



# The University of Georgia

University Council  
Athens, Georgia 30602

February 9, 2011

## UNIVERSITY CURRICULUM COMMITTEE – 2010-2011

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Dear Colleagues:

The attached proposal for a new major in Environmental Health Science (Ph.D.) will be an agenda item for the February 16, 2011, Full University Curriculum Committee meeting.

Sincerely,

David E. Shipley, Chair  
University Curriculum Committee

cc: Provost Jere W. Morehead  
Dr. Laura D. Jolly



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# The University of Georgia

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College of Public Health  
*Dean's Office*

November 15, 2010

Graduate Curriculum Committee  
UGA Graduate School  
University of Georgia

Dear Colleagues,

Please find attached a proposed new Ph.D. degree program in environmental health science. The proposal was presented to the CPH Curriculum and Academic Programs Committee for comment and has received approval. We present it to the Graduate Curriculum Committee for review and approval.

Please feel free to contact me if any questions arise.

Sincerely,

Phillip L. Williams, Ph.D.  
Dean

**UNIVERSITY SYSTEM OF GEORGIA**

**DOCTORAL DEGREE**

**NEW PROPOSAL**

**Institution:** The University of Georgia  
**Institutional Contact:** President Michael Adams  
VP for Academic Affairs & Provost Jere Morehead  
**Date:** August, 2010  
**School/Division:** College of Public Health  
**Department:** Environmental Health Science  
**Departmental Contacts:** Dr. Jia-Sheng Wang, Department Head  
Dr. Erin K. Lipp, Graduate Coordinator  
**Name of Proposed Program/Inscription:** Environmental Health Science  
**Degree:** Ph.D.  
**Major:** N/A  
**CIP Code:** 51.2202  
**Anticipated Starting Date:** Fall 2011

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## **1. Program Description and Objectives**

The Dept. of Environmental Health Science at the University of Georgia aims to provide the first PhD program in environmental health in the University System of Georgia. Environmental health is a critical component of good public health implementation and policy, and there is a critical need for workforce development in environmental health service and research, as identified by the WHO, CDC, and National Academies of Science. In addition to the national need for training in environmental health, in Georgia we face a high proportion of environmental exposure issues related to chemicals, occupational hazards and food and waterborne pathogens in addition to a growing population vulnerable to such exposures (i.e., rural, elderly and those of low socioeconomic status). Doctoral-level scientists specifically trained in understanding and solving these issues are critical to improving public health in Georgia as practitioners, administrators and educators, training new generations of environmental health scientists. The development of a PhD program in environmental health is a high priority for the Dept. of Environmental Health Science as well as for the College of Public Health and is included in their respective strategic plans. The program also supports the University's commitment to develop a top-ranked school of public health. Currently there are no universities (public or private) in Georgia that offer a PhD in Environmental Health Science<sup>1</sup>. As the only university within the University System with an accredited school of public health, UGA is well-positioned to offer the first PhD of this kind in the state.

## **2. Description of Program Fit within the Mission of the Institution and the Discipline**

The University's overall mission is reflected in its motto "to teach, to serve, and to inquire into the nature of things." Core characteristics of the University promote an environment of excellence for students and staff where the highest levels of scholarship, discovery and creativity, research productivity and commitment to service are possible and can be applied to education and service to the state of Georgia and the global society. The mission of the Department of Environmental Health Science clearly embraces these goals in its desire to develop itself as a national leader in education, research and service in Environmental Health. Development of a PhD program in Environmental Health Science is a key facet to achieving national standing. UGA would also be the only university within the state of Georgia to offer a PhD in environmental health science.<sup>1</sup>

### *Program fit within the missions and strategic goals of the University, College and Department*

The University of Georgia has recently completed an extensive strategic planning effort to develop goals and directions for the next 10 years. The proposed PhD program in Environmental Health Science will support many of the priorities set forth by the University. In terms of *enhancing graduate and professional programs* (Strategic Direction II), the proposed program would provide opportunities for interdisciplinary doctoral education (Priority C), that integrates

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<sup>1</sup>As of the date of this proposal there are no universities within the state (public or private) that offer a PhD in environmental health science. A PhD program in environmental and occupational health has been proposed at Emory University, Rollins School of Public Health, but will not start accepting students until Fall 2011 ([http://www.sph.emory.edu/cms/departments\\_centers/eoh/degree\\_programs/phd.html](http://www.sph.emory.edu/cms/departments_centers/eoh/degree_programs/phd.html)).

learning across faculty and students in a variety of settings, including seminars, course work and research opportunities. The Dept. of Environmental Health Science currently serves as the primary department for a cross disciplinary doctoral training program in oceans and human health (the NOAA-funded Georgia Oceans and Health Initiative Graduate Training Consortium (GOHI), one of only five such programs nation-wide), which serves as an example of institutional commitment to supporting interdisciplinary research. The proposed program would also help the University meet at least three of its illustrative benchmarks to show enhanced graduate and professional programs. The PhD program would contribute to increasing the percent of total graduate enrollment, increasing the number of doctorates awarded each year and specifically increasing the number of doctorates awarded in STEM disciplines. The proposed PhD program in environmental health science would also increase graduate training in interdisciplinary environmental research (Strategic Direction III: *investing in proven and emerging areas of research excellence at UGA*). Finally, this program will improve the lives of the citizens of the State of Georgia and elsewhere by providing critical training in a core area of public health (Strategic Direction IV; *Serving the citizens of the state of Georgia and beyond*)

Likewise, the mission of the College of Public Health to “promote health in human populations through innovative research, exemplary education, and engaged service dedicated to preventing disease and injury within the state and around the world” will be supported with the addition of a PhD program in environmental health science. There is a critical need both in Georgia and the nation for highly trained professionals and researchers in environmental health sciences and as the only such PhD program in the state, UGA and the College of Public Health would be well positioned to be leaders in this area.

At the department level, the need for a stand-alone PhD program to specifically train students is a critical component in realizing the departmental mission to “conduct innovative research to improve human health, well being, and quality of natural and working environments, and to provide exemplary education and training for future environmental health professionals.” Furthermore, the PhD program would extend graduate options beyond the MS level that is currently available, allowing UGA to offer the terminal degree in Environmental Health Science. EHS faculty have a long history of training PhD students, but students have resided in other programs such as the Interdisciplinary Toxicology Program, Food Science and Ecology. While some EHS students will continue to be a part of those programs because they desire more focused training in these disciplines, others are better served by the broader, public health focus of a PhD in EHS.

#### *Program fit within the needs of the discipline*

There is a nationwide and worldwide need for increased training in environmental health sciences. Reports by professional societies (e.g., National Environmental Health Association, the Institute of Medicine, National Academies of Science, Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) all cite a need for adequately trained professionals in public health in general, and specifically in environmental health sciences. In 2003, the CDC, in collaboration with several other agencies and professional societies, published a strategic plan for expanding the capacity of environmental health in the United States (*A National Strategy to Revitalize Environmental Public Health Service*). Among

the key needs for enhancing the nation's environmental public health infrastructure is the development of a workforce (at multiple levels) that can adequately respond to myriad environmental health issues that we continue to face. Of note, in addition to addressing traditional problems in food, air, and water quality, we now face an increasingly complex set of potential health issues related to environmental exposures. These include, but are not limited to, climate change effects on health, nanotechnology and associated pollution with nanoparticles, increased antibiotic resistance among bacterial pathogens in food and water, and an expanding array of chemicals that continue to be introduced into the environment. In Georgia, we face particular pressures on public health associated with environmental exposures, which are illustrated by vulnerable populations living near hazardous waste sites, and a high level of low income populations that are disproportionately affected, the highest incidence of *Salmonella* infections in the nation (and high profile national outbreaks arising from Georgia plants in recent years), among other issues. Training a cadre of researchers to address these issues and to translate science into practice will be a critical component for public health capacity.

### **3. Program Demand and Need**

*“Environmental health addresses all the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviours. It encompasses the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments.”* – World Health Organization

Up to a quarter of all preventable illnesses could be eliminated through environmental health practices. According to the WHO, up to 13 million deaths (including 4 million children) per year could be prevented by controlling environmental exposures, especially in the developing world. Even in developed countries, environmental exposures are related to significant morbidity attributed to poor air quality (especially in urban areas) and exposure to chemical and microbiological contaminants through food and water. Environmental health professionals and research in environmental health is critically needed for the development of a nationwide health tracking system, as called for by the Pew Environmental Health Commission, to begin to address growing issues in public health associated with environmental exposures (including understanding baseline levels of disease and contaminants as we experience a changing environmental landscape due to development and climate change). The report states that, “We have to track what and where the hazards are in the environment, whether people are at risk from exposures to these hazards, and the health of our communities. Our information about environmental factors must run as deep and comprehensive as our knowledge of the genome.”

To address how the environment impacts public health and how controls of environmental exposure can prevent disease, people trained to deal with emerging issues in environmental health science and across traditional disciplinary boundaries are needed. Currently, there is a global, national and statewide shortage of highly trained environmental health researchers and professionals. The National Environmental Health Association in conjunction with the Centers for Disease Control and Prevention has indicated increasing workforce capacity in the environmental health science as a critical need for protection of public health.

The PhD degree in environmental health science would provide critical workforce training and cutting edge research, which are critically needed at the state, national and international levels. The Dept. of Environmental Health Science has been working toward offering the terminal degree in the field for ~10 years. The department's strategic plan (2002) specifically identified increasing graduate training in environmental health and proposed two additional degree programs. The first was the establishment of a Masters of Public Health (MPH) degree (implemented in 2005 with the start of the College of Public Health) and the second was the development of a PhD in environmental health science. Furthermore, the strategic plan for the College of Public Health, which is currently under development, also calls for the development of the PhD in Environmental Health Science. Given the lack of similar programs in the state, the high rate of applicants to our graduate programs each year, and critical need for environmental health researchers, we expect the demand for the program to be high.

#### **4. Institutional Resources for the Proposed Ph.D. Program**

The Dept. of Environmental Health Science was first created in 1998 and has maintained an active (and growing) academic and research program. The department is housed in the Environmental Health Science Building on the south campus of UGA. The department and the EHS building supports an undergraduate program (BSEH), two master's programs (MSEH and MPH with a concentration in EHS), and predoctoral research, with office space (for faculty, staff, post-doctoral research associates, research professionals, and graduate students), instructional space (a large classroom, two small conference rooms and a teaching laboratory), computer support (including a student computer lab), and research space.

##### *Personnel*

The Dept. of Environmental Health Science includes seven tenured/tenure track faculty, one full time instructor, and two research scientists. The department also has five adjunct professors. The faculty is supported by two administrative staff. The staff members provide academic support (e.g., student records, course loading, admissions) as well as accounting support (e.g., ordering of supplies, payroll and personnel, processing of travel authority requests and travel expense reimbursements). One of the staff members is also the official Graduate Coordinator Administrative Assistant and the Undergraduate Coordinator Administrative Assistant.

##### *Library*

The University Libraries are composed of three on-campus facilities, the Main Library, the Science Library and the Law Library. The University Library is the largest university library in the state, having over 4.7 million volumes and 37,000 full textbooks available online (2007-2008 figures). Approximately 750,000 printed volumes are in the Science Library. As a regional depository, the Library automatically receives all U.S. government publications made available to depositories through the Depository Library Program. The UGA Libraries have access to 80,748 current serials, including 7,763 purchased print subscriptions, 48,691 purchased electronic subscriptions and access to 24,294 titles outside of traditional subscription models. These and over 400 databases can be accessed through GALILEO, a statewide on-line resource ("virtual library") for scholastic publications. The Library also has three special collections: the Felix Hargrett Rare Book and Manuscript Library, the George Foster Peabody Awards Collection, containing over fifty years of broadcast materials, and the Richard B. Russell Library



for Political Research and Studies, which emphasizes the history, culture and current affairs of Georgia and Georgia's representatives in the federal government, especially the intersection of public interest with government. The Russell Library holds regular programs for the public, some of which have focused on health issues. These three special collections (Hargrett, Russell, and Peabody) are preparing to move into a new facility that is under construction now and expected to open in late 2011. The Miller Learning Center has both classroom and electronic library facilities, adding to the different ways that students can access library resources at UGA. The libraries hold a considerable number of monographs and journals (print and electronic) that support the environmental health PhD program. Appendix 4 contains a partial list of scientific journals relevant to EHS that are available through the UGA libraries

### *Laboratory and Equipment Resources*

The Dept. of Environmental Health Science has laboratory space for classroom instruction and facilities devoted to areas of faculty research expertise. Many of the EHS courses have a laboratory component, which allows students to apply scientific techniques and risk assessment methods. The EHS Department has research space totaling 5,224 ft<sup>2</sup> in the EHS building. Four small research laboratories are within the first floor of the EHS building: a 205 ft<sup>2</sup> DNA Research lab (room 130), a 348 ft<sup>2</sup> Aquatic Organism Laboratory (room 128), a 217 ft<sup>2</sup> Air Quality Laboratory (room 126) with a small Environmental Room (room 126a, 64 ft<sup>2</sup>) and an Environmental Exposure Assessment Lab (room 103, 219 ft<sup>2</sup>).

Three research laboratories are located on the second floor of the main EHS building: the Developmental Toxicology laboratory (room 200, 566 ft<sup>2</sup>), a small Tissue Culture laboratory (room 201a, 174 ft<sup>2</sup>) and a Molecular Microbiology Lab/Clean Room (room 202, 224 ft<sup>2</sup>).

Five research laboratories (rooms 300, 301, 303, 304, and 305, total of 2,775 ft<sup>2</sup>), ranging in size from 429 to 679 ft<sup>2</sup>, are located on the third floor of the EHS building, including an Environmental Toxicology and Genomics Lab, Cancer Research Lab, Aquatic Toxicology Lab, Environmental Microbiology Lab and an Environmental Chemistry Lab. Two smaller rooms for incubator storage (room 204a, 119 ft<sup>2</sup>) and a graduate student office/microscope room (303a, 49 ft<sup>2</sup>) are located between rooms 303 and 304. In 2008 additional space was renovated to create a small Research Services room (room 307, 132 ft<sup>2</sup>) and a Chemical Exposure Lab (room 306, 132 ft<sup>2</sup>), with pass-through access to the PBPk Lab. All of these research laboratories have been renovated (new cabinets, fixtures and floors) within the past 10 years, and four of these laboratories have chemical fume hoods. Each of the research laboratories has state of the art equipment for conducting research in basic environmental health research (including molecular biology, microbiology, toxicology, cancer biology, analytical chemistry, animal exposure, and modeling).

**Developmental Toxicology Laboratory.** The developmental toxicology laboratory (room 200) is composed of two rooms, a basic toxicology and biochemical laboratory of approximately 566 ft<sup>2</sup> and a microorganism and tissue culture facility of 174 ft<sup>2</sup>. The laboratory is fully equipped for biochemical and toxicological analyses, including a  $\mu$ Quant universal microplate spectrophotometer capable of measuring fixed wavelengths between 200-999 nm with KC4

software for data analysis, an Eppendorf Realplex 4 Mastercycler, ep gradient S, gel electrophoresis apparatus, table top centrifuges, a water bath, pipettors, pH meter, and other typical biochemical equipment. Microscopes are also available, including an inverted phase microscope and compound microscopes. A small tissue culture facility is also available for incubations and is equipped with a laminar flow clean bench, a biosafety hood, CO<sub>2</sub> incubators and a Coulter counter for determining cell counts. Histochemical equipment is also available for fixing and staining tissue for pathology studies. Storage equipment includes -80°C and -20°C freezers and 4°C refrigerators.

**Environmental Toxicology and Toxicogenomics Laboratories.** The Environmental Toxicology laboratory is a 549 ft<sup>2</sup> lab that was recently renovated (2002) at a cost of approximately \$150,000. All renovation expenses were paid for by a gift from the Georgia Power Company. This lab is equipped with a chemical fume hood, biological safety cabinet, incubators, microscopes, and specialized computer tracking equipment for performing toxicological research using the nematode, *Caenorhabditis elegans*. In addition to traditional toxicology work, toxicogenomic capabilities are also available. Pre-PCR methods (DNA/RNA extractions, etc.) are conducted in room 300 using pipettors, centrifuges, and other small equipment needed for DNA extraction and setting up PCR reactions. PCR and post-PCR experiments are conducted in Room 120, an 865 ft<sup>2</sup> teaching laboratory, along with room 130, a 205 ft<sup>2</sup> research laboratory, with shared instrumentation (e.g., DNA thermocyclers, a real-time PCR system, gel electrophoresis systems, power supplies, centrifuges, freezers, and a photodocumentation system). EHS researchers also make extensive use of the Georgia Genomics Facility (GGF; a shared core laboratory at UGA with >3500 ft<sup>2</sup> of space and >\$1.5 M in instrumentation; see: <http://dna.uga.edu>), with 2 EHS faculty having offices and formal positions within the GGF.

**Environmental Microbiology and Molecular Microbiology Laboratories.** Room 303 in the EHS Bldg. is dedicated as the environmental microbiology lab. It is certified as BioSafety level 2 and has immediate access to an autoclave, dishwashing facilities and water purification system. The main portion of the laboratory is 429 ft<sup>2</sup> and accommodates experiments in both traditional microbiology and molecular biology. The laboratory is equipped for media and reagent preparation, environmental sample processing, DNA analysis and image analysis, PCR preparation and data processing. Equipment includes a laminar flow hood, water baths, low temperature, shaking and standard incubators, and a -80°C freezer for detection, culture and maintenance of microorganisms. A research grade Olympus compound microscope with epifluorescence is also available. An M.J. Research temp cyler with dual alpha blocks and a 96-well gradient block is on-hand for PCR (polymerase chain reaction) and RT (reverse transcription)-PCR. The laboratory also includes an Applied Biosystems Step One real time PCR system. Standard horizontal electrophoresis and a CHEF DR II (Bio-Rad) pulsed field gel electrophoresis (PFGE) system are used for physical separation of nucleic acid fragments. Phylogenetic software for analysis of DNA sequences and DNA fingerprinting are loaded on laboratory computers. Additionally, room 202 serves as a clean room for molecular assays and includes two PCR work stations, freezer, refrigerator, additional PFGE rig, water baths and refrigerated centrifuge.

**Environmental Chemistry and Exposure Laboratories.** These laboratories (rooms 301 and 306; total of 732 ft<sup>2</sup>) are designed for environmental chemistry analyses and experimental studies to support development of exposure and toxicity models. The primary lab has two fume hoods with flammable/acid solvent cabinets, a variety of inhalation exposure chambers, instrumentation and analytical equipment, including two Gas Chromatographs, two Gas Chromatograph-Mass Spectrometers (with quadrupole and ion trap mass spectrometer units), and an Ion Chromatograph.

**Aquatic Toxicology and Aquatic Animal Laboratories.** Rooms 305 and 128 contain research space and equipment for conducting aquatic toxicology research. Brood stock and progeny of fish and frogs are cultured and maintained in the Aquatic Organism Lab in room 128. Experiments are also conducted in this room. This room is equipped with a high-throughput tap water dechlorination system with UV polishing, a 150 gallon head tank for dechlorinated water storage and distribution, three 70 gallon PE tanks and numerous glass aquaria on racks. Source water temperature can be regulated manually via a mixing valve. Analytical toxicology work is conducted in the Aquatic Toxicology Lab in room 305. This lab is equipped with a fume hood and bench space that provides adequate workspace for the current personnel to conduct water quality analyses; tissue, water and sediment extractions and metal digestions; biochemical extraction and analyses for biomarkers. The room also contains incubators for the culture and exposure of aquatic invertebrates; basic histology staining equipment; research-grade stereo, inverted and compound microscopes and two digital cameras with a digital analysis capability. Two Pentium IV computers and a separate desk are available for graduate student use.

**Environmental Exposure Assessment and Air Quality Laboratories.** Rooms 126 and 103 in the EHS Bldg. are dedicated primarily for research in air quality and environmental exposure assessment. The Air Quality Lab (room 126) is outfitted with a standard wet lab facility and a freezer to store environmental samples. It also has a small climate-controlled room attached to it that is outfitted with an analytical balance (Cahn 35 electro-microbalance) used to weigh filters for air monitoring research. The main portion of the laboratory is 350 ft<sup>2</sup> and accommodates experiments in both traditional exposure assessment using environmental and biological samples, and environmental epidemiology. Room 103 has four computer workstations for data reduction and analysis for environmental exposure assessments and storage space for field instrumentation. Additional field instruments for air quality research (cyclone pumps, high capacity filter units, etc.) are stored in the EHS Storage room (105E; 306 ft<sup>2</sup>).

