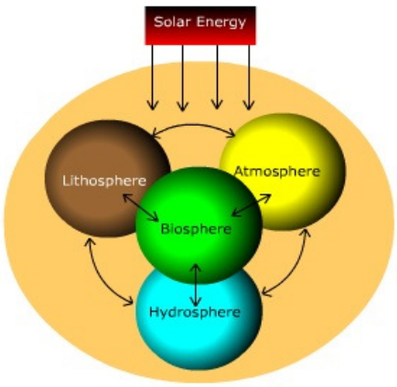
Master of Science in Earth Sciences

Department of Environmental, Earth and Geospatial Sciences

College of Science and Technology

2202 Mary M. Townes Science Complex North Carolina Central University Durham, North Carolina 27707

Fall 2010 Edition



PROGRAM IN EARTH SCIENCES

A Brief History

The General Assembly of North Carolina authorized the establishment of graduate work in the liberal arts and professions at NCCU in 1939. Receiving approval from the University of North Carolina Board of Governors in 1995, the Master of Science in Earth Sciences has a relatively short history. The first M.S. degree in Earth Sciences was conferred in 1998. While the degree program was established in the Department of Geography and Earth Sciences, it became a part of the Environmental, Earth and Geospatial Sciences Department in 2005 when the Environmental Science and the Geography and Earth Sciences departments merged.

Mission and Vision

The Department's mission is to promote intellectual, professional, and personal excellence through the highest quality instruction, research, and service in the Environmental, Earth and Geospatial sciences.

Its vision is to be recognized as a regional, statewide, and national resource for students and society as well as professionals who work in the many fields that are encompassed by the environmental, earth, and geospatial sciences.

PROGRAM OBJECTIVES

The primary objectives of the program are:

1. To provide students with the analytical and methodological skills necessary to understand or derive explanations for individual occurrences, for recurring processes, and for invariable as well as statistical regularities in the earth's atmosphere, lithosphere, hydrosphere, and biosphere.
2. To support the educational needs of students seeking to develop master's level skills in applied earth sciences that are useful in achieving entry or mid-career advancement in occupations requiring these skills.
3. To meet the educational needs of students seeking a master's level education in general earth sciences in preparation for pre-college or community college teaching, further graduate work, or as a general background for current or planned occupations.
4. To offer a graduate program that will clearly communicate to students its learning objectives, provide for student involvement in the learning process, and regularly assess the degree to which expectations and standards are being met.

ADMISSION REQUIREMENTS

To be considered for admissions, a student must submit an application for admission to NCCU graduate programs, an official undergraduate transcript, completed recommendation forms, and a statement of academic objectives to the admissions office of the Graduate Division at least 30 days in advance of the registration date of the semester or summer session in which degree work is to begin. Applicants who apply late or whose application has not been evaluated before registration may be permitted to enroll as a temporary degree-seeking student. However, degree credit for graduate courses may not be granted unless the student meets the requirements of this department.

After the Department has evaluated the student's credentials, the School of Graduate Studies will notify the student of the admission decision by letter. Admitted students have one year to enroll in courses before the admission status expires.

The School of Graduate Studies will notify the student of this time limitation.

The GRE is required for admission. GRE scores of 1200 or better will be viewed more favorably than those below 1200. A student with a GRE score of less than 1000 may be required to retake the GRE within the first semester in which he or she is enrolled.

A writing sample is required from all new graduate students. The writing will be done during an orientation session.

All new graduate students are required to attend the orientation session the week before classes begin or during the first week of class.

TIMELINE AND COURSE REQUIREMENTS FOR COMPLETION OF THE DEGREE

All requirements must be completed within six years of the beginning term of the student's admission to the program. Typically, full-time students complete their coursework in four semesters. During the final semester, a student is admitted to candidacy after the Graduate Council approves his or her research project. It is recommended that students complete the comprehensive examination during the final semester of coursework. Students must be registered for thesis or project and apply for graduation during the semester they intend to graduate. A university calendar with deadlines and dates are produced for each semester by the Graduate Office and must be adhered to.

Progressing through the Program in two years

By working with an academic advisor and following the sequence below, a student pursuing a graduate degree in the Department of Environmental, Earth and Geospatial Sciences on a **full-time** basis should be able to complete all requirements and graduate in 2 years. Research proposals must be submitted and approved by the student's thesis or project committee before April 1 for fall (December) graduation and November 1 for spring (May) graduation.

