality graduate geography programmes remain the primary training grounds. Recently, a few pan-European projects have also emerged, including a new international institute designed to train future geographers. Building on a collaboration between the European Space Agency and the US National Science Foundation, the Vespucci Initiative in 2002 began three-week summer workshops training students from around the world in spatial data infrastructure, spatial analysis and geodemographics. The EU even promotes distance learning: UNIGIS, a network of European universities, prides itself on being the only virtual, global, multilingual GIS programme in the world.

Although GIS is increasingly incorporated into UK government practices, there is little demand for remote-sensing expertise in this small and heavily mapped country. Mark Linehan, director of the London-based Association for Geographic Information, says that although the public-sector market is growing, it remains a struggle to find jobs for MScs at the appropriate pay scale and qualification level.

The European Commission (EC) is laying the groundwork to ease data-sharing across countries in anticipation of wider adoption of GIS among the member-state governments and to cut the costs of data gathering. That process alone will require at least a couple of thousand people trained in GIS, and many more proposals are expected.

Indeed, the EC and the European Space Agency have joined to propose a Global Monitoring for Environment and Security initiative, to provide permanent access to information on environmental management, risk surveillance and civil security. Given the scope of the mandate, this is likely to need people who understand how to interpret, integrate and manage satellite information — those who also have a background in natural-resource issues will be in highest demand.

Considering the role that GIS played in staving the spread of foot-and-mouth disease, such a system will not only increase the prevalence of geospatial skills in Europe, it will better connect data with Europe's resource managers.

Web links

Environmental Systems Research Institute
http://www.esri.com
Association of American Geographers
http://www.aag.org
American Society for Photogrammetry & Remote Sensing
http://www.asprs.org
The Vespucci Initiative
http://www.vespucci.org
Global Monitoring for Environment and Security
http://intelligence.jrc.cec.eu.int/space/baveno/baveno.html
Association for Geographic Information
http://www.agi.org.uk
UNIGIS
http://www.unigis.at/net
US Department of Labor's Career Voyages
http://www.careervoyages.gov
Sloan Foundation professional master's programmes
http://www.sciencemasters.com