**Cancer Etiology and Prevention Research Labs.** Room 304 in the EHS Building and additional lab space in the second floor of the Coverdell Building (Room 226) are designated for Dr. J.-S Wang by the VP for Research. These laboratories are well-established with many pieces of equipment for chemical and biochemical analyses, including a Thermo LC/MSn system, ESA HPLC-CoulArray system, two Agilent HPLC systems (1100 and 1200) with autosampler, Diodearray UV detector, and Fluorescence detector, one Thermo HPLC system including autosampler, Diodearray UV detector, and Fluorescence detector; two Beckman Coulter UV/VIS spectrophotometers (DU640 and DU800), a molecular Devices Spectromax 96 well plate reader for ELISA, a Labco speed vacuum system, a chromatography cool cabinet, a flurometer, multiple centrifuges, and microanalytical balance. The laboratory in Coverdell Building also equipped with a Fast Real Time 7500 PCR system, two regular PCR machines, an

image system, 1- and 2-D gel facilities for genotypic and proteomic analysis, a separate culture facility including a culture hood, two CO<sub>2</sub> incubators, and an Olympus inverted microscope, and a biospecimen repository equipped with six Revco -80°C freezers two -20 °C freezers and cryogenic facility for storage of human cells and biospecimen.

**Teaching Lab.** The EHS Department also has an 865 ft<sup>2</sup> teaching laboratory with bench space for 18 students, which was part of renovated space in 2002. This teaching lab is equipped with two fume hoods, a biosafety cabinet, an autoclave and an 83 ft<sup>2</sup> storage/lab preparatory room. Wet labs are offered as part of core and elective courses in all EHS degree programs. The teaching lab provides bench space and equipment to support training in environmental microbiology, aquatic toxicology, environmental biotechnology, industrial hygiene and environmental chemistry.

**Computer Lab.** Room 104 (295 ft<sup>2</sup>) houses a 10-station computer lab outfitted with ten Pentium IV computers and a high throughput laser printer. The College of Public Health server is also located in a small room behind this facility (room 104A, 71 ft<sup>2</sup>). All computers are loaded with standard word processing, spreadsheet, internet and publishing software and a subset of them also have statistical (SAS, SPSS), graphic (SigmaPlot), GIS (ArcGIS) and risk assessment (Crystal Ball) software. This lab is administered by CPH IT staff and is not a part of the University-wide computer group EITS. The lab is for the exclusive use of CPH students and is used for both instructional and research purposes. A mobile teaching system with 20 Apple Macintosh laptop computers was acquired in 2009. The Macintosh notebook computers can operate both OS X and Windows operating systems and are loaded with standard word processing, spreadsheet, internet, and publishing software as well as specialized software for statistical, graphical, and DNA analysis. Video conferencing equipment is available for use of faculty and graduate students for conducting meetings with off-site collaborators and participating in video conferences. This equipment is on a mobile cart and can be used in any classroom of the EHS building.

### *Supplies*

Research related supplies, which support the research activities of faculty and graduate students, are provided almost exclusively from extramural grant support. Funding to purchase supplies for graduate level laboratory courses is derived from student lab-fees, supplemented by Departmental or College funds when available. Lab fees range from \$50 - \$135 per student per course.

### *Capital expenditures (start-up and at first program review)*

Graduate level training (including at the PhD level) has been on-going by faculty in the department for >15 years. The proposed Ph.D. would serve to formalize a program with a specific academic focus in environmental health science; therefore, we do not anticipate significant start-up costs, especially in tight budget time. However, in order to best position our program, recruit excellent candidates and to provide critical support to our growing course offerings, we are requesting two graduate assistantship positions (33.3% FTE for the academic year), which will be provided by the College of Public Health.

## 5. Curriculum

The field of environmental health science is, by its nature, interdisciplinary, relying on core disciplines of toxicology, microbiology, molecular biology, epidemiology and biostatistics within a framework of public health principles. Students are expected to master all foundational areas in this field. While existing graduate programs, such as the Interdisciplinary Program in Toxicology, may offer focused training in one or two of these core disciplines, the PhD in EHS offers a broader degree with a foundation in public health principles and advanced training in *all* areas of environmental health, including but not focusing on, single disciplines such as toxicology. In developing the curriculum for the PhD in environmental health science, top-ranked peer and aspirational PhD programs in environmental health science were evaluated and elements were adopted such that they fit with the research expertise of the faculty within environmental health science at the University of Georgia and adhered to the guidelines set forth by both the University of Georgia Graduate School and the Council on Education for Public Health (CEPH; the accrediting body for all schools of public health).

The proposed course curriculum falls into Core (21 hours) and Elective (9 hours) categories, with additional doctoral research hours (as recommended by students' advisor and/or doctoral committee). Core areas are defined both by the specific research areas in environmental health science and the need for a solid foundation in public health, which are required by the accrediting body for Schools of Public Health. To that end the curriculum proposed for this degree requires 21 hours of core content, including advanced topics in environmental health, epidemiology, biostatistics, professional ethics and seminars. The requirement of a professional ethics course and the requirement that students regularly present their research to faculty and fellow graduate students are part of the program's effort to socialize doctoral students into the environmental health science discipline as professionals.

When students enter the program they will have an assigned advisor (major professor) who, in most cases, will continue to advise the student (and his/her research) for the duration of the program. In the case of co-advisors, at least one shall be a tenured or tenure-track faculty member of EHS, and each co-advisor will have a full vote on the committee.

The student will work with his or her advisor(s) to develop a dissertation project and will consult on the formation of the student's dissertation committee. The committee will be formed by the end of the first year and will include at least three other faculty members or professionals with the highest terminal degree in their field. At least three committee members (including the major advisor) shall have UGA graduate faculty status. At least two committee members shall be from the department of Environmental Health Science regular or adjunct faculty, including the major professor. Additionally, at least one member of the committee shall be from outside of the department.

After formation of the committee, the student will present a dissertation prospectus for approval (this may also take the form of a full DOE, EPA, NIH, NOAA, NSF or USDA style proposal, at the discretion of the committee). The committee will also review and approve the student's preliminary and final programs of study.

After completing required coursework, students will complete written and oral exams for admission to PhD candidacy. The exams will be administered by the student's committee. Students will not progress to the oral exam unless they have passed the written exam. The committee may suggest or require students to complete additional coursework, directed readings

or other instruction to help students fill knowledge gaps identified during the exams. Students who fail either portion of the exams will be allowed to repeat them one time. Students who fail a second attempt will be allowed to enter the MSEH program.

*Proposed Course of Study*<sup>†</sup>

The following curriculum is based on the guidelines set forth by the University of Georgia Graduate School. The PhD in Environmental Health Science will require 30 hours of course work. For students entering with a M.S. (or other Master's) degree, 16 hours must be taken at 8000 level; those with no master's degree must successfully complete at least an additional 4 hours in graduate-only courses. For all students, greater than 50% of hours on the course of study must be in classes that are limited to graduate students only.

Core (21 h)

Advanced Topics in Environmental Health Science I (EHSC 8010)*	3 h
Advanced Topics in Environmental Health Science II (EHSC 8020)*	3 h
Responsible Conduct of Research (GRSC 8550)	1 h
Proseminar in Environmental Health (EHSC 8050)*	1 h
Graduate Seminar in Env. Hlth. Res. (EHSC 8030* or PBHL 8200)	1 h (x 3 semesters)
Biostatistics (advanced course) (selection from BIOS or STAT)	3 h
Epidemiology (advanced course) (selection from EPID)	3 h
Doctoral Dissertation (EHSC 9300)	3 h
Environmental Health Seminar [Exit Seminar] (EHSC 8150)	1 h

Electives (9 h)

As determined by major professor and dissertation committee

- $\geq 6$  h must be from courses with EHSC prefix (currently offered EHSC courses at the graduate level are listed below).

*List of Graduate-Level Electives Offered through the Dept. of Environmental Health Science*

EHSC 4090/6090 (3 h)	Emerging Technologies: Bioremediation
EHSC 4100/6100-4100L/6100L (3 h)	Industrial Hygiene
EHSC 4150/6150 (3 h)	Solid and Hazardous Waste Management
EHSC(FDST)(MIBO) 4310/6310-4310L/6310L(4 h)	Environmental Microbiology
EHSC 4350/6350-4350L/6350L (3 h)	Environmental Chemistry
EHSC 4400/6400 (3 h)	Environmental Issues in the Developing World
EHSC 4610/6610 (3 h)	Water Pollution and Human Health
EHSC 4490/6490 (3 h)	Environmental Toxicology
EHSC 4700/6700 (3 h)	Genetic Applications in Environmental Health Science
EHSC 4710/6710-4710L/6710L (3 h)	Environmental Biotechnology

<sup>†</sup> Appendix 1 lists all courses and descriptions

\* New course – approval pending

EHSC 4080/6080 (3 h) Environmental Air Quality  
 PHRM(VPHY)(EHSC) 6910 (3 h) Introductory Toxicology  
 EHSC 7010 (3 h) Fundamentals of Environmental Health Science<sup>2</sup>  
 EHSC 8100 (1-3 h) Current Topics in Environmental Health Science<sup>2</sup>  
 EHSC 8110 (3 h) Fundamentals of Chemical and Microbial Risk Assessment<sup>2</sup>  
 EHSC(AAEC) 8120 (2 h) Roles and Responsibilities of Environmental Policy Makers<sup>2</sup>  
 EHSC 8150 (1 h) Environmental Health Seminar<sup>2</sup>  
 EHSC 8210 (3 h) Cancer Etiology and Prevention<sup>2</sup>  
 EHSC 8220-8220L (4 h) Predictive Toxicology Using Predictive Models<sup>2</sup>  
 EHSC(EPID) 8250 (3 h) Biomarkers: Public Hlth, Clin & Environmental Toxicology Applications<sup>2</sup>  
 EHSC 8310 (3 h) Advanced Topics in Aquatic Microbiology, Health and the Environment<sup>2</sup>  
 EHSC(MARS) 8410 (3 h) Oceans and Human Health<sup>2</sup>  
 EHSC 8440 (3 h) Occupational and Environmental Diseases<sup>2</sup>  
 EHSC 8450 (3 h) Genome Technologies<sup>2</sup>  
 EHSC 8510-8510L (3 h) Environmental Risk Assessment and Communication<sup>2</sup>  
 EHSC(EPID) 8540-8540L (3 h) Microbial Quantitative Risk Assessment<sup>2</sup>  
 EHSC 8550 (3 h) Development and Reproductive Toxicology<sup>2</sup>  
 EHSC(ECOL)(FISH)(WASR) 8610 (3 h) Aquatic Toxicology<sup>2</sup>  
 EHSC 8630-8630L (4 h) Quantitative Ecological Toxicology<sup>2</sup>  
 EHSC 8710 (3 h) Issues in Biosafety and Biosecurity<sup>2</sup>  
 EHSC 8800 (1-3 h) Special Problems in Environmental Health Science<sup>2</sup>

*Sample Program of Study*

Student with prior M.S. degree (and no remedial requirements)

**YEAR 1**

Fall

- Advanced Topics in EHS I (EHSC 8010) 3 h (Core)
- Responsible Conduct of Research (GRSC 8550) 1 h (Core)
- Adv. Topics in Aquatic Micro., Health, and the Env. (EHSC 8310) 3 h (Elective - EHSC)
- Fund. of Chem. & Microb. Risk Assess. (EHSC 8110) 3 h (Elective - EHSC)
- Research (EHSC 9000) 8 h

Spring

- Advanced Topics in EHS II (EHSC 8020) 3 h (Core)
- Proseminar in Environmental Health (EHSC 8050) 1 h (Core)
- Environmental Microbiology (EHSC 6310/6310L) 4 h (Elective - EHSC)
- Molecular Epidemiology (EPID 8200) 3 h (Core)
- Doctoral Research (EHSC 9000) 1-12 h

Summer

- Doctoral Research (EHSC 9000) 1-12 h

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<sup>2</sup> Graduate only courses

*Committee formed by end of year 1 (membership includes major professor and at least 3 others [ $\geq 3$  must have graduate faculty status]  $\geq 2$  faculty, including the major professor, must be from the Dept. of Environmental Health Science, one committee member can be selected from outside of Environmental Health Science). Students are encouraged to write a dissertation prospectus; this may entail the writing of a full proposal at the discretion of the dissertation committee.*

## **YEAR 2**

### Fall

- Proseminar in Environmental Health.(EHSC 8050) 1 h (Core)
- Introductory Biostatistics II (BIOS 7020) 3 h (Core)
- Oceans and Human Health (EHSC(MARS) 8410) 3 h (Elective – EHSC)
- Genetic Applications in Env. Health Sci. (EHSC 4700/6700) 3 h (Elective – EHSC)
- Doctoral Research (EHSC 9000) 1-12 h

### Spring

- Doctoral Research (EHSC 9000) 1-12 h

### Summer

- Doctoral Research (EHSC 9000) 1-12 h

*Comprehensive exams – written and oral format (oral exam following generally within 2 weeks but no more than 6 months after the written exam)*

## **YEAR 3**

### Fall

- Grad. Seminar in Environmental Health Res.(EHSC 8030) 1 h (Core)
- Doctoral Research (EHSC 9000) 1-12 h

### Spring

- Doctoral Research (EHSC 9000) 1-12 h

### Summer

- Doctoral Research (EHSC 9000) 1-12 h

## **YEAR 4**

### Fall

- Proseminar in Environmental Health (EHSC 8050) 1 h (Core)
- Doctoral Research (EHSC 9000) 1-12 h

### Spring

- Doctoral Research (EHSC 9000) 1-12 h
- Doctoral Dissertation (EHSC 9300) 1-12 h

Environmental Health Seminar (EHSC 8150) 1 h



## **6. Admissions Criteria**

Applicants will be evaluated based on GRE scores, GPA (undergraduate and/or graduate), official transcripts, statement of interest and three letters of recommendation. Admissions standards will meet or exceed Graduate School guidelines. Students seeking admission to the PhD program directly from a bachelor's degree will be expected to show a high level of achievement in their undergraduate degree to indicate capacity for adequate performance in PhD level curriculum and research. International students whose native language is not English must also submit results of the Test of English as a Foreign Language (TOEFL).

Students admitted to the PhD program must have earned a degree (bachelor's or master's) from an accredited program in Environmental Health or an equivalent science degree. Students entering are expected to have had introductory level epidemiology and biostatistics (or statistics). These may be satisfied by earning the equivalent senior or graduate level course credit prior to admission to the program or by taking courses in these areas as a part of their graduate program with the approval of their graduate committee.

The admissions committee of the Dept. of Environmental Health Science will review all applications and make recommendations to the full faculty. For an applicant to be accepted to the program following favorable departmental review, one member of the faculty will need to sponsor the applicant as the academic and research advisor.

## **7. Availability of Assistantships**

The Dept. of Environmental Health Science offers a limited number of graduate teaching assistantships (GTA) each year. The number of GTAs varies from 4 to 5 annually; GTAs provide an assistantship at 33.3% FTE for the academic year (10 months). All PhD students will have the opportunity to serve as teaching assistants during their academic tenure.

More often graduate students are supported in the department through graduate research assistantships (GRA), which are funded by faculty extramural grants. Collectively, faculty members in the Dept. of Environmental Health Science support 21 to 26 students each year at rates from 33.3% to 50% FTE for the fiscal year (12 months). These assistantships currently fund both MS and PhD students. With the addition of a PhD program in Environmental Health Science, we anticipate an increase in support through extramural funding which will further support students at both the Master's and PhD level.

Excellent applicants will also be nominated for competitive assistantships through the Graduate School (Graduate School Assistantships, Graduate Recruitment Opportunities Assistantship, Presidential Fellows Graduate Program and Dissertation Completion Award) and through available training programs such as the Georgia Oceans and Health Initiative.

It is expected that any student accepted to the PhD program in Environmental Health Science will receive adequate funding in the form of assistantships.

## **8. Student Learning Outcomes**

Through coursework and research experiences toward the completion of the PhD degree in Environmental Health Science, graduates will meet the following competencies:

- 1) Exhibit a strong foundation in the core disciplines of environmental health science, including air quality, food and water quality, environmental exposure, toxicology and risk assessment.
- 2) Follow and promote good ethical practices in the conduct of research.
- 3) Apply biostatistical approaches and evaluate epidemiological studies as they pertain to environmental health research beyond the introductory level.
- 4) Evaluate and critique emerging areas of research in environmental health science and their application to the larger public health discipline.
- 5) Demonstrate in-depth knowledge in at least one area of specialization within the framework on environmental health science.
- 6) Formulate new scientific knowledge in the field of environmental health science and effectively communicate results and their significance through publications, discussions and presentations.

### *Assessment*

Students matriculating in the PhD program in Environmental Health Science will be evaluated annually for their progress toward degree milestones, research productivity and attainment of stated learning outcomes (competencies). Annual evaluation will be completed by both the student (self-evaluation) and the student's committee using a standard assessment survey used within the College of Public Health and tailored to our specific program. The Graduate Coordinator will maintain all evaluation records. The Department of Environmental Health Science will also work with the College of Public Health's Assistant Dean for Assessment to develop instruments to track alumni and their career paths. The adopted assessment protocols will ensure that current students are making adequate forward progress for their degrees, that all EHS PhD graduates are meeting our expected learning outcomes and competencies, and that we have a mechanism in place to evaluate the quality of our graduates by tracking their career paths.

## **9. Administration**

The Ph.D. in Environmental Health Science will be housed within the Dept. of Environmental Health Science in the College of Public Health at the University of Georgia. The administrative structures of the College of Public Health and the Department of Environmental Health Science are included (Appendix 5). Briefly, the EHS Department Head is directly responsible to the CPH Dean and to the faculty of the Department of Environmental Health Science. The EHS faculty report directly to the Department Head and the research and teaching programs in EHS are the direct responsibility of the EHS Department Head. The EHS Graduate Coordinator handles all aspects of the graduate programs housed in EHS (MS EH and the proposed PhD in EHS), including student administration (admissions and annual assessment reporting to UGA and accreditation agencies), graduate orientations, and other activities as needed. An EHS

Graduate Admissions Committee will assist the Graduate Coordinator with admissions decisions.

## **10. Waiver to Degree-Credit Hour**

This section is not applicable to this program (total credit hour requirements do not exceed those of similar programs).

## **11. Accreditation**

Currently, there is no formal accreditation for PhD degrees in environmental health science. The accrediting agency for environmental health, the National Environmental Health Science & Protection Accreditation Council (EHAC), primarily provides accreditation for the bachelor's degree. UGA's BSEH degree remains the only undergraduate degree program in environmental health in Georgia that is accredited by EHAC.

The College of Public Health and all academic and professional degrees offered fall under the general accreditation of the Council on Education for Public Health (CEPH) and specific requirements must be met for each degree under a School's accreditation. Doctoral programs must follow the criteria for all academic degrees, which require that "students pursuing [any academic degree] shall obtain a broad introduction to public health, as well as an understanding about how their discipline-based specialization contributes to achieving the goals of public health" (CEPH Criterion 2.9, *Accreditation Criteria for Schools of Public Health*. June 2005). With regard to curriculum and outcomes, the CEPH criterion expects the following:

“Students in academic curricula should be familiar with the basic principles and application of epidemiology and should develop competence in other areas of public health knowledge that are particularly relevant to their own disciplines. Opportunities for cross-disciplinary work should be afforded to all academic students.

While opportunities to engage in research activities are important for all students, they are essential for students in academic or research curricula. Such opportunities are possible only when faculty themselves are actively engaged in research. Research curricula should culminate in an integrative activity that permits the student to demonstrate the ability to successfully undertake research.”

The course of study and expectations of students in the proposed PhD program fulfill these expectations. Environmental epidemiology will be a critical module in the proposed Advanced Topics in Environmental Health Science I and II. All students in the PhD program will also take at least one course in biostatistics and epidemiology beyond the introductory level. To increase exposure to other disciplines and ensure that students have opportunities for cross-disciplinary work, all students will be required to have at least one committee member from outside of the Dept. of Environmental Health Science and will be encouraged to take elective coursework (at least 3 h) in outside departments.

Finally, all faculty members (with the exception of full time instructor[s]) are actively engaged in research, consistently receive extramural funding, provide ample research opportunities for

doctoral level students and have an excellent track record of publishing student research. The student's dissertation, which is a culmination of his or her research, and the public defense of the dissertation will be used to demonstrate the student's ability to successfully undertake research. Furthermore, it is expected that the research will result in peer reviewed publications with the student as the first author.

## **12. Projected Enrollment**

Faculty members in the Dept. of Environmental Health Science are routinely sought out as potential advisors for prospective PhD students, even without an existing PhD program in EHS. These prospective students express specific interest in our respective research areas and often go on to matriculate at UGA but are admitted through outside programs where our faculty have courtesy appointments (e.g., Interdisciplinary Toxicology Program, Odum School of Ecology, Warnell School of Forestry and Natural Resources, Dept. of Marine Science, Dept. of Food Science and Technology). In some cases, these students would be more interested and be better served by a degree in environmental health science. Student demand can be shown by current and past advisement of Ph.D. students by our faculty (see Table 13.2) and by letters of inquiry to the Graduate Coordinator and individual faculty.