For other important deadlines consult 2010/2011 academic calendar at:
http://www.nccu.edu/formsdocs/proxy.cfm?file_id=964

URL for all Graduate Studies Forms & Docs:
http://www.nccu.edu/formsdocs/search.cfm?Department_ID=68

First Semester

- Complete 9 semester hours of approved coursework
- Develop and submit a plan of study to the academic advisor
- Begin developing ideas for a research project

Second Semester

- Complete 9 semester hours of approved coursework
- Confirm composition of research committee
- Continue developing research project

Third Semester

- Complete courses (all required courses should be completed by the end of this semester)
- Statistics or foreign language requirement should be completed
- Submit and defend proposal to research committee
- Complete research

Fourth Semester

- Complete elective or remaining Coursework
- Apply for admission to candidacy
- Take comprehensive examination
- Complete research thesis or project
- Apply for graduation
- Oral presentation of thesis defense
- Graduate

CURRICULUM COMPONENTS

The program objectives are met through the following components: (1) a core curriculum consisting of 12 credit hours, (2) a concentration of 9 credit hours in applied earth sciences or a concentration of 9 credit hours in general earth sciences, (3) 12 credit hours of electives with or without teacher certification, and (4) a thesis or internship project (at least 3 credit hours) coupled with a systematic program of guidance, advisement, and evaluation that involve students from entry through graduation.

The Master of Science in Earth Sciences curriculum requires satisfactory completion of a minimum of 36 semester-hours of approved graduate credit. Candidates must complete thirty-three (33) credit hours of course work plus at least three (3) credit hours of thesis (1-6 credit hours) or internship (3 credit hours). Students may elect to complete a project (0 credit hours) in lieu of a thesis, in which case three elective hours must then be substituted.

The program is designed to develop master's level competence in **applied earth sciences**, with an emphasis on geographic information systems and remote sensing of the physical environment, or **general earth science**, which is designed to enhance the knowledge of earth science teachers and other professionals who wish to pursue additional graduate work. These concentrations will enable students to match their degree program with their educational and occupational needs and interests. All students will be required to complete a common twelve (12) semester hour sequence of core courses selected from the following: EASC 5000, GEOMORPHIC PROCESSES, EASC 5010, CLIMATOLOGY AND METEOROLOGY, EASC 5020, WATER AND MINERAL RESOURCES, EASC 5030, METHODS AND TECHNIQUES OF EARTH SCIENCE, and EASC 5031, ASTRONOMY.

OBJECTIVE OF THE CORE COURSES

The core courses are designed to provide students with the analytical and methodological skills necessary to understand or derive explanations for individual occurrences, for recurring processes, and for invariable as well as statistical regularities in the earth's lithosphere, hydrosphere, atmosphere, and biosphere. Within this broad goal are several specific objectives. The first specific objective of the core courses is to develop an understanding that the major parts of the earth - core, mantle, crust, oceans, and atmosphere - that can be studied as a dynamic, interactive system in which there is a cyclic flow of energy and material from one reservoir to another. Another important part of this objective is the development of conceptual skills to evaluate the universe, the natural environment on earth, and the various effects of human activity on this environment. Students will attain an understanding of the universe as well as the composition and behavior of the earth, characteristics and formation of earth materials, tectonics, geophysical processes, geology, meteorology and climatology, characteristics of the world's oceans, and natural resources as they relate to the environment. EASC 5000, GEOMORPHIC PROCESSES, EASC 5010, CLIMATOLOGY AND METEOROLOGY, EASC 5020, WATER AND MINERAL RESOURCES and EASC 5031, ASTRONOMY are designed to meet these objectives.

The second objective of the core courses is to enhance one's ability to frame questions concerning the earth's natural environment. Specifically, the objective is to formulate questions which: (1) reflect an understanding of the chemical and physical relationships that produce landforms, mineral resources, and environmental changes that affect human survival on the planet earth, (2) are answerable through available research techniques, and (3) reflect a basic understanding of both the possibilities and limitations of various methodological strategies for seeking answers to these questions. EASC 5030, METHODS AND TECHNIQUES OF EARTH SCIENCE will meet this objective.

The third objective of the core courses is to

provide an understanding of the methodological and statistical tools to answer questions concerning the earth's environment. The specific aim is to introduce research methods and techniques utilized by contemporary earth scientists; specifically those related to computer mapping, geographic information systems, and remote sensing. The EASC 5030, METHODS AND TECHNIQUES OF EARTH SCIENCE and EASC 5031, ASTRONOMY, are designed to meet this objective.