Initial enrollment projections are based on an assessment of current level of support for new students among the core EHS faculty. In the first year, we expect to accept up to 4 new students and anticipate that at least two students may transfer into an EHS PhD from another program. In subsequent years, we anticipate up to 6 new students per year as new faculty are recruited (searches for two assistant professors are currently in progress). The primary limitation on accepting students is the number of available graduate research assistantships that can be offered. Student funding is primarily accomplished through extramural grants to faculty with limited reliance on teaching assistantships. Only in unusual circumstances will students be accepted to the program without an assurance of funding. A secondary constraint on enrollment is the amount of dedicated graduate student desk space in the EHS building, which is sufficient for about 16 PhD students. Additional space is slated for the EHS department when the department moves to join the rest of the College of Public Health at the former Navy School Campus [medical partnership and public health campus].

### *Recruitment*

Upon approval of the PhD program in environmental health science, advertising and recruitment efforts will target potential doctoral students. This will be accomplished through highlights on the departmental and college web site, announcements through the ASPH (Association of Schools of Public Health) weekly e-newsletter, and presence at meetings of professional organizations. Additionally, the department has a history of supporting a higher than average level of underserved and/or minority populations among our graduate students. We anticipate that this trend will transfer to the new PhD program as well. Dr. Mary Alice Smith received the 2005 Alfred P. Sloan Foundation Mentor of the Year award for her work with minority graduate students. She has had two students graduate with PhDs that received the Sloan Foundation fellowships for minority students and currently has one student on a Sloan Foundation fellowship.

## *Matriculation*

Students may be accepted during any academic semester; the program will not be structured in a cohort-based format. The curriculum is designed such that a student may matriculate in any semester and be able to take appropriate course-work.

## **13. Faculty**

The Department of Environmental Health Science faculty includes experts in the core fields of environmental health science, including toxicology, air quality, water quality, genomics, microbiology and risk assessment.

There are currently 7 faculty members with academic rank (Table 13.1) including 2 full professors, 5 associate professors and one full time instructor. Searches are currently underway for two assistant professors, positions that are expected to be filled by Spring 2011. In addition to the core faculty, two research scientists and five adjunct professors augment the program. All core and adjunct faculty contribute to graduate instruction, mentorship and/or advisement. Biographical sketches of all Environmental Health Science core, research and adjunct faculty are included in Appendix 2.

The department has had an active M.S. degree in Environmental Health Science (MSEH) since 1995. Additionally, departmental faculty have a sustained record of advising PhD students through programs such as UGA's Interdisciplinary Program in Toxicology (ITP) (all core EHS faculty are members), where EHS consistently houses the majority of students in this program. Faculty also have obtained courtesy status in other departments on campus in related fields (e.g., Ecology, Marine Science, Forestry and Natural Resources), which has allowed another avenue for advisement of PhD students.

Currently, faculty members in the Dept. of Environmental Health Science serve as major professors for 14 PhD students and, collectively, the core faculty has graduated >24 PhD students (Table 13.2). Additionally, Ph.D. students advised by Environmental Health Science faculty have been recognized for excellence both within the University as well as nationally (and internationally). Students have received awards for teaching and research at UGA (including Outstanding Teaching Assistant and the E. Broadus Browne Award for Excellence in Research). Several students have been awarded competitive university-wide assistantships (e.g., Presidential Fellowships, Graduate School Assistantships) and UGA Dissertation Completion Awards. Students routinely receive competitive travel awards from professional societies (e.g., American Society for Microbiology, Society of Toxicology, Society for Environmental Toxicology and Chemistry), and have competed successfully for top prizes for best poster and best presentation at regional, national and international meetings. Finally, Ph.D. students advised by Environmental Health Science faculty have also received fellowships from the U.S. EPA (STAR fellowships), NOAA (Nancy Foster Scholarship), National Estuarine Research Scholarships and the Georgia Oceans and Health Initiative (a PhD training grant to UGA, funded by NOAA), which are extremely competitive and awarded to a very few students nation-wide each year.

Table 13.1 Inventory of faculty directly involved in the administration of the proposed PhD program (core faculty in the Dept. of Environmental Health Science)

Faculty Name	Rank	Highest Degree	Degrees Earned	Academic Discipline	Current Workload	Graduate Courses Taught <sup>1</sup>
Black, Marsha C.	Associate Professor (Asst. Dean)	Ph.D.	Ph.D. 1989	Aquatic Toxicology; Ecotoxicology	17.5% Research 37.5% Teaching 15% Admin. 5% Service	EHSC 6600, EHSC 6610, EHSC 6010, EHSC 8610, EHSC 8100, PBHL 7800, EHSC 6910
Glenn, Travis	Associate Professor	Ph.D.	M.S. 1990 Ph.D. 1996	Environmental Genomics	32.5% Research 12.5% Teaching 25.0% Admin <sup>2</sup> 5.0% Service	EHSC 6710, EHSC 8450; EHSC 6010
Lipp, Erin K.	Associate Professor	Ph.D.	Ph.D. 1999	Environmental Microbiology	32.5% Research 37.5% Teaching 5% Service	EHSC 6310, EHSC 6310L, EHSC 8410; EHSC 8310; EHSC 6010; PBHL 7800
Naeher, Luke P.	Associate Professor	Ph.D.	M.S. 1994, 1998 Ph.D. 1998	Air Quality; Exposure Assessment	32.5% Research 37.5% Teaching 5% Service	EHSC 6080, EHSC 7010, EHSC 6010
Smith, Mary Alice	Associate Professor	Ph.D.	M.A.T. 1976 M.S. 1980 Ph.D. 1990	Developmental Toxicology; Risk Assessment	32.5% Research 37.5% Teaching 5% Service	EHSC 6490, EHSC 8110, EHSC 8550; EHSC 6010
Wang, Jia-Sheng	Professor (Dept. Head)	Ph.D.	M.D. 1982 Ph.D. 1994	Molecular Toxicology; Cancer Etiology	32.5% Research 15.0% Teaching 22.5% Admin. 5.0% Service	EHSC 7010, EHSC 8210
Williams, Phillip	Professor (Dean)	Ph.D.	Ph.D. 1988	Industrial Hygiene; Toxicology	100% Admin	EHSC 6100, EHSC 6080, EHSC 6010, EHSC 8120
Zimeri, Anne Marie	Instructor	Ph.D.	Ph.D. 2004	Genetics	100% Teaching	EHSC 6090, EHSC 6150, EHSC 6700

<sup>1</sup> See Appendix 1 for a full description of courses; all faculty also direct student research and writing through EHSC 9000 and EHSC 9300

<sup>2</sup> Director of the Georgia Genomics Facility (25% in academic year and 8.3% [one month] summer)

Table 13.2. Record of PhD-level advisement among core faculty in the Dept. of Environmental Health Science.

Faculty Member	# of current PhD students <sup>1</sup>	# of graduated PhD students <sup>1</sup>	# of PhD committees (non-major professor) <sup>2</sup>
Marsha Black	1	3	13
Travis Glenn	3	4	20
Erin Lipp	3	2	9
Luke Naeher	3*	0*	3
Mary Alice Smith	2	6	12
Jia-Sheng Wang	4	9	18
Phillip Williams	2	4	15

<sup>1</sup>Major advisor or co-advisor

<sup>2</sup>Current + former; includes external readerships (foreign PhD granting institutions)

\* In addition to PhD students, Dr. Naeher has graduated one DrPH (Doctor of Public Health) student and is currently advising one DrPH student.

No significant change in workload for the core faculty is anticipated. All faculty members with research appointments already serve as major professors for PhD students matriculating through other programs. All faculty members also teach graduate/PhD-level courses that will be utilized in the new PhD program. Faculty will all contribute lectures in the new core courses in the program (Advanced Topics in Environmental Health Science I and II).

In addition to a record in graduate level training (both through the MSEH program and the varied involvement in other PhD programs), faculty members in Environmental Health Science also demonstrate a clear ability to fully fund and support PhD level students. Appendix 3 provides a summary of current (active) grants within the Department. All tenure/tenure track members of the department are principal investigators or co-investigators on one or more grants. Total award amounts currently exceed \$9.4 million. This funding has and will continue to provide an excellent base to support pre-doctoral students in the program as well as access to current research projects directed by faculty. While teaching assistantships are also used to support students, the majority of student funding comes through external grants obtained by the core faculty.

This Department has the content expertise, experience, research productivity, and size to support a Ph.D. program in Environmental Health.

## **14. External Reviews**

The following list of potential reviewers represents leaders in the field of environmental health science who are members of peer and aspirational academic programs in the field. The list excludes any colleagues who read or provided feedback on the development of this proposal.

- Dr. G. Thomas Chandler, Professor and Dean, University of South Carolina, Arnold School of Public Health, Department of Environmental Health Science
- Dr. Paul Epstein, Associate Director of the Center for Health and the Global Environment at Harvard Medical School
- Dr. Elaine Faustmann, Professor, University of Washington, Dept. of Environmental and Occupational Health Sciences
- Dr. Evan Gallagher, Professor, University of Washington, Dept. of Environmental and Occupational Health Sciences
- Dr. John Groopman, Professor and Dept. Chair, Dept. of Environmental Health Science, Johns Hopkins University
- Dr. Mark Sobsey, Professor, University of North Carolina-Chapel Hill, Gillings School of Global Public Health, Department of Environmental Sciences and Engineering.

## **15. Fiscal, Facilities and Enrollment Impact (Estimated Budget)**

The University general funds from the State provide academic salaries for faculty members, usually at 37.5% for teaching, 32.5% for research, and 5% for service. The University general funds also support staff salary. Research grants are used to cover salaries for other research personnel, including research scientists, postdoctoral associates, technicians, and graduate research assistants. Additional stipends for graduate students are provided through Graduate School Assistantships, research assistantships through the interdisciplinary Toxicology Program, and teaching assistantships provided through the College of Public Health. Costs for research supplies, travel, and laboratory equipment purchases are mainly covered by research grants and indirect cost returns. No start-up funds are requested to support this new PhD program. Given that we have a history of supporting PhD students, we will be able to leverage currently available resources and support to establish the PhD Program.



Table 15.1 Projections for enrollment, expenditure and revenue

	AY 2011/12	AY 2012/13	AY 2013/14	AY 2014/15
<b>I. ENROLLMENT PROJECTIONS</b>				
<b>Student Majors</b>				
Shifted from other programs	2	0	0	0
New to the institution	5	5	6	6
<b>Total Majors</b>	7	5	6	6
<b>Course Sections Satisfying Program Requirements</b>				
Previously existing	35	38	38	40
New	3	0	2	1
<b>Total Program Course Sections</b>	38	38	40	41
<b>Credit Hours Generated by Those Courses</b>				
Existing enrollments	~560	~560	~560	~560
New enrollments	~70	~50	~60	~60
<b>Total Credit Hours</b>				
<b>DEGREES AWARDED</b>	0	0	2	4
<b>II. EXPENDITURES<sup>2</sup></b>				
	EFT Dollars	EFT Dollars	EFT Dollars	EFT Dollars
<b>Personnel – reassigned or existing positions</b>				
Faculty (7 faculty)	643,788.19	663,101.00 <sup>3</sup>	682,994.00 <sup>3</sup>	703,483.85 <sup>3</sup>
Part-time Faculty (3 faculty)	15,000	15,450.00	15,913.50	16,391.00
Graduate Assistants (up to 26, including MS students)	350,465.00	360,978.95	371,808.00	382,962.57
Administrators	150,000.00	154,500.00	159,135.00	163,909.00
Support Staff (2 staff positions)	55,000.00	56,650.00	58,349.50	60,100.00
Fringe Benefits	317,461.50	326,984.83	336,794.38	346,900.00
Other Personnel Costs	90,000.00	92,700.00	95,481.00	98,345.00
<b>Total Existing Personnel Costs</b>	1,621,714.69	1,670,364.78	1,720,475.38	1,772,091.42

<sup>2</sup> Includes state operating funds, extramural research grants and indirect cost returns

<sup>3</sup> Assumes 3% annual increase

<b>EXPENDITURES (Continued)</b>				
<b>Personnel – new positions</b>				
Faculty				
Part-time Faculty				
Graduate Assistants				
Administrators				
Support Staff				
Fringe Benefits				
Other personnel costs				
<b>Total New Personnel Costs</b>	0	0	0	0
<b>Start-up Costs (one-time expenses)</b>				
Library/learning resources	0	0	0	0
Equipment	0	0	0	0
Other	0	0	0	0
Physical Facilities: construction or major renovation	0	0	0	0
<b>Total One-time Costs</b>	0	0	0	0
<b>Operating Costs (recurring costs – base budget)<sup>4</sup></b>				
Supplies/Expenses	807,137.00	800,000.00	800,000.00	800,000.00
Travel	69,930.00	70,000.00	70,000.00	70,000.00
Equipment	50,000.00	50,000.00	50,000.00	50,000.00
Library/learning resources				
Other				
<b>Total Recurring Costs</b>	927,067.00	920,000.00	920,000.00	920,000.00
<b>GRAND TOTAL COSTS</b>	2,525,774.60	2,566,667.70	2,616,067.30	2,666,951.40

<sup>4</sup> Includes both State operating funds, extramural research grants and indirect cost returns

<b>III. REVENUE SOURCES</b>				
<b>Source of Funds</b>				
Reallocation of existing funds				
New student workload				
New Tuition				
Federal funds (estimated income from external grants)	\$250,000	\$250,000	\$250,000	\$250,000
Other grants				
Student fees (associated laboratory fees)	\$6,000	\$6,000	\$6,000	\$6,000
Other				
New state allocation requested for budget hearing				
<b>Nature of Funds</b>				
Base budget				
One-time funds				
<b>GRAND TOTAL REVENUES</b>	\$256,000	\$256,000	\$256,000	\$256,000

## **Appendices**

## **Appendix 1. Description of all graduate level courses offered in the Dept. of Environmental Health Science**

**Course ID:** EHSC 6080. 3 hours.  
**Course Title:** Environmental Air Quality  
**Course Description:** Sources, control, and modeling of air pollution; effects of air pollutants on human health and the environment; atmospheric chemistry, indoor air quality, and regulatory issues.  
**Oasis Title:** ENVIR AIR QUALITY  
**Prerequisite:** CHEM 2211 and CHEM 2211L  
**Semester Course Offered:** Offered spring semester every year.  
**Grading System:** A-F (Traditional)

**Course ID:** EHSC 4090/6090. 3 hours.  
**Course Title:** Emerging Technologies: Bioremediation  
**Course Description:** Bioremediation is the treatment of contaminated soils, sediments, and groundwater by microorganisms, fungi, plants, or components from these organisms. Overview of organism physiology, genetic engineering, and details of environmental health hazards amenable to bioremediation. Exploration of case studies that exemplify approaches to bioremediation.  
**Oasis Title:** BIOREMEDIATION  
**Prerequisite:** BIOL 1103 or BIOL 1107-1107L  
**Semester Course Offered:** Offered spring semester every even-numbered year.  
**Grading System:** A-F (Traditional)

**Course ID:** EHSC 4100/6100-4100L/6100L. 3 hours. 2 hours lecture and 2 hours lab per week.  
**Course Title:** Industrial Hygiene  
**Course Description:** The anticipation, recognition, evaluation, and control of those environmental factors, arising in or from the workplace, which can cause sickness, impaired health and well-being, or significant discomfort and inefficiency among workers or among community citizens.  
**Oasis Title:** INDUSTRIAL HYGIENE  
**Prerequisite:** CHEM 2211 and CHEM 2211L  
**Semester Course Offered:** Offered fall semester every year.  
**Grading System:** A-F (Traditional)

**Course ID:** EHSC 4150/6150. 3 hours.  
**Course Title:** Solid and Hazardous Waste Management

**Course Description:** Regulatory, chemical, and engineering aspects of solid and hazardous waste management, including RCRA, CERCLA, landfill and incinerator design, pollutant transport and fate, and potential for human health impacts.

**Oasis Title:** SOL HAZ WASTE MGMT

**Prerequisite:** MATH 1113 and CHEM 2211 and CHEM 2211L

**Semester Course Offered:** Offered fall semester every year.

**Grading System:** A-F (Traditional)

**Course ID:** ENVM(EHSC) 4250/6250. 3 hours.

**Course Title:** Environmental and Public Health Law

**Course Description:** Basic legal principles and procedures as they relate to environmental regulations and public health. Coverage of common law, torts, nuisances, regulatory standards, and state and federal environmental laws. Delineation of significant constitutional and federal regulations that affect managerial decisions.

**Oasis Title:** ENV PUB HLTH LAW

**Duplicate Credit:** Not open to students with credit in AAEC 4930/6930

**Prerequisite:** Third-year student standing and (POLS 1101 or HIST 2111 or HIST 2112)

**Semester Course Offered:** Offered spring semester every year.

**Offered:**

**Grading System:** A-F (Traditional)

**Course ID:** EHSC(FDST)(MIBO) 4310/6310-4310L/6310L. 4 hours. 2 hours lecture and 4 hours lab per week.

**Course Title:** Environmental Microbiology

**Course Description:** Types of microorganisms in the environment; effect of environmental conditions on microbial existence; public health aspects of environmental microbiology; applications of microorganisms to solve environmental problems.

**Oasis Title:** ENVIRON MICROBIOL

**Prerequisite:** MIBO 3000-3000L or MIBO 3500

**Semester Course Offered:** Offered spring semester every year.

**Offered:**

**Grading System:** A-F (Traditional)

**Course ID:** FDST(EHSC)(MIBO) 4320/6320-4320L/6320L. 3 hours. 2 hours lecture and 3 hours lab per week.

**Course Title:** Hazard Analysis Critical Control Point in the Food Industry

**Course Description:** Emphasis on Hazard Analysis Critical Control Point (HACCP) and its prerequisite (e.g., GAP, GMP, SSOP) programs used to promote food safety in the food industry. Upon completion of the course and passing an examination, the students will receive HACCP

certification.

**Oasis Title:** HACCP IN FD IND  
**Prerequisite:** FDST 3000 or MIBO 3000-3000L or MIBO 3500  
**Semester Course Offered:** Offered fall semester every year.  
**Grading System:** A-F (Traditional)

**Course ID:** **EHSC 4350/6350-4350L/6350L.** 3 hours. 3 hours lecture and 2 hours lab per week.  
**Course Title:** **Environmental Chemistry**  
**Course Description:** Chemical principles of environmental processes which result from natural or human-generated phenomena; air, water, and soil chemical reactions involving pollutants and wastes; measurement of pollutants in the environment.

**Oasis Title:** ENVIRONMENTAL CHEM  
**Prerequisite:** CHEM 2211 and CHEM 2211L and MATH 1113 and STAT 2000  
**Semester Course Offered:** Not offered on a regular basis.

**Grading System:** A-F (Traditional)

**Course ID:** **EHSC 4400/6400.** 3 hours.  
**Course Title:** **Environmental Issues in the Developing World**  
**Course Description:** Study of environmental issues in developing countries, including water, soil, and air contamination resulting from human impacts and industrial development. Strategies to mitigate or manage contamination issues will also be discussed.

**Oasis Title:** ENV ISSUE DEV WORLD  
**Undergraduate Prerequisite:** EHSC 3060 or PBHL(PMCY) 3100 or permission of department  
**Graduate Prerequisite:** EHSC 7060 or permission of department  
**Semester Course Offered:** Offered spring semester every year.  
**Grading System:** A-F (Traditional)

**Course ID:** **EHSC 4490/6490.** 3 hours.  
**Course Title:** **Environmental Toxicology**  
**Course Description:** Extent and significance of toxic agents in the environment, and the physical, chemical, and biological processes which determine their behavior, fate, and ultimate effect on human health.  
**Oasis Title:** ENVIRON TOXICOLOGY  
**Prerequisite:** CHEM 2211 and CHEM 2211L and (BIOL 1104 or BIOL 1108-1108L)

**Semester Course Offered:** Offered fall semester every year.

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 4610/6610. 3 hours.  
**Course Title:** Water Pollution and Human Health  
**Course Description:** Human health issues related to water consumption and use, focusing on water contamination from municipal, industrial, and agricultural practices.  
**Oasis Title:** WATER POLLUTION  
**Prerequisite:** EHSC 3060  
**Pre or Corequisite:** (CHEM 2211 and CHEM 2211L) or permission by department  
**Semester Course Offered:** Offered fall semester every year.

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 4700/6700. 3 hours.  
**Course Title:** Genetic Applications in Environmental Health Science  
**Course Description:** Exploration of environmental and public health issues through the use of genetics. Overview of basic genetics followed by the use of molecular genetic tools to provide evidence for use in the food industry, conservation biology, and pollutant remediation. Includes ethical, legal, and social implications of these technologies.  
**Oasis Title:** EHS APPL GENETICS  
**Prerequisite:** BIOL 1103 or 1107-1107L  
**Semester Course Offered:** Offered spring semester every odd-numbered year.

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 4710/6710-4710L/6710L. 3 hours. 2 hours lecture and 3 hours lab per week.  
**Course Title:** Environmental BioTechnology  
**Course Description:** The use of molecular genetic tools to solve ecological, environmental, and public health issues. Provides detailed insight for applications and use of molecular genetic tools and hands-on experience. Intended to provide relevant training and experience for laboratory-based graduate studies and careers.  
**Oasis Title:** ENVI BIOTECH  
**Undergraduate Prerequisite:** (BIOL 1103 or BIOL 1107-1107L) and (BIOL 1104 or BIOL 1108-1108L) and [(CHEM 1110 and CHEM 1110L) or (CHEM 1211 and CHEM 1211L) or (CHEM 1311 and CHEM 1311L)] and (GENE (BIOL) 3200 or EHSC 4700/6700)



**Graduate Prerequisite:** One-year undergraduate biology, introductory chemistry lab, and a course in genetics  
**Semester Course Offered:** Offered fall semester every year.

**Grading System:** A – F (traditional)

**Course ID:** EHSC 6010. 1 hour.  
**Course Title:** Proseminar in Environmental Health  
**Course Description:** Research methods with an emphasis on presentation and instructional techniques.  
**Oasis Title:** PROSEMINAR IN EH  
**Prerequisite:** Permission of department  
**Semester Course Offered:** Offered spring semester every year.  
**Grading System:** A-F (Traditional)

**Course ID:** PHRM(VPHY)(EHSC) 6910. 3 hours.  
**Course Title:** Introductory Toxicology  
**Course Description:** Basic toxicology principles, including dose-response relationships, principles of toxicity and safety evaluation, pharmacokinetics and metabolism of chemicals, basic mechanisms of cellular injury, factors influencing toxicity, carcinogenesis/mutagenesis, governmental regulations, and exposure and risk assessment.  
**Oasis Title:** INTRODUCTORY TOX  
**Semester Course Offered:** Offered fall semester every year.  
**Grading System:** A-F (Traditional)

**Course ID:** EHSC 7010. 3 hours.  
**Course Title:** Fundamentals of Environmental Health Science  
**Course Description:** Fundamentals of environmental health science, including health problems related to contamination of air, water, food, the workplace, and other environments. Environmental control agencies, policies and regulations, and pollution prevention and control strategies are discussed.  
**Oasis Title:** FUND ENV HLTH SCI  
**Duplicate Credit:** Not open to students with credit in EHSC 7060  
**Semester Course Offered:** Offered fall and spring semester every year.  
**Grading System:** A-F (Traditional)

**Course ID:** EPID(EHSC) 8070. 3 hours.  
**Course Title:** Environmental and Occupational Epidemiology  
**Course Description:** Advanced concepts in epidemiology with a focus on environmental and occupational epidemiology. Areas of emphasis will include exposure assessment, observational and experimental study designs, data interpretation, major environmental exposure groups (e.g., air, water, pesticides, metals, noise, others), case studies, and real-world practical applications.  
**Oasis Title:** ENV OCC EPI  
**Prerequisite:** EHSC 4070/6070 or permission of department  
**Semester Course Offered:** Offered spring semester every year.

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 8100. 1-3 hours. Repeatable for maximum 6 hours credit.  
**Course Title:** Current Topics in Environmental Health Science  
**Course Description:** Public health, industrial hygiene, environmental protection, hazardous waste management, and environmental/occupational toxicology.  
**Oasis Title:** TOPICS ENVIRON HLTH  
**Semester Course Offered:** Not offered on a regular basis.

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 8110. 3 hours.  
**Course Title:** Fundamentals of Chemical and Microbial Risk Assessment  
**Course Description:** Examination of fundamental elements of risk assessment, chemicals, and microorganism assessments, and assessment use by federal agencies. Risk assessments conducted and used by international groups will be compared and evaluated. Includes a combination of lecture, case studies, critical discussions of primary literature, and a group risk assessment project.  
**Oasis Title:** FUND RISK ASSESS  
**Duplicate Credit:** Not open to students with credit in EHSC 7510 or EHSC 8510-8510L  
**Semester Course Offered:** Offered spring semester every year.

**Grading System:** A-F (Traditional)

**Course ID:** EHSC(AAEC) 8120. 2 hours.  
**Course Title:** Roles and Responsibilities of Environmental Policy Makers  
**Course Description:** Roles of science, engineering, law, journalism, economics, grass roots activism, and the legislative and regulatory process in the development of environmental policy.

**Oasis Title:** ENVIRON POLICY  
**Prerequisite:** Permission of department  
**Semester Course Offered:** Not offered on a regular basis.

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 8150. 1 hour. Repeatable for maximum 2 hours credit.  
**Course Title:** Environmental Health Seminar  
**Course Description:** Selected topics in environmental health.  
**Oasis Title:** ENVIR HLTH SEMINAR  
**Prerequisite:** Permission of department  
**Semester Course Offered:** Offered fall, spring and summer semester every year.

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 8210. 3 hours.  
**Course Title:** Cancer Etiology and Prevention  
**Course Description:** Cancer is the leading cause of mortality in the world and fully understanding cancer's etiology is essential for public health professionals. This course covers etiological risk factors and preventive strategies of major human cancers, and will explore environmental causes, carcinogenesis, and prevention of human cancers.  
**Oasis Title:** CANCER ETIOL PREV  
**Prerequisite:** EHSC 7060 or EPID 7010 or PHRM(VPHY) 6910 or permission of department  
**Semester Course Offered:** Offered fall semester every year.

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 8220-8220L. 4 hours. 3 hours lecture and 2 hours lab per week.  
**Course Title:** Predictive Toxicology Using Mathematical Models

**Course Description:** This modeling course is designed for life science graduate students with an interest in quantitative toxicology. Biologically based models founded on fundamentals of chemistry, biochemistry and physiology such as physiologically based pharmacokinetic/pharmacodynamic (PBPK/PD) models are discussed in mammalian species. PBPK models are dosimetry models that describe the uptake, distribution, metabolism, and elimination of chemicals in the body and when combined with toxic responses, predict toxicity.

**Oasis Title:** PBPK MODELS

**Prerequisite:** Permission of department

**Semester Course Offered:** Not offered on a regular basis.

**Grading System:** A-F (Traditional)

**Course ID:** EHSC(EPID) 8250. 3 hours.

**Course Title:** **Biomarkers: Public Health, Clinical, and Environmental Toxicology Applications**

**Course Description:** Biomarkers in clinical practice, and in public and environmental health. Biomarkers of disease, exposure to chemicals or pathogens, and adverse insults on humans play an important role in Environmental Health Science, Epidemiology, and Toxicology.

**Oasis Title:** BIOMARKERS

**Prerequisite:** EPID 7010 or EHSC 7060 or EHSC 4490/6490

**Semester Course Offered:** Offered spring semester every year.

**Grading Sys:** A-F (Traditional)

**Course ID:** EHSC 8310. 3 hours. Repeatable for maximum 9 hours credit.

**Course Title:** **Advanced Topics in Aquatic Microbiology, Health, and the Environment**

**Course Description:** Special topics related to public health, water quality, and environmental microbiology will be covered by a combination of lecture, student-driven seminars, and critical discussions of primary literature. Topics will vary by semester and may include oceans and human health, methods in environmental microbiology, and wastewater microbiology.

**Oasis Title:** AQUATIC MICRO HEALT

**Prerequisite:** Permission of department

**Semester Course Offered:** Offered fall semester every odd-numbered year.

**Grading Sys:** A-F (Traditional)

**Course ID:** FISH(EHSC)(ECOL)(ENTO)(VPHY)(PHRM) 8350. 3 hours.

**Course Title:** **Fundamentals of Ecotoxicology**

**Course Description:** An introduction to the toxic effects of contaminants on non- human organisms, types of contaminants impacting ecosystems, fate and transport of contaminants in the environment, effects of contaminants at various levels

of biological organization ranging from biochemical reactions in the cell to ecosystem function, and ecological risk assessment.

**Oasis Title:** FUND ECOTOX

**Duplicate Credit:** Not open to students with credit in FISH(EHSC)(ECOL)(ENTO)(VPHY)(PHRM) 8350 or ENTO(EHSC)4060/6060

**Prerequisite:** BIOL 1108-1108L and CHEM 2211

**Semester Course Offered:** Offered spring semester every even-numbered year.

**Grading Sys.:** A-F (Traditional)

**Course ID:** **EHSC 8400.** 3 hours.

**Course Title:** **Occupational and Environmental Diseases**

**Course Description:** Provides an understanding of the current state of occupational and environmental diseases in the United States for occupational health and safety practitioners, toxicologists, and other public health students. A basic understanding of toxicology, human physiology, and anatomy is recommended for the course.

**Oasis Title:** OCC & ENV DISEASES

**Duplicate Credit:** Not open to students with credit in EHSC 7400

**Prerequisite:** EHSC 4490/6490 or PHRM(VPHY) 6910 or permission of department

**Semester Course Offered:** Offered spring semester every year.

**Offered:**

**Grading Sys.:** A-F (Traditional)

**Course ID:** **EHSC(MARS) 8410.** 3 hours.

**Course Title:** **Oceans and Human Health**

**Course Description:** Oceans and the marine environment are increasingly recognized for their role in the health of the human population, both as a source of disease and source of new bioactive (medicinal) agents. Exploration of this emerging field with a combination of lecture, student-driven seminars, and critical discussions of primary literature.

**Oasis Title:** OCEAN HUMAN HEALTH

**Prerequisite:** MARS(MIBO) 4620/6620-4620L/6620L or EHSC(FDST)(MIBO) 4310/6310-4310L/6310L or MARS 8010 or permission of department

**Semester Course Offered:** Offered fall semester every even-numbered year.

**Offered:**

**Grading System:** A-F (Traditional)

**Course ID:** **EHSC 8450.** 3 hours.

**Course Title:** **Genome Technologies**

**Course Description:** The development and use of new high throughput molecular genetic tools. Provides detailed insight for applications, acquisition of instrumentation, and use of genomic assays. Intended to provide relevant training for students that will establish laboratories and make use of genomic information.

**Oasis Title:** GEN TECH

**Prerequisite:** [(BIOL 1103 and BIOL 1103L) or (BIOL 1104 and BIOL 1104L) or BIOL 1107-1107L or BIOL 1108-1108L)] and [GENE(BIOL) 3200 or EHSC 4700/6700] or permission of department

**Semester Course Offered:** Offered spring semester every odd-numbered year.

**Offered:**

**Grading System:** A-F (Traditional)

**Course ID:** **EHSC 8510-8510L.** 3 hours. 2 hours lecture and 2 hours lab per week.

**Course Title:** **Environmental Risk Assessment and Communication**

**Course Description:** Assessment of risks related to environmental exposures; government agency definition and conduct of risk assessments; public communication of environmental exposure risks.

**Oasis Title:** ENV RISK ASST/COM

**Prerequisite:** EHSC 4490/6490 or PHRM(VPHY) 6910 or PHRM(VPHY)(POUL)(EHSC) 8930 or permission of department

**Semester Course Offered:** Not offered on a regular basis.

**Offered:**

**Grading System:** A-F (Traditional)

**Course ID:** **EHSC(EPID) 8540-8540L.** 3 hours. 2 hours lecture and 2 hours lab per week.

**Course Title:** **Microbial Quantitative Risk Assessment**

**Course Description:** Presentation of the framework for stochastic microbial quantitative risk assessment (QRA) to evaluate threats to human or animal health resulting from exposure to contaminated food, water, or air. The use of simulation software in QRA modeling will be introduced. Food and Drug Administration QRA's will be covered as examples.

**Oasis Title:** MICRO RISK ASST

**Pre or Corequisite:** Any one of the following: BIOS 2010-2010L or BIOS 7010 or MATH 2500 or STAT 2000 or STAT 2100H or STAT 6210 or STAT 6310 or STAT 6810 or permission of

department

**Semester Course Offered:** Not offered on a regular basis.

**Grading Sys.:** A-F (Traditional)

**Course ID:** EHSC 8550. 3 hours.

**Course Title:** Developmental and Reproductive Toxicology

**Course Description:** Topics will include developmental and reproductive processes; how chemical, biological, or physical agents disrupt normal processes; experimental approaches to evaluating suspected teratogens; and mechanisms for how exposure to agents results in reproductive or developmental abnormalities. Class will include a combination of lecture, case studies, and critical discussions of primary literature.

**Oasis Title:** DEVELOP REPROD TOX

**Prerequisite:** PHRM(VPHY) 6910 or EHSC 4490/6490 or permission of department

**Semester Course Offered:** Offered spring semester every year.

**Grading Sys.:** A-F (Traditional)

**Course ID:** EHSC(ECOL)(FISH)(WASR) 8610. 3 hours.

**Course Title:** Aquatic Toxicology

**Course Description:** Toxicological effects of aquatic pollution focusing on fate and transport of xenobiotics; xenobiotic accumulation, dynamics, and toxicity in aquatic organisms; the analysis and modeling of the effects of aquatic pollution on organisms; and the determination of related risks to aquatic ecosystems and human populations.

**Oasis Title:** AQUATIC TOXICOLOGY

**Prerequisite:** CHEM 2211 and CHEM 2211L and [EHSC 4490/6490 or PHRM(VPHY) 6910 or PHRM(VPHY)(POUL)(EHSC) 8920]

**Semester Course Offered:** Offered spring semester every even-numbered year.

**Offered:**

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 8630-8630L. 4 hours. 3 hours lecture and 2 hours lab per week.

**Course Title:** Quantitative Ecological Toxicology

**Course Description:** Principles and quantitative methods for the analysis of ecotoxicological data.

**Oasis Title:** QUANT ECOTOXICOLOGY

**Prerequisite:** ECOL(BIOL) 3500-3500L and (STAT 4220 or STAT 6220)

**Semester Course Offered:** Offered maymester every odd-numbered year.

**Offered:**

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 8710. 3 hours.  
**Course Title:** Issues in Biosafety and Biosecurity  
**Course Description:** Legal and technical aspects of biosafety and biosecurity as applied to emerging infections, bioterrorism, bioengineering, and laboratory or environmental situations involving humans, plants, or animals. Specific prevention strategies and techniques for containment, decontamination, and disposal, designed to prevent or minimize occupational or environmental risk, will be presented.  
**Oasis Title:** ISSUES IN BIOSAFETY  
**Duplicate Credit:** Not open to students with credit in EHSC 7070  
**Semester Course Offered:** Not offered on a regular basis.

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 8800. 1-3 hours. Repeatable for maximum 6 hours credit.  
**Course Title:** Special Problems in Environmental Health Science  
**Course Description:** Research or intensive study in a specialized area of environmental health under the direction of a faculty member.  
**Oasis Title:** SPECIAL PROBLEMS  
**Nontraditional Format:** Research in an area of interest under the direction of a faculty member.  
**Prerequisite:** Permission of department  
**Semester Course Offered:** Offered fall, spring and summer semester every year.  
**Offered:**  
**Grading System:** A-F (Traditional)

**Course ID:** PHRM(VPHY)(POUL)(EHSC) 8930. 3 hours.  
**Course Title:** Chemical Toxicology  
**Course Description:** Chemical contamination of air, water, and food by major agricultural and industrial chemicals. Emphasis will be placed on sources of contamination, fate of chemicals in the environment, target species, health effects, chemical analyses, and contamination control.  
**Oasis Title:** CHEMICAL TOXICOLOGY  
**Prerequisite:** PHRM(VPHY) 6910 or permission of department  
**Semester Course Offered:** Offered spring semester every year.  
**Offered:**

**Grading System:** A-F (Traditional)

**Course ID:** EHSC 9000. 1-12 hours. Repeatable for maximum 45 hours credit.  
**Course Title:** Doctoral Research



**Course** Research while enrolled for a doctoral degree under the direction of faculty members.  
**Description:**  
**Oasis Title:** DOCTORAL RESEARCH  
**Nontraditional** Independent research under the direction of faculty members.  
**Format:**  
**Prerequisite:** Permission of department  
**Semester Course** Offered fall, spring and summer semester every year.  
**Offered:**  
**Grading System:** S/U (Satisfactory/Unsatisfactory)

**Course ID:** EHSC 9005. 3 hours. Repeatable for maximum 45 hours credit.  
**Course Title:** Doctoral Graduate Student Seminar  
**Course** Advanced supervised experience in an applied setting. This course may not be used to satisfy a student's approved program of study.  
**Description:**  
**Oasis Title:** DOC GRAD STU SEM  
**Nontraditional** Seminar.  
**Format:**  
**Semester Course** Offered fall, spring and summer semester every year.  
**Offered:**  
**Grading System:** S/U (Satisfactory/Unsatisfactory)

**Course ID:** EHSC 9300. 1-12 hours. Repeatable for maximum 12 hours credit.  
**Course Title:** Doctoral Dissertation  
**Course** Dissertation writing under the direction of a major professor.  
**Description:**  
**Oasis Title:** DOCT DISSERTATION  
**Nontraditional** Independent research and preparation of the doctoral dissertation.  
**Format:**  
**Prerequisite:** Permission of department  
**Semester Course** Offered fall, spring and summer semester every year.  
**Offered:**  
**Grading System:** S/U (Satisfactory/Unsatisfactory)

## **Appendix 2. Biographical sketches for all faculty members in the Dept. of Environmental Health Science (including core faculty, research associates and adjunct faculty)**

### *Core Faculty*

Marsha C. Black, Associate Professor and Assistant Dean

Travis C. Glenn, Associate Professor

Erin K. Lipp, Associate Professor

Luke P. Naeher, Associate Professor

Mary Alice Smith, Associate Professor

Jia-Sheng Wang, Professor and Dept. Head

Phillip Williams, Professor and Dean

Anne Marie Zimeri, Instructor

### *Adjunct Faculty and Research Associates*

Dana Cole, Adjunct Assistant Professor

William Cosgrove, Adjunct Instructor

Brian G. Forrester, Adjunct Associate Professor

Ken Jones, Research Associate

Dr. Ron Riley, Adjunct Professor

Ted Simon, Adjunct Professor

Lili Tang, Research Associate

## Core Faculty

## BIOGRAPHICAL SKETCH

Marsha C. Black, PhD

### Professional Preparation:

PhD	Ecology	University of Tennessee	1989
BA	Comprehensive Science	Converse College	1975

### Academic and Research Experience:

- 8/08 – present Interim Assistant Dean for Academic Affairs, College of Public Health; Associate Professor, Graduate Coordinator (7/08-6/09), Department of Environmental Health Science, The University of Georgia, Athens, GA
- 7/06 – 8/08 Interim Department Head, Department of Environmental Health Science, College of Public Health, The University of Georgia, Athens, GA
- 7/00 – 7/06 Associate Professor and Undergraduate Coordinator (7/01-6/08), Department of Environmental Health Science, The University of Georgia, Athens, GA
- 1/95 - 6/00 Assistant Professor, Department of Environmental Health Science, The University of Georgia, Athens, GA
- 8/90 - 12/94 Assistant Professor, Department of Zoology, Oklahoma State University, Stillwater, OK
- 5/89 - 7/90 Postdoctoral Research Associate, Department of Biology, University of Joensuu, Joensuu, Finland

### Peer-reviewed Publications (10 of 38 total)

1. Belin, JI, TA McCaskey, and MC Black. 2000. Evaluating the efficiency of toxicity abatement in a constructed wetland with *Ceriodaphnia dubia*. *Journal of Toxicology and Environmental Health Part A*, 60:101-115.
2. Conners, DE and MC Black. 2004. Evaluation of lethality and genotoxicity in the freshwater mussel *Utterbackia imbecillis* (Bivalvia: Unionidae) exposed singly and in combination to chemicals used in lawn care. *Archives of Environmental Contamination and Toxicology* 46:362-371.
3. Henry, TB, J-W Kwon, KL Armbrust, and MC Black. 2004. Acute and chronic toxicity of five selective serotonin reuptake inhibitors in *Ceriodaphnia dubia*. *Environmental Toxicology and Chemistry* 23:2229-2233.
4. Konwick, BJ, AT Fisk, AW Garrison, JK Avants and MC Black. 2005. Acute enantioselective toxicity of fipronil and its desulfinyl photoproduct to *Ceriodaphnia dubia*. *Environmental Toxicology and Chemistry* 24:2350-2355.
5. Overmyer JP, DR Rouse, AW Garrison, JK Avants, ME DeLorenzo, KW Chung, PB Key, WA Wilson, MC Black. 2007. Toxicity of fipronil and its enantiomers to marine and freshwater non-targets. *Journal of Environmental Science and Health Part B* 42:471-480.
6. Henry, TB and MC Black. 2007. Mixture and single-substance acute toxicity of selective serotonin reuptake inhibitors in *Ceriodaphnia dubia*. *Environmental Toxicology and Chemistry* 26:1751-1755.
7. Wilson, WA, BJ Konwick, AW Garrison, JK Avants, MC Black. 2008. Enantioselective chronic toxicity of fipronil to *Ceriodaphnia dubia*. *Archives of Environmental Contamination and Toxicology* 54:36-43.