Objectives of the courses (EASC 5000, EASC 5010, EASC 5020, EASC 5030, EASC 5031) are basic to the graduate program overall. Four of the five courses will be required of all students regardless of whether they opt for applied earth sciences or general earth sciences track.

PROGRAM CONCENTRATIONS

In addition to completing the core curriculum outlined above, students must elect to complete a concentration option in either applied or general earth sciences. The overall objective of the applied earth sciences concentration is to support the educational needs of students seeking to develop skills in applied earth science areas such as remote sensing of natural resources, computer assisted cartography, digital geographic information systems, and data analyses related to natural resources, waste disposal, locating sites for critical facilities, geophysical study of geohazards, water resource management, agriculture, urban and regional planning, and coastal zones management. Many students enrolled in the applied program are individuals seeking mid-career development of research and data analysis skills relevant to their areas of employment or persons seeking entry into positions requiring applied earth science skills. The general earth science concentration is designed to meet the educational needs of students seeking a master's level education in preparation for pre-college or community college teaching, further graduate work, or as a general background for current or planned occupations.

The **applied earth science concentration** is specifically designed to provide students with the skills to: (1) determine the data requirements needed to answer such questions as those related to the location of mineral and energy resources, the selection of locations of critical facilities such as dams, waste disposal sites or nuclear reactors, environmental processes responsible for geohazards, the long-term effects of climatic change on water supply, and land use planning in coastal zones; (2) conduct computer-based regional geographic studies provide programming services for statistical, analytical and high resolution computer-graphic applications, perform tests and development on spatial data models, and evaluate digital geodata products for end-user applications; (3) evaluate and make policy recommendations on land use/land cover data, carry out spatial analyses related to natural resources management; and (4) provide expert advice on state-of-the-art developments in image processing, digital cartography, spatial data base management, and modernization of mapping technology.

The concentration in applied earth sciences encompasses a minimum of 36 credit hours divided between regular course work and internship. Students electing the applied earth sciences concentration will be required to complete three specific courses: EASC 5100, EARTH SCIENCE FIELD METHODS AND TECHNIQUES; EASC 5110, REMOTE SENSING OF NATURAL RESOURCES; and EASC 5120, DIGITAL GEOGRAPHIC INFORMATION SYSTEMS. These courses are specifically designed to prepare students to conduct applied research in organizational settings.

The **general earth science concentration** is envisioned to provide students with broad and advanced understanding of earth systems science. Focus of the program, in addition to core courses, is the study of Earth's major subsystems - atmosphere, hydrosphere and lithosphere. After completing the general concentration students will be well positioned for variety of teaching and research career

options that require competency in earth and environmental sciences. In particular, they will be able to: (1) effectively serve in positions that require conceptual earth science knowledge and ability to follow current developments in earth science research; (2) design and teach inquiry-based face-to-face and online earth science courses; (3) make management decisions with awareness of nature-society and nature-human interactions; (4) serve as consultants on issues of geohazards, environmental justice and sustainability; (5) continue their geosceince education at the PhD level.

The concentration in general earth sciences encompasses a minimum of 36 credit hours divided between regular course work and internship. Students electing the general earth sciences concentration will be required to complete three specific courses: EASC 5200, ATMOSPHERIC DYNAMICS; EASC 5210, LITHOSPHERIC MOVEMENTS; and EASC 5220 HYDROSPHERIC PROCESSES. These courses are specifically designed to prepare students to continue their graduate level studies or pursue careers in teaching or consulting.

COURSE DESCRIPTIONS

EASC 5000. Geomorphic Process

Examines the latest research findings on the following topics: composition of the earth, plate tectonics and diastrophism, tectonics and volcanoes, igneous, sedimentary and metamorphic processes, variations and characteristics of landforms, weathering, soil formation, geologic history and uniformitarianism, and the geologic time scale. 3 credit hours (Laboratory Required)

EASC 5010. Climatology and Meteorology

Provides recent research results on cyclones and anticyclones, severe weather conditions, weather patterns and short-range forecasting, the nature and physical factors of climate, geographic patterns of climate, air pollution and climate, structure of the atmosphere, energy and climate, heat transfer processes, atmospheric circulation, causes of clouds and precipitation, and types of climates. 3 credit hours (Laboratory Required)

EASC 5020. Water and Mineral Resources

Current scientific knowledge and research of the physical, chemical, and biological characteristics of the world's hydrosphere are provided. It also provides in-depth knowledge of the earth's natural resources, with a special emphasis on minerals. Among the topics to be examined are: surface waters, oceanic circulation, the hydrologic cycle, submarine topography, chemical substances of seawater; causes, characteristics, and types of ocean waves and tides, shoreline erosion, formation, properties, and identification of minerals; and relationships between rocks and minerals. 3 credit hours (Laboratory Required)