8. Henry, TB and MC Black. 2008. Acute and chronic toxicity of fluoxetine (SSRI) in western mosquitofish. *Archives of Environmental Contamination and Toxicology* 54:325-330.
9. Shoults-Wilson, W.A., Peterson, J.T., Unrine, J.M., Rickard, J., Black, M.C. 2009. The Asian clam *Corbicula fluminea* as a biomonitor of trace element contamination: Accounting for natural sources of variation using a hierarchical model. *Environmental Toxicology and Chemistry* 28:2224-2232.
10. Conners, DE, ER Rogers, KA Armbrust, J-W Kwon and MC Black. 2009. Growth and development of tadpoles (*Xenopus laevis*) exposed to selective serotonin reuptake inhibitors, fluoxetine and sertraline, throughout metamorphosis. *Environmental Toxicology and Chemistry* 28:2671-2676.

**Books and Book Chapters (1 of 4 total)**

1. Ankley, GT, MC Black, J Garric, TH Hutchinson and T Iguchi. 2005. A framework for assessing the hazard of pharmaceutical materials to aquatic species, pp. 183-237 in R. Williams (ed), *Human Pharmaceuticals: Assessing the Impact on Aquatic Ecosystems*. SETAC Press, Pensacola, FL

**Membership and Service to Professional Societies**

SETAC-- Society of Environmental Toxicology and Chemistry (member since 1984)  
 SETAC North America Board of Directors 2000-2003  
 Editorial Board: *Environmental Toxicology and Chemistry* (1999-2002)

**Collaborators & Other Affiliations (since 2005)**

Name	Co-Author	Collaborator	Advisees =1 Advisors=2	Other – Specify Nature
Armbrust, Kevin	x	x		
Avants, Jimmy K.	x	x		
Baird, Suzanne	x		1	
Brew, David		x		
Buzbee, Miles			1	
Cabrera, Miguel	x	x		Co-author on poster
Chung, KW	x	x		
Conners, Deanna E.	x	x	1	
DeLorenzo, Marie	x	x		
Fisk , Aaaon	x	x		
Garrison, A. Wayne	x	x		
Gay, Paige		x		
Henry, Theodore B.	x	x		
Huang, Qingguo		x		
Iwanowicz, Deborah Cartwright		x	1	
Jennings, Cecil A.	x	x		

Key, Pete	x	x		
Konwick, Brad J	x	x	1	
Kwon, Jeong -Wook	x	x		
McCarthy, John F.			2	
Oikari, Aimo			2	
Overmyer JP	x	x		
Pan, Zhengwei		x		
Pennisi, Svoboda		x		
Petersen, Elijah		x		
Peterson, Douglas L.	x	x		
Peterson, JamesT	x	x		
Rickard, James	x			
Roberts, Emily			1	
Robinette, Maryanne		x		
Rogers, Emily D.	x	x	1	
Rouse, DR	x	x		
Sanglikar, Aarti			1	
Shoults-Wilson, W. Aaron	x	x	1	Wilson, W. Aaron is the same person
Strange, Richard			2	
Taylor, Milton		x		
Unrine, Jason M.	x	x		
White, Sarah		x		
Zhou, Yiping		x		
Ziegeweid, Jeffery R.	x	x	1	
Zimeri, Anne Marie		x		

## BIOGRAPHICAL SKETCH

Travis C. Glenn

### a. Professional Preparation

Iowa State University, Ames, IA.	Animal Ecology	BS	1989
University of Michigan, Ann Arbor, MI	Natural Resources	MS	1990
University of Maryland, College Park, MD	Zoology	Ph.D	1997
University of South Carolina, Columbia, SC	Biology	Postdoc	1997-1998

### b. Appointments

2007- present	Associate Professor, Department of Environmental Health Science, UGA
2007- present	Georgia Genomics Facility, Faculty Director, UGA
2004-2007	Associate Research Scientist, Savannah River Ecology Lab, UGA
2002-2007	Assoc. Director, Institute of Biol. Research and Training, Univ. of South Carolina
1998-2007	Adjunct Assistant/Associate Professor, Dept. Biol. Sci., Univ. of South Carolina
1998-2004	Assistant Research Scientist, Savannah River Ecology Lab, UGA
1997-1998	Post-doctoral Researcher, Dept. of Biology, University of South Carolina
1992-1996	Pre-doctoral Research Fellow, Smithsonian Institution, Washington, DC

### c. Publications (10 of 104 total: *postdoc*, *graduate* or *undergraduate student* authors)

Weber, J. N., M. B. Peters, *O.V. Tsyusko*, C. R. Linnen, C. Hagen, N. A. Schable, T. D. Tuberville, A. M. McKee, *S. L. Lance*, *K. L. Jones*, H. S. Fisher, M. J. Dewey, H. E. Hoekstra, and T. C. Glenn. 2010. Five hundred microsatellite loci for *Peromyscus*. *Conservation Genetics* 11:1243-1246.

Croshaw, D. A., *M. B. Peters*, and T. C. Glenn. 2009. Comparing the performance of analytical techniques for genetic parentage of half-sib progeny arrays. *Genetics Research* 91: 313-325.

Dalzell, P., L. G. Miles, S. R. Isberg, T. C. Glenn, C. King, V. Murtagh, and C. Moran. 2009. Standardized reference ideogram for physical mapping in the saltwater crocodile (*Crocodylus porosus*). *Cytogenetic and Genome Research* 127:204-212.

Duffie, C. V., T. C. Glenn, F. H. Vargas, and P. Parker. 2009. Genetic structure among breeding colonies of the Galápagos endemic flightless cormorant (*Phalacrocorax harrisi*). *Molecular Ecology* 18: 2103-2111. **Cover Photo.**

*Lance, S. L.*, T. D. Tuberville, L. Dueck, C. Holz-Schietinger, P. L. Trosclair III, R. M. Elsey, and T. C. Glenn. 2009. Multi-year multiple paternity and mate fidelity in the American alligator, *Alligator mississippiensis*. *Molecular Ecology* 18: 4508-4520. **Cover Photo.**

Ma, H., P. M. Bertsch, T. C. Glenn, *N. J. Kabengi*, and P. L. Williams. 2009. Bioavailability and toxicity of manufactured zinc oxide nanoparticles in the nematode *Caenorhabditis elegans*. *Environmental Toxicology and Chemistry* 28(6):1324-1330.

Ma, H., T. C. Glenn, C. H. Jagoe, *K. L. Jones*, and P. L. Williams. 2009. A transgenic strain of the nematode *Caenorhabditis elegans* as a biomonitor for heavy metal contamination. *Environmental Toxicology and Chemistry* 28(6):1311-1318.

Miles, L. G., S. R. Isberg, T. C. Glenn, *S. L. Lance*, P. Dazell, P. C. Thomson, and C. Moran. 2009. A genetic linkage map for the saltwater crocodile (*Crocodylus porosus*). *BMC Genomics* 10:339.

- Glenn, J. L. W., C.-F. Chen, A. Lewandowski, C.-H. Cheng, C. M. Ramsdell, R. Bullard-Dillard, J. Chen, M. J. Dewey, and T. C. Glenn. 2008. Expressed Sequence Tags from *Peromyscus testis* and placenta tissue: analysis, annotation, and utility for mapping. *BMC Genomics* 9:300.
- Winn, R. N., A. J. Majeske, C. H. Jagoe, M. B. Norris, M. H. Smith, and T. C. Glenn. 2008. Transgenic  $\lambda$  medaka: a new model for germ cell mutagenesis. *Environmental and Molecular Mutagenesis* 49(3): 173-184.

#### d. Synergistic Activities

Wrote the first step by step protocol for development of microsatellite loci targeted to workers in ecology and evolution, and made it available by ftp (pre-dated web sites). The updates to these protocols continue to be used around the world. These protocols have been used in workshops in multiple countries, as well as my own classes. In the fall 2009 class we isolated microsatellites for students from 6 different departments at UGA, with model organisms including plants, animals, and fungi.

Co-founded the Reptilian Genomics Working Group, which successfully proposed and sequenced *Anolis carolinensis* – the first non-avian reptile to have its entire genome sequenced. The genome manuscript is in prep for submission to Nature in 2010. The painted turtle is also now being sequenced at the Wash U. Genome Sequencing Center. American alligators and saltwater crocodiles are being sequenced by a coalition of researchers.

Established and maintained collaborative multi-user DNA research laboratories at UGA, the Savannah River Ecology Laboratory and the University of South Carolina.

Made the SREL DNA lab available to investigators regionally, nationally, & internationally, emphasizing minority-serving institutions; hosting students, post-docs, and faculty from around the US & world.

Co-Organized the 2<sup>nd</sup> and 3<sup>rd</sup> International Crocodylian Genetics and Genomics Workshops at the San Diego Zoo in 2001 and at the Smithsonian Tropical Research Institute (Panama) in 2007, as well as an international workshop – “Exploring Potential Collaborative Research in Human Health and Ecotoxicology Risks Using Medaka as a Model Organism” at the University of Georgia in 2004.

#### e. Collaborators and Other Affiliations

i. **Collaborators over the last 48 months** (and their current affiliations); excludes dozens of co-authors of primer notes and collaborators on the reptilian genomics projects:

K. Beard (UT State), P. Bertsch (U. KY), R. Brumfield (LSU), J. Carroll (UGA), M. Chuong (Southern CA), L. Densmore (TX Tech.), R. Elsey (LA Wildl. & Fish.), B. Faircloth (UCLA), M. Felder (U. SC), K. Franel (Radford), G. Graves (Smithsonian), J. Hamrick (UGA), C. Hill (Coastal Carolina), H. Hoekstra (Harvard), S. Isberg (Porosus Pty. Ltd., Australia), C. Jagoe (FL A&M), S. Lance (UGA), D. Main (WA State), J McArthur (UGA), K. Mock (UT State), C. Moran (U. Sydney, Australia), T. Mousseau (U. SC), C. J. Nairn (UGA), W. Palmer (Tall Timbers), P. Parker (U. MO, St. Louis), C. Peterson (UGA), C. Pruett (FIT), D. Ray (Miss. State), T. Reeder (San Diego State), A. Sakai (U.C. Irvine), R. Sawyer (U. SC), C. Schneider (Boston U.), N. Schizas (U. Puerto Rico), G Szalai (U. SC), O. Tsyusko (U. KY), D. Trapnell (UGA), T. Tuberville (UGA), R. C. Tuckfield



(Savannah River Nat. Lab.), J. Wade (MI State), P. Williams (UGA), S. Weller (U.C. Irvine), K. Winker (U. AK, Fairbanks), R. Winn (UGA), P. Wu (Southern CA), J. Zimbrick (CO State).

**ii. Graduate and Postdoctoral Advisors (and their current affiliations):**

Post-doctoral: Roger Sawyer (U. SC); PhD: Wolfgang Stephan (U. Munich) & Michael Braun (Smithsonian); MS: Bobbi Low (U. Michigan)

**iii. Thesis Advisor and Postgraduate-Scholar Sponsor (and their current affiliations):**

Thesis Advisor or Co-advisor: Ellen Breazel (PhD, Clemson U.), Lisa Davis (MS, PhD, Applied Biosystems); Jeffrey French (MS, U. SC), Susanne Hauswaldt (PhD, U. Pottsdam), Susan Humphries (MS, environmental consultant, CO), Lee Miles (PhD, Sigma, Australia), William Curt Ouzts (MS, Midlands Tech. College), Brad Temple (MS, UGA DVM program), John Finger (PhD, current – Toxicology) Anna McKee (PhD, current – Forestry & Natural Resources), and Arlena Wartell (PhD, current - Ecology).

Graduate Student Sponsor [ $\geq 1$  year in my lab, (i.e., informal co-advisor)]: Chris Comer (PhD, Stephen F. Austin State U.), Dean Croshaw (PhD, U. AZ), Bobby Fokidis (MS, U. AZ), Taras Oleksyk (PhD, U. Puerto Rico ), Hongbo Ma (PhD, UGA), N. Schable (MS, E. IL), 11 additional visiting students (generally  $\leq 3$  months) – none likely to review this proposal.

Postdoctoral Sponsor/Co-Sponsor: Julie Weston (U. SC), Ramunas Stepanauskus (Bigelow Lab of Ocean Sciences), Olga Tsyusko (U. KY), Ken Jones (UGA), Stacey Lance (UGA)

**Total**: 7 MS, 10 PhD, 5 Post-doctoral; **Last Five Years**: 2 MS, 7 PhD, 4 Post-doctoral

## BIOGRAPHICAL SKETCH      Erin K. Lipp

### (a)              Professional Preparation

<u>Institution</u>	<u>Major(s)</u>	<u>Degree</u>	<u>Year</u>
New College of Florida	Biology	B.A.	1994
University of South Florida	Marine Science	Ph.D.	1999
U MD Inst. of Biotechnology (Center of Marine Biotech)		Post-doc	2000 - 2002

### (b)              Appointments

- 2007 – present:    Assoc. Professor, Environmental Health Science, University of Georgia, Athens
- 2002 – 2007:      Asst. Professor, Environmental Health Science, University of Georgia, Athens
- 2000-2002:        Postdoctoral Fellow, Center of Marine Biotechnology, University of Maryland Biotechnology Institute
- 1999-2000:        Postdoctoral Fellow, Marine Science, University of South Florida

### (c)      Publications (10 selected)

- Futch, J.C., D.W. Griffin and E.K. Lipp. 2010. Human enteric viruses in groundwater indicate offshore transport of human sewage to coral reefs of the Upper Florida Keys. *Environmental Microbiology*
- Turner, J.W., B. Good, D. Cole and E.K. Lipp. 2009. Environmental factors affect the status of plankton as a reservoir for *Vibrio* species. *The ISME (International Society for Microbial Ecology) Journal* 3: 1082 – 1092. DOI:10.1038/ismej.2009.50
- Gentry, J.B., J. Vinjé, D. Guadagnoli and E.K. Lipp. 2009. Norovirus distribution within an estuarine environment. *Applied and Environmental Microbiology* 75 (17): 5474 - 5480. DOI:10.1128/AEM.00111-09
- Lipp, E.K., Futch, J.C. and D.W. Griffin. 2007. Analysis of multiple enteric viral targets as sewage markers in coral reefs. *Marine Pollution Bulletin* 54: 1897-1902.
- Haley, B.J., D. Cole and E.K. Lipp. 2009. Distribution, Diversity and Seasonality of Waterborne Salmonellae in a Rural Watershed. *Applied and Environmental Microbiology* 75(5) 1248 - 1255.
- Porter, J.W., E.K. Lipp, K.P. Sutherland, and E. Mueller. 2006. The ecology of an infectious disease in the Florida Keys: From pathogen to politics." *In The Ecology of Infectious Disease*. R.S. Ostfeld and V. Eviner, eds. Princeton University Press; Princeton, NJ. *In Press*.
- Fong, T.T. and E. K. Lipp. 2005. Enteric viruses of humans and animals in aquatic environments: health risks, detection and potential water quality assessment tools. *Microbiology and Molecular Biology Reviews* 69 (2): 357-371.

- Lipp, E.K., J.L. Jarrell, D.W. Griffin, J. Jacukiewicz, J. Lukasik and J.B. Rose<sup>†</sup>. 2002. Preliminary evidence for human fecal contamination in corals of the Florida Keys, U.S.A. *Marine Pollution Bulletin* 44: 666-670.
- Lipp, E.K., A. Huq and R.R. Colwell. 2002. Effects of global climate on infectious disease: the cholera model. *Clinical Microbiology Reviews*. 15: 757 -770.
- Harvell, C.D., K. Kim, J.M. Burkholder, R.R. Colwell, P.R. Epstein, J. Grimes, E.E. Hofman, E.K. Lipp, A.D.M.E. Osterhaus, R. Overstreet, J.W. Porter, G.W. Smith and G. Vasta. 1999. Diseases in the ocean: Emerging pathogens, climate links, and anthropogenic factors. *Science* 285: 1505 - 1510.

**(d) Synergistic Activities**

1. Lead PI for NOAA Oceans and Human Health Ph.D. Training Grant: *Georgia Oceans and Health Initiative*
2. Invited participant, author and discussion leader for federal agency workshops and assessment products related to the effects of climate change on waterborne disease, including the UESPA (2008 Modeling Workshop and SAP 4.6), CDC (Drinking water and climate change workshop), WHO (training module for southeast Asia members) and NOAA (the “ENSO Experiment”)
3. Expert witness. U.S. House of Representatives, Congressional subcommittee on Water Resources and the Environment. Testified in hearing on HR 2452 *Raw Sewage Overflow Right to Know Act* (amendment to the Clean Water Act) [2007]
4. *Member*. U.S. Coral Reef Task Force/Southeast Florida Coral Reef Initiative. Technical Advisory Committee (Land Based Sources of Pollution and Water Quality Focus Area).

**(v) Collaborators & Other Affiliations**

**(i) Collaborators and Co-Editors (since 2005)**

D. Cole (CDC)	R.R. Lowrance (USDA)
K. Ebi (IPCC)	M. McLaughlin (U. S. Geological Survey)
E. Espeland (UMBI)	J. Porter (University of Georgia)
P. Gay (UGA)	J. Rose (Michigan State Univ)
B. Good (GA DNR)	N. Schmidt (University of Arizona)
D. Griffin (United States Geological Survey)	K.P. Sutherland (Rollins College)
D. Guadagnoli (GA DNR)	J. Vinjé (CDC)
M. Jenkins (USDA)	P. Yager (UGA)

**(ii) Advisors**

Ph.D: Joan B. Rose (University of South Florida)  
 Post Doctoral: Rita R. Colwell (University of Maryland Biotechnology Inst.)

**(iii) Graduate Advisees (15 total)**

Crews, M.K. (M.S., current)	Joyner, J. (Ph.D., current)	Turner, J.W. (Ph.D., 2010)
Fong, T.-T. (M.S. 2004)	Looney, E.E. (M.S., 2008)	Vereen, E. (M.S., 2005; Ph.D., current)
Futch, J.C. (Ph.D., 2010)	Malayil, L. (M.S., 2009)	Westrich, J. (Ph.D., current)
Gentry, J.B. (M.S., 2008)	Martin, G. (M.S., 2009)	
Griffith, M.L. (M.S., current)	Mote, B. (M.S., 2009)	
Haley, B.J. (M.S., 2006)	Onifade, T.J. (M.S., 2005)	

## BIOGRAPHICAL SKETCH

Luke P. Naeher

### a. Professional Preparation:

Cornell University, Ithaca, NY	BS	1987-89	Biology
State University of New York, Stony Brook, NY	MS	1990-98	Marine Env. Science
Harvard University, Boston, MA	MS	1992-94	Env. Health Science
Yale University, New Haven, CT	PhD	1994-98	Epi. & Pub. Health

### b. Appointments

- 07/07-present Associate Professor (with Tenure), College of Public Health, Department of Environmental Health Science, The University of Georgia (UGA), Athens, GA
- 06/07-present Adjunct Professor, Au Sable Institute for Environmental Studies, Coupeville, WA
- 07/06-present Visiting Professor, Universidad Peruana Cayetano Heredia, Lima, Peru
- 05/00-present Adjunct Professor, Wheaton College, Wheaton, IL (Wheaton College Science Station)
- 08/07-07/08 Graduate Coordinator, College of Public Health, Department of Environmental Health Science, UGA
- 07/01-06/07 Assistant Professor, College of Public Health, Department of Environmental Health Science, UGA
- 10/01-09/05 Environmental Epidemiologist, Centers for Disease Control and Prevention, Atlanta, GA (part-time IPA)
- 09/98-06/01 Environmental Epidemiologist, Centers for Disease Control and Prevention, Atlanta, GA
- 01/95-08/98 Doctoral Research Fellow, Yale School of Medicine, New Haven, CT
- 09/93-01/96 Project Consultant, World Health Organization, Xela, Guatemala
- summer 1993 Industrial Hygiene Intern, Exxon Company U.S.A., Houston, TX
- 01/91-08/92 Pre-Doctoral Research Assistant, State University of New York at Stony Brook, Stony Brook, NY

### c. Five Most Recent Publications (out of 46)

- Simpson CD, **Naeher LP**. Biological monitoring of woodsmoke exposure. 2010. *Inhalation Toxicology*. 22(2):99-103.
- **Naeher LP**, Hilliard A, Barr D, Holmes A, Tulve NS, Fortmann RC, Kieszak SM, Bozeman E, Olsson AO, Needham LL, Rubin CS. 2010. Urinary biological monitoring for organophosphate and pyrethroid pesticide exposures in children living in Jacksonville, Florida. *Science of the Total Environment*. 408(5):1145-1153.
- Cassidy BE, Aguilar-Villalobos M, Ryan PB, **Naeher LP**. 2010. Reduced PM<sub>2.5</sub> in Trujillo, Peru on *El Dia Sin Autos* ("The Day without Cars"). *Journal of Environmental Health*. 73(1):14-18.
- Hale BD, Fairchild BD, Worley JW, Harper LA, Ritz CW, Czarick M, Rathbun S, **Naeher LP**. Comparison of ammonia measurement methods inside and outside of tunnel-ventilated broiler houses. *Journal of Applied Poultry Research*. (in press).

- Irvin EA, Calafat AM, Silva MJ, Aguilar-Villalobos M, Needham LL, Hall DB, Cassidy BE, **Naeher LP**. An estimate of phthalate exposure among pregnant women living in Trujillo, Peru. *Chemosphere*.(in press)

#### **Five Other Significant Publications**

- **Naeher LP**, Holford TR, Beckett WS, Belanger K, Triche EW, Bracken MB, Leaderer BP. 1999. Healthy women's PEF variations with ambient summer concentrations of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>4=</sub>, H<sub>+</sub>, and O<sub>3</sub>. *American Journal of Respiratory and Critical Care Medicine*. 160:117-125.
- **Naeher LP**, Smith KR, Leaderer BP, Neufeld L, Mage D. 2001. Carbon monoxide as a tracer for assessing exposures to particulate matter in wood and gas cookstove households of highland Guatemala. *Environmental Science & Technology*. 35:575-581.
- **Naeher LP**, Rubin C, Hernandez-Avila M, Noonan GP, Paschal D, Narciso J, Espinoza Lain R, Gastanaga C, Almeyda R, Jarrett J, Caldwell KL, McGeehin M. 2003. Use of isotope ratios to identify sources contributing to pediatric lead poisoning in Peru. *Archives of Environmental Health*. 58(9):579-589.
- **Naeher LP**, Brauer M, Lipsett M, Zelikoff JT, Simpson CD, Koenig JQ, Smith KR. 2007. Woodsmoke health effects: A review. *Inhalation Toxicology*. 19:67-106.
- **Naeher LP**, Barr DB, Rithmire N, Kelly J, Holmes A, Needham LL, Rubin CS. 2009. Pesticide exposure resulting from treatment of lice infestation in school-aged children in Georgia. *Environment International*. 35(2):358-362.

#### **d. Selected Synergistic Activities**

- 04/09-present Editorial Board Member, Environment International
- 05/09-present Temporary Member, Infectious, Reproductive, Asthma and Pulmonary Conditions (IRAP) Scientific Review Group
- 09/08-present Temporary Member, NIH Kidney, Nutrition, Obesity and Diabetes Epidemiology (KNOD) Scientific Review Group
- 08/07-present Member, TKC (for CDC), Post-Katrina/Formaldehyde/Mobile Home/Trailer Exposure and Health Project Expert Panel
- 01/07-present Member, Scientific Advisory Board, Turkish Armed Forces Preventive Medicine Bulletin
- 01/07-present Councilor (2007-09), International Society of Exposure Analysis
- 10/06-present Member, NIOSH, Environmental Research Center, Site Review Team
- 05/04-present Temporary Member, NIH Epidemiology of Clinical Disorders and Aging (ECDA) Study Section
- 09/01-present Member, AIHA, Occupation Epi Committee (Secretary 2004/05; Chair elect 2005/06; Chair 2006/07)
- 08/06-08/08 Contributing Author, Atmospheric Brown Clouds: Regional Assessment Report with Focus on Asia. Published by the United Nations Environment Programme, Nairobi, Kenya.
- 09/01-06/05 Member, National Children's Study, Workgroup on Exposure to Chemical Agents
- 05/00-04/03 Member, American Thoracic Society, Assembly on Env and Occupational Health, Program Committee

**Collaborators and Other Affiliations**

**e. Collaborators and other affiliations for the past five years.**

<b>Research collaborators</b>	<b>graduate/postdoc advisors</b>	<b>Graduate students and postdocs</b>
Drs. Larry Needham, Andreas Sjodin, Ben Blount, J. Tom Bernert, Antonia Califat, and Dana Barr (CDC/NCEH), Dr. Chris Simpson (UW Seattle), Dr Jim Zhang (Rutgers), Drs. John Balmes, Nina Holland, and Kirk Smith (UC Berkeley), Dr. Jaymie Meliker (SUNY Stony Brook), Drs. Steve Rathbun and Dan Hall (UGA)	Dr. Brian Leaderer, Yale University Dr. Bruce Brownawell, SUNY Stony Brook Dr. Kirk Smith (UC Berkeley)	Gideon St. Helen, Olorunfemi Adetona, Kevin Horton, Suyang Liu, Adwoa Agyepong

## BIOGRAPHICAL SKETCH Mary Alice Smith

### (a) Professional Preparation

<u>Institution</u>	<u>Major(s)</u>	<u>Degree</u>	<u>Year</u>
Auburn University	Biology Education	B.S.	1971
Emory University	Secondary School Science	M.A.T.	1976
Emory University	Developmental Biology	M.S.	1980
Univ Ark for Med Sciences	Toxicology	Ph.D.	1990
Emory University	Toxicology	Postdoc	1989-1991

### (b) Appointments

1999 – present:	Assoc. Professor, Environmental Health Science and Center for Food Safety, University of Georgia, Athens
2004-present	Co-director, Academy of the Environment, University of Georgia, Athens
2000-present	Collaborative Scientist, Yerkes National Primate Research Center, Atlanta, GA
2001-2001	Visiting Scientist, Center for Oral and Systemic Diseases, School of Dentistry, University of North Carolina, Chapel Hill, NC
1994-1999:	Asst. Professor, Environmental Health Science and Food Science and Technology, University of Georgia, Athens
1993	Assistant Professor (Temporary position), Biology Department, Emory University, Atlanta, GA.
1991-1994	Adjunct Assistant Professor, Environmental and Occupational Health Division, School of Public Health, Atlanta, GA
1991-1993	Senior Scientist, Law Environmental, Inc, Kennesaw GA.

### (c) Publications (Five most recent publications)

AR Richardson, E Pollack and **MA Smith**<sup>†</sup>. Invited chapter on “Intrauterine Infections” in Comprehensive Toxicology, 2<sup>nd</sup> Edition, Developmental Toxicology, T Knudsen and GP Daston (eds). (in press, June 2010).

Richardson, AN, LR Beuchat, S Lambert, D Williams and **MA Smith**<sup>†</sup>. Comparison of virulence of three strains of *Cronobacter sakazakii* in neonatal CD-1 mice. *Journal of Food Protection* 73(5):849-854. 2010.

Williams, D, J Castleman, C-C Lee, B Mote, and **MA Smith**<sup>†</sup>. Risk of fetal mortality after exposure to *Listeria monocytogenes* based on dose-response data from pregnant guinea pigs and primates. *Risk Analysis* 29(11):1495-1505. 2009.

Richardson, A, S Lambert and **MA Smith**<sup>†</sup>. Neonatal mice as models for *Cronobacter sakazakii* infection in infants. *Journal of Food Protection* 72(11):2363-2367. 2009.

Buchanan, RL, AH Havelaar, **MA Smith**, RC Whiting and E Julien. The Key Events Dose-Response Framework: Its potential for application to foodborne pathogenic microorganisms. *Critical Reviews in Food Science and Nutrition* 49:718-728. 2009.

### **Five Other Significant Publications:**

Irvin, EA, D Williams, SE Hamler, and **MA Smith**<sup>†</sup>. Immunological and pathological changes in the placenta during infection with *Listeria monocytogenes* in pregnant guinea pigs. *Reproductive Toxicology* 26:151-155. 2008.

**Smith, MA<sup>†</sup>**, K Takeuchi, G Anderson, GO Ware, HM McClure, RB Raybourne, N Mytle, MP Doyle. Dose response for *Listeria monocytogenes*-induced stillbirths in nonhuman primates. *Infection Immunity* 76(2):726-731. 2008.

Williams, D, EA Irvin, RA Chmielewski, JF Frank, and **MA Smith<sup>†</sup>**. Dose response of *Listeria monocytogenes* after oral exposure in pregnant guinea pigs. *Journal of Food Protection* 70(5):1122-1128. 2007.

Henderson, WM<sup>†</sup> and **MA Smith**. Perfluorooctanoic acid (PFOA) and perfluorononanoic acid (PFNA) in fetal and neonatal mice following in utero exposure to 8-2 fluorotelomer alcohol (FTOH). *Toxicological Science*. 95(2):452-61. 2007.

**Smith, MA<sup>†</sup>**, K Takeuchi, RE Brackett, HM McClure, R Raybourne, K Williams, US Babu, GO Ware, JR Broderon, and MP Doyle. A nonhuman primate model for *Listeria monocytogenes*-induced stillbirths. *Infection and Immunity* 71(3):1574-1579. 2003.

**(d) Synergistic Activities (Last 5 years)**

- Invited member, National Academies/NRC Committee to Review the Draft IRIS Assessment on Formaldehyde. 2010-2011.
- Invited workshop participant on Susceptible Populations sponsored by the Interagency Risk Assessment Consortium (FDA, USDA, EPA, CDC). January 20-21 in Greenbelt, MD. 2010.
- Secretary, Teratology Society, (2009-2012). Elected by professional society to serve a 3-year term.
- Invited presentation (2009), International Association for Food Protection – Asia, Seoul, Korea.
- Member, National Institutes of Health Study Section, National Institute of Environmental Health Sciences, Special Emphasis Panel on Systemic Injury by Environmental Exposures (SIEE) (ZRG1 DIG-C 90S) 2008-2009.
- Invited voting member, Food and Drug Administration, Advisory Committee Meeting on Antiinfective Drugs, November 18-19, 2008. College Park, MD.
- Member, National Institutes of Health Study Section, National Institute of Child Health and Human Development, National Children’s Study Centers, June 8-10, 2008. Washington, DC.
- Invited member of the International Life Science Institute Expert Panel on Global Thresholds Project 2007-2008.
- Invited member of expert panel for evaluating microbial risk assessment by the Council for Agricultural Science and Technology (CAST) Task Force.
- Invited workshop participant by the Danish Institute for Food and Veterinary Research in KolloKolle, Denmark, 2005.

**(v) Collaborators & Other Affiliations**

**(i) Collaborators and Co-Editors (since 2005)**

Research collaborators (recent 5 years)	graduate/postdoc advisors	Graduated Ph.D students
S Stice (UGA, ADS) F West (UGA, ADS) L Beuchat (UGA, CFS) M Doyle (UGA, CFS) R Buchanan (Univ MD) K Williams (FDA) R Raybourne (FDA) R Riley (USDA) K Voss (USDA)	Dr. Bill Elmer (Emory U) Dr. Ray Harbison (UAMS) Dr. S Offenbacher (Emory U and UNC, Chapel Hill)	Dr. Amita Kanti Dr. Jerry Campbell Dr. Lonnie Williams Dr. W. M. Henderson Dr. Elizabeth Irvin Dr. A. Richardson Dr. D. Williams Kwaku Agyekum (current)



<p>M Henderson (EPA)  L Gram (Dutch Food Safety)  H McClure (Yerkes Primate Center)  S Offenbacher (UNC, Chapel Hill)</p>		<p>MS Degrees:  Jerry Campbell  David Holcomb  Emily Hanson  Kwaku Agyekum  Lonnie Williams  Ofia Hodoh  Denita Williams  Glenn Tillman</p> <p>Post-docs:  Kazue Takeuchi  Nutan Mytle</p>
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## BIOGRAPHICAL SKETCH **Jia-Sheng Wang**

### (a) Professional Preparation

<u>Institution</u>	<u>Major(s)</u>	<u>Degree</u>	<u>Year</u>
Shanghai First Medical College	Preventive Medicine	M.B.	1978
Shanghai First Medical College	Toxicology	M.D	1982
Boston University	Pathology/immunology	Ph.D.	1994
Johns Hopkins University	Molecular Epidemiology	PDF	1995

### (b) Appointments

2008 - Present	Professor and Head, Department of Environmental Health science, College of Public Health, The University of Georgia
2006 – 2008	Professor and Division Leader, Division of Human Health Sciences, The Institute of Environmental and Human Health, Texas Tech University
2000 – 2005	Associate of Professor (tenured), Department of Environmental Toxicology, Texas Tech University
1997 – 1999	Research Assistant Professor, Johns Hopkins School of Public Health
1994 – 1996	Senior Research Associate, Johns Hopkins School of Public Health
1992 – 1993	Research Affiliate, Division of toxicology, Massachusetts Institute of Technology
1986 – 1991	Visiting Scientist, Division of Toxicology, Massachusetts Institute of Technology
1982 – 1985	Assistant Professor, Food Safety, Nanjing Railway Medical College

### (c) Publications (A total of 105)

#### **Five Most Recent Publications:**

- Xu, L., Qian, G., Tang, L., Su, J., and **Wang, J.-S.** 2010. Genetic Variations of Hepatitis B Virus and Serum Aflatoxin-Lysine Adduct on High Risk of Hepatocellular Carcinoma in Southern Guangxi, China. *J. Hepatol.* In press.
- Shen, C.-L., Yeh, J. K., Samathanam, C. A., Cao, J. J., Stoecker, B. J., Dagda, R. Y., Chyu, M.-C., **Wang, J.-S.** 2010. Protective actions of green tea polyphenols and alfacalcidol on bone microstructure in female rats with chronic inflammation. *J. Nutritional Biochem.* In Press
- Xu, L., Cai, Q., Tang, L., Wang, S., Hu, X., Su, J., Sun, G., **Wang, J.-S.** 2010. Evaluation of fumonisin biomarkers in a cross-sectional study with two high-Risk populations in China. *Food Additive & Contam.* 27, 1161-1169.
- Chen, L., Shao, C., Cobos, E., **Wang, J.-S.**, Gao, W. 2010. 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone Induces CRM1-Dependent P53 Nuclear Accumulation in Human Bronchial Epithelial Cells. *Toxicol Sci.* 116, 206-215.
- Groopman, J. D. and **Wang, J.-S.**, 2010. Molecular Biomarkers. *Comprehensive Toxicology*, 2:267-295.

**Five Other Significant Publications:**

Tang, L., Xu, L., Afriyie-Gyawu, E., Liu, W., Wang, P., Tang, Y., Wang, Z., Huebner, H. J., Ankrah, N.-A., Ofori-Adjei, D., Williams, J. H., **Wang, J.-S** and Phillips, T. D. 2009. Aflatoxin-albumin adducts and correlation with decreased serum levels of vitamins A and E in an adult Ghanaian population. *Food Additives and Contam.* 26 (1): 108–118.

Tang, L., Tang, M., Xu, L., Luo, H., Huang, T., Yu, J., Zhang, L., Cox, SB., Gao, W.-M and **Wang, J.-S.** 2008. Modulation of Aflatoxin Biomarkers in Human Blood and Urine by Green Tea Polyphenols Intervention. *Carcinogenesis* 29(2):411-417.

Cai, Q., Tang, L. and **Wang, J.-S.** 2007. Validation of fumonisin biomarkers in F344 rats. *Toxicol Appl. Pharmacol.* 225:28-39.

Luo, H., Cox, SB., Gao, W.-M., Yu, J., Tang, L. and **Wang, J.-S.** 2006. Metabolic Profiling in Validation of Plasma Biomarkers for Green Tea Polyphenols. *Metabolomics*, 2(4):235-241.

Luo, H., Tang, L., Billam, M., Tang, M., Huang, T., Yu, J., Wei, Z., Liang, Y., Wang, K., Zhang, Z., Zhang, L., and **Wang, J.-S.** 2006. Phase IIa chemoprevention trial of green tea polyphenols in high-risk population of liver cancer: II. Modulation of urinary excretion of green tea polyphenols and 8-hydroxydeoxyguanosine. *Carcinogenesis*. 27:262-268.

**(d) Synergistic Activities**

1. National Institute of Environmental Health Sciences (NIEHS) Study Section for review NIEHS Center Grants, 2006-2010
2. National Institute of Environmental Health Sciences (NIEHS) Study Section for review KO1, ROO, RO3, R13, R15, and r21 projects, 2005-2010
3. President, Food Safety Special Section, Society of Toxicology, 2009-2010
4. President, American Association of Chinese in Toxicology, 2009-2011
5. Editorial Board Member for International Journal of Molecular and Genetic Epidemiology
6. Editorial Board Member for Journal of Environmental and Occupational Medicine
7. Keynote Speaker for Latin America Society of Mycotoxinology, 2010
8. Distinguished Cancer Scholar, Georgia Cancer Coalition, 2009-2014
9. Principal Investigator for the National Cancer Institute RO1 grant titled “chemoprevention of green tea polyphenols on liver cancer” (2003-2010).
10. Principal Investigator for the USAID grant titled “Established a global network for aflatoxin exposure” (2008-2013)

**(e) Collaborators & Other Affiliations**

<b>Research collaborators (recent 5 years)</b>	<b>graduate/postdoc advisors</b>	<b>Graduated Ph.D students (recent 5 years)</b>
Dr. Timothy Phillips (Texas A&M U.), Dr. Pauline Jolly (UAB), Dr. Dan Brown (Cornell U.), Dr. J-Y Hong (Rutgers), Dr. Leslie Shen (Texas Tech U), Dr. Guiju Sun (Southeast U.), Dr. Jianjia Su (Guangxi Cancer Inst.)	Dr. Gerald Wogan, (MIT) Dr. Ken Zaner, (Boston U). Dr. John Groopman (Johns Hopkins U.)	Dr. Haitao Luo, Dr. Madhavi Billam Dr. Fujun Liu Dr. Qingsong Cai Dr. Zemin Wang Dr. Piwen Wang Dr. Yuntian Tang Dr. Li Xu

**BIOGRAPHICAL SKETCH Phillip L. Williams****(a) Professional Preparation**

<u>Institution</u>	<u>Major(s)</u>	<u>Degree</u>	<u>Year</u>
Georgia State University	Biological Sciences/ Chemistry	B.S.	1975
Georgia Institute of Technology	Environmental Biology	Ph.D.	1988

**(b) Appointments**

2007 – present:	Dean, College of Public Health, University of Georgia, Athens
2005 - 2006	Interim Dean, College of Public Health, University of Georgia, Athens
2001 – present:	Professor, Environmental Health Science, University of Georgia, Athens
2001 - 2010	Adjunct Professor, Dept. of Environmental and Occupational Health, Rollins School of Public Health, Emory University, Atlanta, GA
2002 - 2006	Chair, Public Health Division, Biomedical and Health Sciences Institute, University of Georgia, Athens, GA
1993 – 2001	Associate Professor, Environmental Health Science, University of Georgia, Athens
1993 – 2001	Adjunct Associate Professor, Dept. of Environmental and Occupational Health, Rollins School of Public Health, Emory University, Atlanta, GA
1991 – 1993	Adjunct Assistant Professor, Dept. of Environmental and Occupational Health, Rollins School of Public Health, Emory University, Atlanta, GA
1991 – 1993	Vice President, A. T. Kearney (Consulting firm), Atlanta, Georgia
1988 – 1991	Project Director, A. T. Kearney (Consulting firm), Atlanta, Georgia
1985 – 1988	Senior Research Scientist, Georgia Tech Research Institute, Atlanta, GA
1980 – 1985	Research Scientist, Georgia Tech Research Institute, Atlanta, GA
1978 – 1980	Research Technologist, Engineering Experiment Station, Georgia Tech, Atlanta, GA
1975 – 1978	Industrial Hygienist, U.S. Department of Labor, Occupational Safety and Health Administration, Macon, GA

**(c) Publications****(i) Five Recent Publications**

- Melstrom, P. and **Williams, P. L.** 2007. Reversible AChE Inhibitors in *C. elegans* vs. Rats, Mice. *Biochemical and Biophysical Research Communications*. 357:200-205.
- Leung, M., **Williams, P.**, Benedetto, A., Au, C., Helmcke, K., Ashner, M., and Meyer, J. 2008. *Caenorhabditis elegans*: An Emerging Model in Biomedical and Environmental Toxicology. *Toxicological Sciences*. 106(1):5-28.
- Rajini, P.S., Melstrom, P. and **Williams, P. L.** 2008. A Comparative Study on the Relationship Between Various Toxicological Endpoints in *Caenorhabditis elegans* Exposed to Organophosphorus Insecticides. *Toxicology and Environmental Health, Part A*, 71 (15):1043-1050.
- Ma, H., Glenn, T., Jagoe, C., Jones, K., and **Williams, P.** 2009. A Transgenic Strain of the Nematode *Caenorhabditis elegans* as a Biomarker for Heavy Metal Contamination. *Environmental Toxicology and Chemistry*. 28(6): 165-172.