EASC 5030. Methods and Techniques of Earth Science

Provides an understanding of earth science research frameworks and the manner in which geodata are collected and analyzed. The following topics are covered: (1) THE SCIENTIFIC METHOD -- identification, formulation, and testing of hypotheses, theories, and models in geology, meteorology, climatology, and oceanography; (2) STATISTICAL ANALYSES -- uses of multivariate statistical techniques in the geosciences; (3) COMPUTER MAPPING -- computers and algorithms, raster symbols and surface mapping, raster-mode measurement and

analysis, vector symbols, cartometry and map projections, cartographic data structures, computer-assisted map design; (4) GEOGRAPHIC INFORMATION SYSTEMS -- data capture, structuring editing, structure conversion, geometric correction, projection conversion, spatial definition, generalization, enhancement, classification, statistical generation, retrieval, overlaying, display, analytical technique support, and data management; (5) REMOTE SENSING -- scope of remote sensing, the electromagnetic spectrum and basic matter and energy relations, atmospheric windows, power spectra, transmission and interference, sensors and platforms, the variable meaning of resolution, history of satellite sensing, multi-spectral scanning, spectral analysis. 3 credit hours (Laboratory Required)

EASC 5031. Astronomy (3)

The overall objective of this course is to increase students' knowledge of the universe by examining the findings of recent research on physical principles governing the universe, the structures of the planets and their atmospheres, the solar system, the Milky Way, and remote galaxies. Some of the key topics to be discussed are: Solar System, Stars and Stellar Evolution, Stellar Systems and Motions, Galactic and Extragalactic Astronomy, Astronomical Instrumentation and Development, Radio Spectrum Management. 3 credit hours (Laboratory Required)

EASC 5100. Earth Sciences Field Methods and Techniques

This course is aimed at providing students with skills needed to systematically acquire new or raw data within a specific research area. This includes an organized recording or observations made in the field within a defined spatial matrix or research area and the utilization of systems of data classification subject to subsequent processing, presentation, and analysis. The term methods describes the overall research framework or design, and techniques refers to the manner in which field data are collected. 3 credit hours (Laboratory Required)

EASC 5110. Remote Sensing of Natural Resources

This course is designed to help students obtain advanced proficiency in geographic information processing by learning how information is obtained about objects without being in direct contact with them. They will learn about specific sensors, such as cameras and multi-spectral scanning systems that are flown on aircraft or spacecraft and how the imagery obtained by those sensors is analyzed optically or digitally to yield valuable information of the earth's resources. 3 credit hours (Laboratory Required)

EASC 5120. Digital Geographic Information Systems

This course will teach students about the most recent improvements in computer processing of geographic information. Some of those improvements include algorithm development for converting geographic data into computer readable formats, their subsequent storage for modeling, and statistical analysis and the display of maps and models. Students will also learn about the latest methods of research and data symbolization and will become familiar with the practical and theoretical aspects of cartographic communication, design, and construction. 3 credit hours (Laboratory Required)

EASC 5200. Atmospheric Dynamics

This course is designed to increase students' knowledge of the earth's upper and lower atmosphere, including its general circulation and the physical bases of climate, and the smaller-scale, shorter-term phenomena that describe weather processes. Recent research on natural global chemical cycles of gases and particulates in the earth's atmosphere are considered, as well as the composition and the dynamics of the coupled upper atmospheric system. The course also discusses state-of-the-art knowledge of the sun as it relates to the earth's upper atmosphere and space environment. 3 credit hours (Laboratory Required)

EASC 5210. Lithospheric Movements

This course will present the latest research on insights into the physical and chemical characteristics and processes that produce such geologic features as hydrocarbon and ore deposits and events such as earthquakes, volcanic eruptions, and landslides. The focus is primarily on the constitution of the earth's lithosphere. A great deal of emphasis is placed on plate tectonics, which has provided earth scientists with a working model of the earth as a whole. Plate tectonics represents a unifying concept of global structure and composition, it is a fresh context for viewing earth history, and it is also a framework into which to set detailed local geo-science studies. 3 credit hours (Laboratory Required)

EASC 5220. Hydrospheric Processes

Recent research articles in scientific publications are used to improve students' understanding of the sea and the ocean basins. The emphasis is placed on physical and geologic processes in the ocean. Physical process will include state-of-the-art ideas on oceanic circulation and transport; eddy generation, physical circulation and turbulent mixing on continental shelves; mixing and circulation in estuaries; wind-generated tides and surface and internal waves; diffusion, conduction, convection, and three dimensions turbulence; physical properties of seawater; and circulation and mixing processes in lakes. Geologic processes to be discussed will include: the structure of continental margins, oceanic rise systems and deep sea sedimentary basins; exchanges of heat and chemical elements between seawater and oceanic rocks; tectonic and volcanic activity at mid-ocean ridges; variations in chemicals and minerals in marine sediments; and sediment types as a result of paleo-environmental controls. 3 credit hours (Laboratory Required)

EASC 5600. Independent Study

This being an independent study course, the students are expected to work on individual projects as directed. Students should have a clear understanding of the concepts and issues and should be willing and able to work independently. This course will cover advanced topics or topics related to specific research interests. Regular contact with the instructor is required. 1- 6 credit hours (repeatable).

EASC 5700. Directed Research

This being a directed research course, the students are expected to work on individual projects as directed. Students should have a clear understanding of the concepts and issues and should be willing and able to work independently under research mentor’s guidance. This course will cover

topics related to individual students' thesis. Regular contact with the instructor is required. 1- 6 credit hours (repeatable).

EASC 5800. Internship (3)

Students must complete a supervised internship in an agency approved by the department. A written analysis demonstrating a mastery of the skills learned must be presented to a faculty committee for approval. The format of this document must meet with standards prescribed by the department.

EASC 5900. Thesis (1-6)

Students will develop a research design on an acceptable topic approved by an adviser. The format of the resulting original research must meet the standards set by the department and the Graduate School. The thesis must be successfully defended before a faculty committee. 3 credit hours

INTER-INSTITUIONAL COURSES

Students may take courses through our inter-institutional agreement with Duke University, North Carolina State University, the University of North Carolina at Chapel Hill, or the University of North Carolina at Charlotte. The faculty advisor will determine the number of allowable inter-institutional credits. Furthermore, the advisor must give prior approval for course work to be applied towards the degree program at NCCU. Forms for taking courses at one of the cooperating institutions may be obtained from the Graduate Studies Office. Full-time students may take a maximum of 2 inter institutional courses during a semester. There is no additional charge for taking these courses.

FACILITIES

The Department is located on the first and second floor of the Mary M. Townes Science Complex. It is equipped with smart classroom technology, videoconferencing and modern science laboratories. This new state-of-the-art science facility allows for information sharing and student and faculty collaboration across the sciences.

In addition to computer labs dedicated to teaching GIS and remote sensing course, the department has 7 state-of-the-art desktops for special projects and research, 2 color printers, 1 large format plotter, GPS units, palm pilots dedicated for student research. The department also has state-of-the-art servers for internet based GIS and data applications. The hardware is used to support widely used GIS software, which includes the ESRI suite of software, ERDAS Imagine, IDRISI Kilimanjaro, and MapInfo. As part of the ESRI site license agreement, the students, faculty, and staff have access to most courses offered on ESRI's web based learning center - the virtual campus. A Broadband Seismic Station is also included in the special projects lab. NCCU is the only university in North Carolina that collects seismic data routinely included in the Advanced National Seismic System data processing infrastructure. Real time display of NCCU seismic data can be accessed on line at the Center for Research and Information web site: http://folkworm.ceri.memphis.edu/heli_bb_other/. Students and faculty interested in geoscience education and the use of technology may use the data for development of educational and outreach materials and for research.

Soil, water, and air constituents can be analyzed in the Department's **environmental science laboratory**. Our teaching and research laboratory is equipped with many state of art analytical and monitoring instruments that can meet the need for the completion of most projects related to the topics mentioned above. Some of the instruments in our laboratory are chromatography instruments (liquid chromatography (LC-MS and HPLC), gas chromatography (GC), GC-MS, ion chromatography, atomic absorption spectrometer) for chemical analysis, PQ200 and 6-digit balance and portable monitors for PM studies, Scanning Mobility Particle Sizers (SMPS) and condensation particle counter (CPC) for ultrafine and nanoparticle exposure studies, and portable spirometers and ECG units for exposure associated physiology studies. Faculty in the department also has an access to the facility at Duke University SMiF (shared material instrument facilities) for TEM, SEM, XRD, clean room and others.