Ma, H., Bertsch, P., Glenn, T., Kabengi, N., and **Williams, P.** 2009. Toxicity of Manufactured Zinc Oxide Nanoparticles in the Nematode *Caenorhabditis elegans*. . *Environmental Toxicology and Chemistry*. 28(6): 206-212.

**(ii) Five Other Significant Publications**

**Williams, P** and Burson, J. (Eds.) 1985. Industrial Toxicology: Safety and Health Applications in the Workplace. New York: Van Nostrand Reinhold, 502 pages.

**Williams, P.**; James, R; and Roberts, S. (Eds.) 2000. Principles of Toxicology: Environmental and Industrial Applications, Second Edition. New York: John Wiley & Sons, 603 pages.

Anderson, G.; Boyd, W.; and **Williams, P.** 2001. Assessment of Sublethal Endpoints for Toxicity Testing with the Nematode *Caenorhabditis elegans*. *Environmental Toxicology and Chemistry*, 20(4):833-838.

Cole, R.; Anderson, G.; and **Williams, P.** 2004. The Nematode *Caenorhabditis elegans* as a Model for Organophosphate Induced Mammalian Neurotoxicity. *Toxicology and Applied Pharmacology*. 194:248-256.

Jackson, B., **Williams, P.**, Lanzirotti, A. and Bertsch, P. 2005. Evidence for biogenic pyromorphite formation by the nematode *Caenorhabditis elegans*. *Environmental Science and Technology*. 39:5620-5625.

**(d) Synergistic Activities**

1. *Expert Consultant in Public Health*, Wuxi Centers for Disease Control and Prevention, Wuxi, China, 2010 – 2012.
2. *Review Panel Member*, National Research Foundation, Dubai, United Arab Emirates, November 1-2, 2008, Dubai, UAE.
3. *Chairperson*, State of Georgia Public Health Commission (appointed by the Governor), June 2010 to January 2011.
4. *ASAC Commissioner*, Accreditation Board for Engineering and Technology (ABET), 2004-2009.

**(v) Collaborators & Other Affiliations**

**(i) Collaborators and Co-Editors (since 2005)**

P.S. Rajini (India)

Paul Bertsch (Univ. of Kentucky)

David DePomeri (U. of Nottingham)

Stephen Roberts (U. of Florida)

**(ii) Advisors**

Ph.D.: David B. Dusenbery (Georgia Tech, retired)

**(iii) Graduate Advisees**

Ma, Hongbo (Ph.D. 2009)

15 Ph.D. committees at UGA (completed degree)

Melstrom, Paul (Ph.D., 2007)

17 MS graduates served as major professor

Boyd, Windy (Ph.D. 2002)

13 MS committees at UGA (degree completed)

Kanna, N. (Ph.D. 1996)

## BIOGRAPHICAL SKETCH

Anne Marie Zimeri

### a. Professional Preparation

Indiana University-Purdue University Indianapolis, IN	Biology	BS	1997
University of Georgia, Athens, GA	Genetics	Ph.D	2004
USDA-Agricultural Research Services Athens, GA	Toxicology	Postdoc	2004

### b. Appointments

- 2007- present Instructor, Department of Environmental Health Science, UGA  
2007- present Undergraduate Internship Coordinator, Department of Environmental Health Science, UGA  
2008- present Undergraduate Coordinator, Department of Environmental Health Science, UGA  
2006-2007 Lecturer, Departments of Genetics, Cell biology, and Biochemistry, UGA Gwinnett Campus  
2004-2006 Postdoctoral Research Scientist, USDA-ARS Toxicology and Mycotoxin Research Unit, Athens, GA

### c. Publications (7 total)

**Zimeri AM**, Riley, RT, Glenn AE (2009) Fumonisin FB1 works synergistically with other fungal metabolites and is translocated from metabolically active point on the stalk to kernels in maize. *Mycophthologia* (in prep.)

**Zimeri AM**, Riley RT, Glenn AE (2009) The mycotoxin fumonisin B1 is necessary for corn seedling disease development and is translocated from roots to shoots. *Plant Molecular Biology* (in prep.)

**Zimeri AM**, Gupta D (2009) Genetic Engineering. *New Georgia Encyclopedia* 4/27/2009

Glenn AE, Zitomer NC, **Zimeri AM**, Williams LD, Riley RT, Proctor RH (2008) Transformation-mediated complementation of a FUM gene cluster deletion in *Fusarium verticillioides* restores both fumonisin production and pathogenicity on maize seedlings. *Mol Plant Microbe Interact.* Jan;21(1):87-97

Williams LD, Glenn AE, **Zimeri AM**, Bacon CW, Smith MA, Riley RT (2006) Disruption of ceramide biosynthesis and accumulation of sphingoid bases and sphingoid base 1-phosphates: A mechanism for *Fusarium verticillioides* effects of root development in maize-seedling disease. *Plant Physiology* (under review)

**Zimeri AM**, Dhanker OP, McCaig B, Meagher RB (2005) The plant MT1 metallothioneins are stabilized by binding cadmiums and are required for cadmium tolerance and accumulation. *Plant Molecular Biology* 58(6):839-55

Philip E. Dykema, Philip R. Sipes, **Anne Marie Zimeri**, Brenda J. Biermann, Dring Crowell, and Stephen K. Randall (1999) A new class of proteins capable of binding transition metals. *Plant Molecular Biology* 41: 139-159

**d. Synergistic Activities**

DEVELOPED GRANT BASED RESEARCH PROGRAM: Examined the role of secondary metabolites that work synergistically with FB1 to in fractionated fungal extracts and analyzed genetic responses in maize to FB1 using RT-PCR and creating cDNA subtraction libraries

OVERSAW AGENCY COLLABORATIONS: coordinated collaborations with microscopists at the University of Georgia to examine cellular toxicity responses

SUPERVISED AND MENTORED STUDENT INTERNS: developed student summer internship projects for two South Carolina Alliance for Minority Participation (SCAMP) students, and one Berry College intern. Supervised and monitored research.

COLLABORATE WITH USEPA Collaborate with Section Chief of USEPA to provide instruction and training for undergraduate and graduate students on compliance for RCRA, CERCLA, EPCRA, CFR and other federal environmental regulations.

Administrate the undergraduate program for the department which includes scholarship selection, advising decisions, recruitment

DIRECT ENVIRONMENTALLY BASED COMMUNITY SERVICE LEARNING PROJECTS: Foster the development of outreach 200 undergraduates each year including an outreach program for the Stroud Elementary fall fair, and a 'Go Green to \$ave Green' at UGA.

SERVE ON DEVELOPMENT COMMITTEES FOR THE INTERDISCIPLINARY TOXICOLOGY PROGRAM (ITP): Collected data and authored education section for the ITP Self Study. Served as editor for the final document submitted to the Dean of the Graduate School. Composed surveys and assimilated data for ITP Strategic Planning committee.

**e. Collaborators and Other Affiliations**

**i. Collaborators since 2005** (and their current affiliations)

Riley, RT (USDA-ARS), Glenn AE (USDA-ARS), Gupta D: student (UGA), Zitomer NC (USDA-ARS), Williams LD (Burdock Group, Orlando FL), Bacon CW (USDA-ARS), Smith MA (UGA), Dhanker OP (U-Mass), McCaig B (UGA), Meagher RB (UGA), Black M (UGA)

**ii. Graduate and Postdoctoral Advisors** (and their current affiliations):

Post-doctoral: Anthony Glenn (USDA-ARS); PhD: Richard B. Meagher (UGA)

## Adjunct Faculty and Research Associates



**BIOGRAPHICAL SKETCH****Dana Cole****(a) Professional Preparation**

<u>Institution</u>	<u>Major(s)</u>	<u>Degree</u>	<u>Year</u>
California Polytechnic Univ.	Animal Science	B.S.	1989
University of California Davis	Veterinary Med.	D.V.M	1993
Texas A&M Univ.	Dipl. ACVIM		1994 – 1997
University of NC – Chapel Hill	Epidemiology	Ph.D.	2004

**(b) Appointments**

2008 – present: Doctoral Epidemiologist, Centers for Disease Control and Prevention  
 2004 – 2008: Medical epidemiologist, GA Division of Public Health, Acute Disease Epi  
 2002-2004: Assistant Professor, UGA Large Animal Medicine and Surgery

**(c) Selected Publications**

1. **Cole D**, Long S, Sobsey M. 2003. Evaluation of F+RNA and F+DNA coliphages as source-specific indicators of fecal pollution in impacted surface waters. *Applied and Environmental Microbiology* 69(11):6507-6514.
2. Vereen, E., R.R. Lowrance, **D.J. Cole** and E.K. Lipp. 2007. Fate and ecology of campylobacters in coastal plain streams (Georgia, United States of America). *Applied and Environmental Microbiology* 73: 1395 – 1403.
3. Tobin-D'Angelo M, Thomas S, **Cole D**, Turner J. 2007. *Vibrio* in Georgia. *Georgia Epidemiology Report* 23(7):1-3
4. Haley, B.J., **D. Cole** and E.K. Lipp. 2009. Distribution, Diversity and Seasonality of Waterborne *Salmonella* in a Rural Watershed. *Applied and Environmental Microbiology* 75(5) *In press*.
5. Vieira A, Hofacre C, Smith J, **Cole D**. 2009. Human Contacts and Potential Pathways of Disease Introduction on Georgia Poultry Farms. *Avian Diseases In press*.

**(d) Honors** (selected)

2005 Invited Cochair and Lead Author. Council for Agricultural Science and Technology (CAST). *Fate and Transport of Zoonotic Bacterial, Viral, and Parasitic Pathogens During Swine Manure Treatment, Storage, and Land Application*. Published 2008.

2008 Invited Speaker. Earth, Wind and Fire: A One Medicine Approach to Climate Change. *Public Health Response to Drought in Georgia*.

2009 Invited Expert. National Center of Excellence for the Study of Preparedness and Catastrophic Event Response (PACER). *Syndromic Surveillance Response Project*

**(e) Advisors**

Ph.D: Mark. D. Sobsey (UNC)

## **BIOGRAPHICAL SKETCH**      **William Cosgrove**

### **a. Professional Preparation:**

University of Georgia	BS	1978	Environmental Health
Clemson University	MS	1979	Environmental System Engineering

### **b. Appointments**

1978 -1980    Environmental Engineer – Water Compliance Unit, EPA  
1990 -1985    Chief, Resources Conservation Recovery Act (RCRA) Unit, EPA  
1996-1998    Lead Region Coordinator – Regional Science & Technology (RS&T) Organization, EPA  
1995-1999    Technical Authority \_ RCRA (concurrent with Lead Region Coordinator role) /  
2000-        Acting Chief, Region 4 Office of Quality Assurance and Data Integration , EPA  
2000-2003    Chief, Organic Chemistry Section  
2006- Present Chief, Ecological Assessment Branch, EPA

### **c. Publications**

Criteria for Project Performance Certification: Journal of the Water Pollution Control Federation, Alexandria, VA, January, 1988

RCRA Waste Management: Planning Implementation and Assessment of Sampling Activities: Manual of Practice #42, American Society for Testing and Materials, West Conshohocken, PA, 2000.

### **d. Selected Synergistic Activities**

1. 1994- Present – Instructor in the Environmental Science Department
2. 1995- 1996 -Co-Instructor for the Solid and Hazardous Waste treatment Management (EHS).
3. 1996 – Coordinated the technical training and activities for several EHS student trainees at EPA.
4. 1994- Present EHS Graduate Advisory Committee
5. 2001 - Instructor for EHS Solid and Hazardous Waste Management Class.
6. 1998- Appointed as an Adjunct Instructor Environmental Health Science Department

### **e. Collaborators and Other Affiliations**

N/A

## **BIOGRAPHICAL SKETCH      Brian G. Forrester**

### **(a) Professional Preparation**

<u>Institution</u>	<u>Major(s)</u>	<u>Degree</u>	<u>Year</u>
University of Georgia	Chemistry	BS	1980
Emory University	Medicine	MD	1984
Johns Hopkins University	Occupational Health	MPH	1990

### **(b) Appointments**

2005-	Adjunct Associate Professor, UGA
1998-	Medical Director, Athens Regional Hospital Occupational Medicine
1997-2004	Associate Professor, University of Alabama Schools of Medicine & Public Health
1993-1997	Assistant Professor, University of Alabama Schools of Medicine & Public Health
1991-1993	Instructor, University of Alabama School of Public Health

### **(c) Publications (Selected 10)**

- Roth, V.S., **Forrester B. G.** 1999. Tuberculosis. In: McCunney RJ (ed.). Medical Center Occupational Health and Safety. Lippincott, Williams, & Wilkins, Philadelphia.
- Forrester, B. G.** 1999. Operating Rooms. In: McCunney RJ (ed.). Medical Center Occupational Health and Safety. Lippincott, Williams, & Wilkins, Philadelphia.
- Forrester, B. G.** 1999. Environmental Epidemiology for the Busy Clinician. *J. Occupational and Environ. Med.* 41:72
- Watts, D. N., Jacobs, R. R., **Forrester, B. G.**, Bartolucci, A. 1998. An evaluation of latex sensitivity among atopic and non-atopic intensive care workers. *Am J. Industrial Med.* 34:359-363.
- Forrester B. G.**, Roth, V. S. 1998. Hand dermatitis in intensive care units. *J. Occupat. Environ Med.* 40:881-885.
- Weaver, M., **Forrester, B. G.**, Brown, K., Capilouto, E., Hilyer, J. 1998. Health risk influence on medical care costs and utilization among 2898 municipal employees. *Am J Prev Med.* 15:250-253.
- Forrester, B. G.** 1997. Reactive airways dysfunction syndrome (RADS): Occurrence after exposure to a refractory ceramic fiber-phosphoric acid binder mixture. *Southern Med J.* 90:447-450.
- Forrester, B. G.** 1996. Asbestos health effects, treatment, and control. *J. Occupat Environ Med.* 38:1181.
- Forrester, B. G.**, Weaver, M. T., Brown, K. C., Phillips, J. A., Hilyer, J. C. 1996. Personal health risk predictors of occupational injury among 3415 municipal employees. *J Occupat Environ Med.* 38:515-521.
- Phillips, J. A.**, Forrester, B. G., Brown, K. C. 1996. Lowback pain, prevention and management. *AAOHN J.* 44:40-51.

### **(d) Synergistic Activities**

1. Diplomate, National Board of medical Examiners, in Georgia (1987-) and Alabama (1991-).

2. American Board of Preventive Medicine, Certified in Occupational Medicine, 1992.
3. Fellow, American College of Preventive Medicine, 1993.
4. Fellow, American College of Occupational and Environmental Medicine, 1995.
5. Approved “A” Reader for the Pneumoconioses, National Institute for Occupational Safety and Health, 1993.
6. Certified Medical Review Officer, Medical Review Certification Council, 1998.
7. Certified Independent Medical Examiner, American Board of Independent Medical Examiners, 1999.
8. Co-chair, Athens Regional Medical Center Mass Casualty/Terrorism Incident Task Force, 2001-2004.

(e) **Collaborators & Other Affiliations**  
N/A

## BIOGRAPHICAL SKETCH

Ken Jones

### a. Professional preparation

Colorado State University	Wildlife Biology	B.S., 1995
Texas A&M University – Kingsville	Wildlife Biology	M.S., 1998
University of Illinois – Chicago	Biology	Ph.D., 2003
Kansas State University	Ecological Genomics	Postdoc, 2003-2007
University of Georgia	Environmental Genetics	Postdoc, 2007-2009

### b. Appointments

2009 to present	Assistant Research Scientist, Georgia Genomics Facility and the Department of Environmental Health Science, University of Georgia, Athens, GA.
2009 to present	Adjunct Professor, Department of Biological Sciences, University of New Orleans, New Orleans, Louisiana.
2008 to 2009	Research Associate/Postdoctoral Fellow, Department of Environmental Health Science, University of Georgia, Athens, GA.
2007 to 2008	Research Associate/Postdoctoral Fellow, University of Georgia, Savannah River Ecology Lab, Aiken SC.
2003 to 2007	Research Associate/Postdoctoral Fellow, Division of Biology, Kansas State University, Manhattan, KS.

### c. Publications (32 published, 1 in press)

- Coolon J, Jones K, Narayanan S, Wisely S. (2009) Microbial ecological response of the intestinal flora of *Peromyscus maniculatus* and *P. leucopus* to heavy metal contamination. *Molecular Ecology* 19:67-80.
- Jumpponen A, Jones K, Mattox J, Yaeger C (2009) Massively parallel 454-sequencing of fungal communities in *Quercus* spp. ectomycorrhizas indicates seasonal dynamics in urban and rural sites. *Molecular Ecology* 19:41-53.
- Jumpponen A, Jones KL (2009) Massively parallel 454-sequencing indicates hyperdiverse fungal communities in temperate *Quercus macrocarpa* phyllosphere. *New Phytologist* doi: 10.1111/j.1469-8137.2010.03197.x.
- Miller SR, Strong AL, Jones KL, Ungerer MC (2009) Barcoded pyrosequencing reveals shared bacterial community properties along two alkaline hot spring temperature gradients in Yellowstone National Park. *Applied and Environmental Microbiology*. 75: 4565–4572.
- Coolon JD, Jones KL, Todd TC, Carr B, Herman MA. (2009) *C. elegans* genetic response to soil bacteria reveals environment-specific fitness effects. In press with *PLoS Genetics*.
- Jones, K.L., T.C. Todd, J.L. Wall-Beam, J.D. Coolon, J.M. Blair, and M.A. Herman. 2006. Molecular approach for assessing responses of microbial-feeding nematodes to burning and nitrogen enrichment in a native grassland. *Molecular Ecology* 15:2601-2609.
- Jones, K.L., T.C. Todd, and M.A. Herman. 2006. Development of taxon-specific markers for high-throughput screening of microbial-feeding nematodes. *Molecular Ecology Notes* 6:712-714.

Ashley, M.V., J.A. Wilk, S.M.N. Styan, K.J. Craft, K.L. Jones, K.A. Feldheim, K.S. Lewers, and T. Ashman. 2003. High variability and disomic segregation of microsatellites in the octiploid *Fragaria virginiana* Mill. (Rosaceae). *Theoretical and Applied Genetics* 107:1201–1207.

Jones, K.L., G.L. Krapu, D.A. Brant, and M.V. Ashley. 2005. Population genetic structure in migratory sandhill cranes and the role of Pleistocene glaciation. *Molecular Ecology* 14:2645-2657.

Jones, K.L., T.C. Glenn, R.C. Lacy, J.R. Pierce, N. Unruh, C.M. Mirande, and F. Chavez-Ramirez. 2002. Whooping Crane studbook refinement utilizing microsatellite DNA and leg banding analyses. *Conservation Biology* 16(3):789-799.

#### **d. Synergistic activities**

Genetic Advisor and Genealogist to the US Fish and Wildlife Service Masked Bobwhite Quail Recovery Team.

Genetic Advisor and Genealogist to the joint US Fish and Wildlife Service and Canadian Wildlife Service Whooping Crane Recovery Team.

I mentored Julie Wall (2004), Tiara Perez (2005), and Erika Pabon (2006) during their summer internship with KSU's Summer Undergraduate Research Opportunities Program (SUROP). I also mentored Kaitlen Wagner (2007) through the NSF REU program, as well as mentor two University of Georgia undergraduates Sheena Zhang and Nicole Jozwiak, 2008-current).