GRADE POINT AVERAGE AND RESIDENCE REQUIREMENTS

A cumulative grade point average of at least 3.0 is required graduation and for students to stay in good academic standings. The cumulative grade point average is computed by dividing the total number of quality points earned by the total number of semester hours attempted.

FINANCIAL ASSISTANCE

Financial assistance may be available through the School of Graduate Studies as well as the Department. Assistantships are not merely a form of financial support, but should enhance students overall educational experience. Recipients are expected to provide high quality support for the university's academic endeavors while acquiring and refining their professional skills.

Assistantships may be supported through departmental or faculty grants and gifts or awards from individual donors, foundations, or state and federal agencies. Regardless of the source of funding, all assistantships, waivers, and other financial awards for graduate students must be processed through the School of Graduate Studies.

STUDENT INTERNSHIPS, RESEARCH AND OTHER OPPORTUNITIES

Students may participate in a paid internship with an agency approved by the faculty. Participating agencies and organizations offering internships include: the United States Environmental Protection Agency (EPA), the Carolina Population Center (CPC), the Conservation Fund (CF), Durham Area Transportation Authority (DATA), NC Department of Transportation (NCDOT), the City of Durham Water Resources, and the National Oceanic and Atmospheric Administration (NOAA), to name a few.

Students pursuing master's degree in Earth Science can also work on various topics related to environmental and environmental health. In previous years, inter-institutional and inter-departmental collaborative work with U.S. Environmental Protection Agency (EPA), Duke University, and other departments at NCCU have been conducted. Among the potential research topics that students can work on are exposure assessment of particulate matters (PMs) of all size ranges, applications of GIS in various

environmental/environmental health studies, characterization of ultrafine and nanomaterials, identification of chemical pollutants in fluidal environment, post-exposure risk assessment, and exposure-disease association studies.

The **Geospatial Research, Innovative Research and Service** (GRITS) Initiative, as part of the Department of Environmental, Earth and Geospatial Sciences promotes geospatial education and applications within and outside NCCU. Graduate students working with GRITS are exposed to a multitude of opportunities such as working on projects with non-profits, government agencies and the private sector. Students who are planning to pursue further studies at the doctoral level are provided with opportunities to interact with faculty from other institutions specializing in specific areas of geospatial education and research. Graduate students are also encouraged to participate in local and national geospatial conferences as student volunteers and presenters. In partnership with the American Society for Photogrammetry and Remote Sensing (ASPRS), the Department of Environmental, Earth and Geospatial Sciences offers graduate students the "Provisional Certificate" program. Students who complete requisite courses and pass an exam conducted by ASRPS are granted "Provisional Certified Mapping Scientist" certification. After entering the workforce, students can gain experience and convert the provisional certificate into a full certificate.

THE GRADUATE FACULTY

Dr. Yolanda Banks Anderson (Professor)
Environmental Science (Toxicology)
B.S., University of North Carolina at Greensboro
M.S., Harvard University School of Public Health

Dr. John Bang (Associate Professor)
Biochemistry
B.S., University of Illinois at Urbana-Champaign.
M.D., University of Illinois at Chicago
Ph.D., University of Texas at El Paso

Dr. Garrett Love (Assistant Professor)
Civil Engineering (Computational Science)
B.S., Massachusetts Institute of Technology
M.S., Ph.D., Duke

Dr. Michael Pirani (Assistant Professor)
Geography (Medical Geography)
B.A., Worcester State College in Massachusetts
M.A., University of Kentucky in Lexington
Ph.D., University of Washington

Dr. Gordana Vlahovic (Associate Professor)
Geophysics (Seismology)
B.S., University of Zagreb
M.S., Ph.D., University of North Carolina at Chapel Hill

Dr. Harris E. Williams (Associate professor)
Geography (Meteorology/Climatology)
B.S., North Carolina Central University
M.A., Ph.D., Arizona State University

Dr. Yolanda Banks Anderson received the BS degree in Medical Technology from the University of North Carolina at Greensboro (1974-1978), the MS degree in Environmental Health Sciences from the Harvard University School of Public Health (1984-1986), and the PhD in Environmental Science and Engineering from the University of North Carolina at Chapel Hill (1986-1990). She joined the faculty of NCCU as Associate Professor and Director of the Environmental Science Program in 1996. In 2007, she was named chair of the Department of Environmental, Earth and Geospatial Sciences. He research interests are in environmental justice, environmental health and environmental monitoring. She is the Principal Investigator of the Environmental Risk and Impact in Communities of Color and Economically Disadvantaged Communities Project funded by the US Environmental Protection Agency. Currently, there are two postdoctoral research associates, one graduate student and 5 undergraduate students working in her laboratory. She has also received research and training grants from the NIH and the EPA Community-University Partnership Program. Dr. Anderson is a member of the Society of Toxicology (recently completing a year as Chair of the Career Resources and Development Committee), the North Carolina Society of Toxicology, and the American Public Health Association. She serves on the Board of Directors of the North Carolina Environmental Education Fund and previously served (for six years) on the Board of Trustees for North Carolina Environmental Defense. has received his B.S. degree in Biochemistry from the University of Illinois at Urbana-Champaign in 1988.

Dr. John Bang completed U.S. medical licensing examinations after the completion of medical education (M.D.) in two institutions (University of Illinois at Chicago, 1994, CAHSU 1998). In the course of residency training (Internal Medicine at Medical college of Virginia hospital in 1994 and Anesthesiology from SUNY Brooklyn 1998), he began appreciating another way of using his educational backgrounds in research and teaching areas. His interest in environmental impacts on human health soon led him to pursue a graduate study in Environmental Sciences and Engineering department at the University of Texas at El Paso (Ph.D. 2003). His distinctive performance in conducting research won him two E.P.A. grants (STAR and SCERP) during this graduate study and presidential honor at the college of sciences & engineering with active publication in national and international peer reviewed journals. His graduate work was focused on characterization of ambient ultra-fine particles from various sources and their cardiopulmonary effects. With his familiarity with various types of environmental pollution issues and human health, his current research foci rest on broad range of topics including both synthetic and natural ultra-fine/nano particle characterization from various sources, nanomaterial synthesis for pollutant detoxification, cardio-respiratory physiological studies secondary to pollution, scaffold building for environmental and tissue engineering applications, manufacturing devices applicable to environmental and health care fields, and local environmental health.

Dr. Garrett Love A product of Aberdeen, ID and Tilton, NH, Garrett Love received his BS degree in Civil Engineering from the Massachusetts Institute of Technology in 1991, followed by MS and PhD degrees in Civil Engineering from Duke University in 1997 and 2000, respectively. His academic studies have been complemented by a tour of service as a high school mathematics teacher at Central High School in Helena, Arkansas as part of the Arkansas/Mississippi Delta Corps of Teach for America (1991-1994), and by a 5-year stint (2001-2005) as a staff scientist with the Shodor Education Foundation, “a non-profit research and education organization dedicated to the advancement of science and math education, specifically through the use of modeling and simulation technologies”. Dr. Love joined the faculty of North Carolina Central University in the fall of 2005, and is currently an assistant professor in the Department of Environmental, Earth and Geospatial Sciences.

His primary academic research area is in the field of computational mechanics, notably finite element methods for impact analysis. He has been involved in a number of educational development grants as staff and instructor of the National Computational Science Institute, the SuperComputing Educational Program for conferences in 2001-2004, the SCOLLARCITY Math Science Partnership in upstate New York and the REVITALISE collaboration between East Carolina University and the National Center for Supercomputing Applications in Urbana-Champagne, Illinois, to name a few. He maintains a website of personally created educational resources for computational science at http://www.shodor.org/~grl/Resources/ and is currently developing a new Bachelor of Science degree in Computational Science in the College of Science and Technology at NCCU. Recent research interests have followed as extensions of educational curriculum development in the application of computational methods, and incorporate such environmental problems as groundwater pollutant transport and the verification and refinement of weather models through NASA data collection.

Dr. Michael Pirani has taught a variety of different classes in Geography and Earth Sciences since 1985, and has been teaching at NCCU since 1999. His education included undergraduate work at Worcester State College in Massachusetts and Master's degree studies at the University of Kentucky in Lexington, and he completed his PhD in Medical Geography in 1991 at the University of Washington in Seattle. In addition to his professor duties, Dr. Pirani worked as a health service researcher for several years. He has published research on a variety of issues surrounding access to health care and health services in rural areas of the United States. His current research interests include topics in medical and political geography and environmental justice. In addition to his duties on campus at NCCU, Dr. Pirani enjoys accompanying his students on trips to academic events such as workshops and professional meetings, and spending time with his family.

Dr. Gordana Vlahovic is an Associate Professor in the department of Environmental, Earth and Geospatial Sciences. She received BS in Physics from the Faculty of Sciences at the University of Zagreb, Croatia in 1991 and PhD in Geology/Geophysics from the University of North Carolina at Chapel Hill (UNC-CH) in 1999. Before joining the NCCU faculty she worked as seismologist at the Center for Earthquake Research and Information at the University of Memphis, TN and Wave Propagation Laboratory at UNC-CH. Her primary research interests are in the area of seismotectonics and geohazards. She has worked extensively on the imaging of the intraplate seismic zones in North America by using tomography and potential field methods. Her secondary research interest is in the area of geoscience education and development of innovative, case study teaching materials and online course content. At the present she is directing NSF funded postdoctoral and graduate student research in the area of intraplate seismotectonics. During the last five years Dr. Vlahovic received more than 1.3 M in funding from NSF and National Geospatial Intelligence Agency for geophysical study of New Madrid Seismic Zone, development of geospatial partnerships and internships for students, establishment of GIS center at NCCU and creation of American Society for Photogrammetry and Remote Sensing sponsored GIS certification for students.

Dr. Harris E. Williams is an associate professor in the Department of Environmental, Earth and Geospatial Sciences. He holds the BS degree in geography from NCCU and the MA and Ph.D. degrees in geography from Arizona State University with a focus in water resources and climatological issues. He has 28 years of college teaching experience. He teaches Meteorology and Climatology (EASC 5010) and Geomorphic - (5000) and Lithospheric Processes (5210) at the graduate level. Dr. Williams has done post doctoral work with the Southern Fellowship Fund

and the National Center for Atmospheric Research and he has participated in many workshops, including workshops on Geographic Information Systems and Remote Sensing at the United States Geological Survey and the National Weather Service Training. In addition to joining the faculty at NCCU in 1975, he served on the faculty at Elizabeth City State University, Elizabeth City, North Carolina. He has presented papers at professional meetings and published papers. He is also a participant in an American Meteorology Society Online program where he teaches classes in Online Weather Studies and Online Ocean Studies. His research focuses on water resources and the origin and spread of drought conditions.

TITLES OF GRADUATE STUDENTS THESIS AND RESEARCH PROJECTS

David Kearny, "An Assessment of Durham County's Water Flushing Progress", Fall 1998.

Cato DeVane, "An Analysis of Nitrogen and Ozone Concentrations in the Charlotte, North Carolina Region", Spring 1999.

Bettina D. Brinkley, GIS Internship at the U.S. Environmental Protection Agency, Spring 1999.

Thomas I. Parrish, IV, " Js GIS: An Experiment In Multi-Platformed GIS", Spring 2000.

Nathanel M. Dumas, "An Analysis of City and County Land Parcel Assessments: A Case Study to Create a Parcel District Map for Durham, North Carolina", Spring 2002.

Reginal D. Daye, "Using Geographic Information Systems to Aid in Cancer Cluster Determinations", Spring 2002.

Porche L. Spence, "An Evaluation of Fecal Coliform Concentrations Upstream and Downstream From The Irwin Creek and Sugar Creek Waste Water Treatment Plants Located in South Central Mecklenburg County, North Carolina, 1998-2001", Spring 2003.

Willie Woodard, "The Implementation of Geographic Information Systems in the Public Schools To Evaluate School District End of Grad Test Median Income", Spring 2005.

Cha'ssem S. Anderson, "Bus and Bus Stop Designs Related to Perceptions Of Crime in the Triangle", Fall 2006.

Aziz Carrell, "An assessment of the Deforestation Process in the Munessa-Shashemane Forest of Ethiopia: A GIS and Remote Sensing Approach", Fall 2006.

Kibri E. Hutchinson, "Using GIS to Assess the Vulnerability of Eastern North Carolina Residents to a Major Hurricane", Fall 2006.

Raymond Robinson, "Examining the Principle Differences and Similarities Of Mobility

Between Commuter and Residential Students at North Carolina Central University", Fall 2006.

Peter N. Muriuki, "An Analysis of Landslide Susceptibility Factors in The Mountains of NC", Fall 2007

Tamara Spivey, "Wheelchair Navigation System Using the GIS Cost Distance Pathway Approach", Fall 2007

James Trice, III, "A Geographic Information Science (GISci) Approach to Evaluating Airboat Use in the Florida Everglades", Fall 2007.

Candice Morrison, The Analysis of Selected Pyrethroid Pesticides In an Environmental Sample using High Pressure Liquid Chromatography Diode Array Detection (HPLC-DAD) With Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) Verification: A Post-Column Derivatization Approach", Spring 2008.

Taihisa Hill, "Using GIS to Delineate Flood Evacuation Routes for Dominica, West Indies", Fall 2008.