#### **e. Collaborators and other affiliations**

##### (i) Collaborators:

Ashley M (UIC), Blair J (KSU), Brandt D. (USGS), Chavez-Ramirez F (TAMUK), Carroll JP (UGA), Casey AE (KSU), Coolon J (MU), Eo SH (UGA), French JO (USC), Gibson JP (OU), Glenn T (UGA), Hagen C (UGA), Heincelman TJ (USC), Hereford S (USFWS), Herman M (KSU), Howard J (NOU), Jagoe C (UGA), Jones JM (OU), Jumpponen A (KSU), Krapu G (USGS), Lance S (UGA), Lee EJ (SNU), Lee WS (SNU), Leibo S (ACRES), Ma H (UGA), Mattox J (KSU), McCann K (SACWG), Miller SR (UMt), Moore J (UGA), Myrold, D (OSU), Narayanan S (KSU), Nguyen TH (UIUC), Park YS (SNU), Peterson D (UGA), Rhim SJ (CAU), Rodwell L (SACWG), Sandercock B (KSU), Sawyer R (USC), Strong AL (UMt), Thompson A. (UGA), Todd T (KSU), Ungerer MC (KSU), Verdoorn G (SACWG), Wall-Beam JL (KSU), Wells L (UGA), Williams PL (UGA), Wisely S (KSU), Yaege C

##### (ii) Advisors:

MS graduate advisor: Felipe Chavez-Ramirez (Texas A&M University-Kingsville)

PhD graduate advisor: Mary V. Ashley (University of Illinois-Chicago)

Postdoctoral advisor: Michael Herman (Kansas State University)

Postdoctoral advisor: Travis Glenn (University of Georgia)

##### (iii) Thesis Advisor:

##### Graduate Students (1)

MS graduate student: Jessica Henkel (University of New Orleans), Postdoctoral Scholars (0)

## BIOGRAPHICAL SKETCH      Ron Riley

### **a. Professional Preparation:**

University of California, Davis, CA	BA	1967	Biology
California State University, Humboldt, CA	MA	1973	Biology
Oregon State University, Corvallis, OR	Ph.D.	1978	Biology

### **b. Appointments**

1980 - -present	Research Toxicologist (GS-15) and Lead Scientist, USDA, Agricultural Research Service, Russell Research Center, Athens, GA
1978-1980	National Research Council Post doctoral Res. Associate, Corvallis Environmental Research Laboratory, Corvallis, OR
1976 -1978	USEPA Graduate Research Assist, Oregon State University, Corvallis, OR
1973-1976	Sea Grant Program Graduate Research Assistant Oregon State University, Corvallis, OR
1970-1972	Graduate Teaching Assistant, California State University, Humboldt, Arcata, CA.

### **c. Recent Publications**

- Gelineau-van Waes, J., Voss, K. A., Stevens, V. L., Speer, M. C. and **Riley, R. T.** 2009. Maternal fumonisin exposure as a risk factor for neural tube defects,. In Taylor, S. (ed.) Advances in Food and Nutrition Research, 56. pp. 145-181.
- Zitomer, N.C., Mitchell, T., Voss, K.A., Bondy, G.S., Pruett, S.T., Garnier-Amblard, E.C., Liebeskind, L.S., Park, H., Wang, E., Sullards, M.C., Merrill, A.H. Jr., and **Riley, R.T.** 2009. Ceramide synthase inhibition by fumonisin B<sub>1</sub> causes accumulation of 1-deoxy-sphinganine: A novel category of bioactive 1-deoxy-sphingoid bases and 1-deoxy-dihydroceramides biosynthesized by mammalian cell lines and animals. *Journal of Biological Chemistry* 284(8): 4786-4795.
- Voss, K. A., **Riley, R. T.**, Snook, M. E., Gelineau-van Waes, J. 2009. Comparing the reproductive and sphingolipid metabolic effects of fumonisin B<sub>1</sub> and its alkaline hydrolysis product in LM/Bc mice: hydrolyzed fumonisin B<sub>1</sub> did not cause neural tube defects. *Toxicol. Sci.* 112:459-67.
- O'Donnell, K., Gueidan, C., Sink, S., Johnston, P. R., Crous, P., Glenn, A., **Riley, R.T.**, Zitomer, N., Colyer, P., Waalwijk, C., van der Lee, T., Moretti, A., Kang, S., Kim, H-S., Geiser, D. M., Juba, J., Baayen, R. P., Cromey, M. G., Bithel, S., Sutton, D. A., Skovgaard, K., Ploetz, R., Kistler, C., Elliott, M., Davis, M. 2009. A two-locus DNA sequence database for typing plant and human pathogens within the *Fusarium oxysporum* species complex. *Fungal Genetics Biol.* 46:936-948.
- Zitomer NC, Jones, S., Bacon CW, Glenn AE, Baldwin, T. and **Riley, R.T.** 2010. Sphingoid bases and their 1-phosphates, but not fumonisins, are translocated from roots to aerial tissues of maize seedlings watered with fumonisins. *J. Agric. Food Chem.* 58:7476-81.

Burns, T. D., Snook, M. E., Riley, R. T., and Voss, K. A. 2008. Fumonisin concentrations and *in vivo* toxicity of nixtamalized *Fusarium verticillioides* culture material: Evidence for fumonisin-matrix interactions. *Food Chem. Toxicol.* 46:2841-2848.

Dvorak, N., **Riley, R.T.**, Harris M. and McGregor, J.A. 2008. Fumonisin mycotoxin contamination of corn-based foods consumed by potentially pregnant women in Southern California. *The Journal of Reproductive Medicine* 53: 672-676.

Zitomer, N. C., Glenn, A. E., Bacon, C.W. and **Riley, R.T.** 2008. A single extraction method for the analysis by liquid chromatography/tandem mass spectrometry of fumonisins and biomarkers of disrupted sphingolipid metabolism in tissues of maize seedlings. *Analytical and Bioanalytical Chemistry* 391:2257-2263.

Torres, O.A., Palencia, E., Lopez de Pratdesaba, L., Grajeda, R, Fuentes, M., Speer, M., Merrill, A.H., Jr., O'Donnell, K., Bacon, C.W., Glenn, A.E. and **Riley, R.T.** 2007. Estimated fumonisin exposure in Guatemala is greatest in consumers of lowland maize. *Journal of Nutrition* 137:2723-2729.

Williams, L. D., Glenn, A. E., Bacon, C. W., Zimeri, A. M., Smith, M. A., and **Riley, R. T.** 2007. Fumonisin disruption of ceramide biosynthesis in maize roots and the effects on plant development and *Fusarium verticillioides*-induced seedling disease. *J. Agric. Food Chem.* 55:2937-2946.

**d. Selected Synergistic Activities**

1. 1999 -2008 Editorial Board Member, *Mycopathologia*
2. 1995- Present Editorial Board Member, *Environmental Toxicology and Pharmacology*
3. 1991 Co-guest editor, *Mycopathologia* to publish *Fumonisin: A Current Perspective and View to the Future*.
4. 2001 Co- Guest Editor Aflatoxin/Fumonisin Eliminator and Fungal Genomics Workshops.
5. 2007 Guest –Co-Editor special issue of animal Feed Science and Technology.
6. 2009-210 Invited member of the “Editor Group” for the International Agency for Research on cancer.

**Collaborators and Other Affiliations**

**e. Collaborators and other affiliations for the past five years.**

<b>Research collaborators</b>	<b>Graduate students and postdocs</b>
Julia Cabrera Valverde, Universidad Francisco Marroquin Christopher Cortop, Chemical Industry Institute of Toxicology James Pestka, Michigan State University, Roger Coulombe, Utah State University, Cooperative Western Regional Research Project Janee Gelineau Van Waes, Creighton University Marcy Speer, Duke University Sarah Pruet, Emory University Steve Saunders, Frito-Lays	Hwansoo Yoo, Ph.D. 1994 Lonnie D. Williams, Ph.D. 2006





Simon TW (1997) Combining Physiologically Based Pharmacokinetic Modeling with Monte Carlo Simulation to Derive an Acute Inhalation Guidance Value for Trichloroethylene. *Regul Toxicol Pharmacol* **26**, 257-270

Simon TW, Barnes K (1995) Olfaction and Prey Search in the carnivorous leech, *Haemopis marmorata* *J Exp Biol* **199**, 2041-2051

**(d) Synergistic Activities**

2009 Consultation and statistical modeling regarding dose response of perfluorooctanoic acid (PFOA)

2009 Consultation regarding USEPA's new arsenic cancer slope factor

2009 Assessment of the relative susceptibility of monkeys and humans to PCBs

2009 EPA dioxin workshop

## BIOGRAPHICAL SKETCH      Lili Tang

### (a) Professional Preparation

<u>Institution</u>	<u>Major(s)</u>	<u>Degree</u>	<u>Year</u>
Southeast University School of Medicine	Preventive Medicine	M.B.	1987
Jiangnan University	Food Science	M.S.	1997
Fudan University School of Medicine	Toxicology	Ph.D.	2001

### (b) Appointments

2009-	Associate Research Scientist
2008-2009	Professor, Nutrition and Food Safety, Jiangnan University, PRC
2004-2008	Research Assistant Professor, TIEHH, Texas Tech University, TX, USA
2002-2004	Postdoctoral Research Associate, Texas Tech University, TX, USA
1999-2002	Associate Professor of Food Nutrition and Safety, Wuxi University of Light Industry, Wuxi, PRC.
1993-1998	Lecturer of Food Nutrition and Safety, Wuxi University of Light Industry, Wuxi, PRC.
1987-1993	Assistant professor of Nutrition, Nanjing Railway Medical College, Nanjing, PRC.

### (c) Publications

#### Five Most Recent Publications:

- Xu, L., Qian, G., **Tang, L.**, Su, J., and Wang, J.-S. 2010. Genetic Variations of Hepatitis B Virus and Serum Aflatoxin-Lysine Adduct on High Risk of Hepatocellular Carcinoma in Southern Guangxi, China. *J. Hepatol.* In press.
- Xu, L., Cai, Q., **Tang, L.**, Wang, S., Hu, X., Su, J., Sun, G., Wang, J.-S. 2010. Evaluation of fumonisin biomarkers in a cross-sectional study with two high-Risk populations in China. *Food Additive & Contam.* 27, 1161-1169.
- Tang, L.** E. Afriyie-Gyawu, H. J. Huebner, N.-A. Ankrah, D. Ofori-Adjei, W. O. Ellis, P. E. Jolly, J. H. Williams, J.-S. Wang and T. D. Phillips. 2009. Aflatoxin exposure decreases serum levels of vitamins A & E in Ghanaians at high risk for aflatoxicosis. *Food Additives & Contaminants*, 26 (1): 108–118.
- Johnson, N. M., Afriyie-Gyawu, E., Huebner, H., Marroquin-Cardona, A., **Tang, L.**, Xu, L., Ankrah, N.-A., Ofori-Adjei, D., Jolly, P. E., Jonathan H. Williams, J. H., Wang, J.-S and Phillips, T. D. (2009). Urinary 1-hydroxypyrene: Biomarker of PAH exposure in a Ghanaian population. *Sci. Total Environ*, 407:1886-1891.
- Tang, L.**, Tang, M., Huang, T., Yu, J., Zhang, L., Cox, SB., Gao, W.-M and Wang, J.-S. (2008) Modulation of Aflatoxin Biomarkers in Human Blood and Urine by Green Tea Polyphenols Intervention. *Carcinogenesis* 29 (2):411-417.

#### Five Other Significant Publications:

- Tang, L.**, Tang, M., Xu, L., Luo, H., Huang, T., Yu, J., Zhang, L., Cox, SB., Gao, W.-M and Wang, J.-S. 2008. Modulation of Aflatoxin Biomarkers in Human Blood and Urine by Green Tea Polyphenols Intervention. *Carcinogenesis* 29(2):411-417.

**Tang, L.**, Guan, H., Ding, X., and Wang, J.-S. (2007) Modulation of Aflatoxin Toxicity Biomarkers by Lycopene in F344 Rats. *Toxicol Appl Pharm.* 219, 10-17

Cai, Q., **Tang, L.** and Wang, J.-S. 2007. Validation of fumonisin biomarkers in F344 rats. *Toxicol Appl. Pharmacol.* 225:28-39.

Luo, H., **Tang, L.**, Billam, M., Tang, M., Huang, T., Yu, J., Wei, Z., Liang, Y., Wang, K., Zhang, Z., Zhang, L., and Wang, J.-S. 2006. Phase IIa chemoprevention trial of green tea polyphenols in high-risk population of liver cancer: II. Modulation of urinary excretion of green tea polyphenols and 8-hydroxydeoxyguanosine. *Carcinogenesis.* 27:262-268.

**Tang, L.**, Jin, T., Zheng, X. and Wang, J.-S. (2005). Lycopene inhibits the growth of human androgen-independent prostate cancer cells in vitro and in BALB/c nude mice. *J. Nutr.* 135(2): 287-290.

**(d) Synergistic Activities**

1. Cancer Prevention Research Fellowship Award, Awarded by the Cancer Research and Prevention Foundation and American Society of Preventive Oncology, USA, 2004.
2. National Scientific Achievement Award (Level II, #205), Awarded by Ministry of Education, PRC, 2003.
3. Co-Investigator for the National Cancer Institute RO1 grant titled “chemoprevention of green tea polyphenols on liver cancer” (2003-2010).
4. Co-Investigator for the USAID grant titled “Established a global network for aflatoxin exposure” (2008-2013)

**(e) Collaborators & Other Affiliations**

<b>Research collaborators (recent 5 years)</b>	<b>graduate/postdoc advisors</b>	<b>Graduated Ph.D students</b>
Dr. Timothy Phillips (Texas A&M U.), Dr. Pauline Jolly (UAB), Dr. Dan Brown (Cornell U.), Dr. J-Y Hong (Rutgers), Dr. Leslie Shen (Texas Tech U), Dr. Guiju Sun (Southeast U.), Dr. Jianjia Su (Guangxi Cancer Inst.)	Xiaoling Ding (Jiangnan U) Taiyi Jin (Fudan U.) Jia-Sheng Wang (UGA)	0

### Appendix 3. Summary of current (active) grants among the core faculty in the Dept. of Environmental Health Science

Primary EHS Investigator	Role	Grant Title	Grant Agency	Grant Total	Years Awarded
Black, Marsha C.	Principal Investigator	<i>Oyster Spat Sticks to Improve Coastal Water Quality</i>	Georgia Sea Grant	\$129,919	2
	Co-Investigator	<i>Georgia Oceans and Health Initiative (GOHI) Graduate Training Consortium</i>	NOAA	\$518,196	3
	Co-Investigator	<i>Environmental behaviors of solubilized carbon nanotubes in aquatic systems: transformation, sorption and toxicity exposure</i>	EPA	\$383,375 (\$183,227 to MB)	3
Glenn, Travis C.	Multi-PI project	<i>Collaborative Research: The Evolution of Heterostylous Breeding Systems in Populations of <i>Oxalis alpina</i> in the Sky Islands of the United States and Mexico.</i>	NSF	\$140,363 (UGA portion)	3
	Co-Investigator	<i>PIRE: Genetics of invasive species exchanged between the Southeastern U.S. and China, Taiwan &amp; Hong Kong</i>	NSF	\$2.5 M	5
Lipp, Erin K.	Principal Investigator	<i>Georgia Oceans and Health Initiative (GOHI) Graduate Training Consortium</i>	NOAA	\$518,196	3
	Principal Investigator	<i>Watershed scale transport of Salmonella, Campylobacter, and indicator organisms in the Satilla River Basin</i>	USDA	\$384,097	3
	Co-Investigator	<i>Collaborative Research: Ecology of a Reverse Zoonosis: Human-Environment Interactions in the Transmission, Persistence, and Virulence of White Pox Disease in Elkhorn Coral</i>	NSF	\$2.2 M (\$622,686 to EKL)	5
	Co-Investigator	<i>Oyster Spat Sticks to Improve Coastal Water Quality</i>	Georgia Sea Grant	\$129,919	2
	Co-Investigator	<i>Human fecal microflora as a source of coral pathogens in the Dry Tortugas National Park: Are coral pathogens invasive or endemic?</i>	DOI (Nat'l Park Service)	\$69,958 (\$24,592 to EKL)	2
Naeher, Luke P.	Principal Investigator	<i>Biomarkers of Exposure to and Health Effects from SHS in Outdoor Smoking Areas</i>	NIH	\$408,183	2
	Principal Investigator	<i>Natural and Man-made Radiological Levels in Smoke and Surface Fuels in Relation to Prescribed Fires at Savannah River Site and Other Southeastern Forests</i>	USDA	\$89,805	1.5
	Co-Investigator	<i>International Training and Research in Environmental and Occupational Health (Peru)</i>	NIH	\$755,000 (\$77,153 to LPN)	5
Smith, Mary Alice	Principal Investigator	<i>Probiotics to prevent Cronobacter sakazakii (Enterobacter sakazakii)</i>	Mead Johnson	\$45,743	1

		<i>infection and morbidity in a neonatal mouse model</i>	Nutrition		
	Principal Investigator	<i>Refinement of Listeria monocytogenes (L. monocytogenes) low dose data from pregnant guinea pigs for human risk assessment</i>	American Meat Institute Foundation	\$150,000	4
	Co-Investigator	<i>Alfred P. Sloan Foundation Minority Student Network funding directly to Kwaku Agyekum to conduct PhD research with Dr. Smith</i>	Alfred P. Sloan Foundation	\$36,000	4
Jia-Sheng Wang (PI)	Principal Investigator	<i>Chemoprevention of green tea polyphenols on liver cancer</i>	NCI/NIH	\$1.84M	5
	Principal Investigator	<i>Development of methods for establishing a global network for aflatoxin exposure</i>	USAID/ Peanut CRSP	\$1.0M	5
	Co-Investigator	<i>GTP and Tai Chi for Bone Health: a Pilot Study</i>	NCCAM/N IH	\$572,720	3
	Principal Investigator	<i>Distinguished Cancer Scholarship</i>	Georgia Cancer Coalition	\$750,000	5
Phillip L. Williams	Principal Investigator	Endowed Chair (Georgia Power Professor)	Georgia Power		
Anne Marie Zimeri		N/A			

#### **Appendix 4. Library holdings (print journals) relevant to Environmental Health Science. Additional journals are available in electronic format.**

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**Journal**

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*Acta. Pharmacol. Toxicol.*  
*Ambio*  
*American Pharmacy*  
*Analytical Biochemistry*  
*Annual Review of Biochemistry*  
*Applied and Theoretical Electrophoresis*  
*Aquaculture*  
*Aquaculture and Fisheries Management*  
*Aquatic Toxicology*  
*Archives of Biochemistry and Biophysics*  
*Archives of Environmental Contamination and Toxicology*  
*Archives of Toxicology*  
*Australian Journal of Ecology*  
*Biochemical and Biophysical Research Communications*  
*Biochemical Society Transactions*  
*Biochemistry*  
*Biological Bulletin*  
*Biology of Reproduction*  
*Biomarkers*  
*Bulletin of Environmental Contamination Toxicology*  
*Canadian Journal of Fisheries and Aquatic Sciences*  
*Carcinogenesis*  
*Cell Biology and Toxicology*  
*Chemico-Biological Interactions*  
*Chemosphere*  
*Comparative Biochemistry and Physiology*  
*Conservation Biology*  
*Critical Reviews in Toxicology*  
*Developmental Biology and Teratology*  
*Drug and Chemical Toxicology*  
*Ecological Applications*  
*Ecotoxicology and Environmental Safety*  
*Electrophoresis*  
*Environment*  
*Environment International*  
*Environmental Contamination and Toxicology*  
*Environmental Health Perspectives*  
*Environmental Management*  
*Environmental and Molecular Mutagenesis*  
*Environmental Pollution*  
*Environmental Research*  
*Environmental Science and Technology*  
*Environmental Toxicology and Chemistry*  
*Environmental Toxicology and Pharmacology*  
*Environmental Toxicology and Water Quality*  
*Estuaries*

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*European Journal of Toxicology*  
*FEBS Letters*  
*Fisheries*  
*Food and Chemical Toxicology*  
*Free Radicals Biology Medicine*  
*Free Radical Research Communications*  
*Freshwater Biology*  
*Functional Ecology*  
*Fundamental and Applied Toxicology*  
*GA Water Resources*  
*Hazard Assessment of Chemicals*  
*Hydrobiologia*  
*International Review of Cytology*  
*Journal of the American College of Toxicology*  
*Journal of Applied Toxicology*  
*Journal of Biochemical Toxicology*  
*Journal of Biological Chemistry*  
*Journal of Comparative Neurology*  
*Journal of Environmental Engineering*  
*Journal of Environmental Health*  
*Journal of Environmental Quality*  
*Journal of Environmental Pathology, Toxicology and Oncology*  
*Journal of Environmental Science and Health*  
*Journal of Experimental Marine Biology & Ecology*  
*Journal of Experimental Zoology*  
*Journal of Fish Biology*  
*Journal of Food Science*  
*Journal of Great Lakes Research*  
*Journal of Molecular Evolution*  
*Journal of the North American Benthological Society*  
*Journal of Plankton Research*  
*Journal of Toxicology and Environmental Health*  
*Limnology and Oceanography*  
*Marine Ecology Progress Series*  
*Marine Biology*  
*Marine Environmental Research*  
*Marine Pollution Bulletin*  
*Molecular Cell Biology*  
*Mutagenesis*  
*Mutation Research*  
*Nature*  
*Neurobehavioural Toxicology and Pharmacology*  
*Nucleic Acids Research*  
*Oecologia*  
*Pesticide Biochemistry and Physiology*  
*Pharmacology and Toxicology*  
*Polar Biology*  
*Polish Archives of Hydrobiology*  
*Proceedings of the GA Water Resources Conference*  
*Radiation Research*

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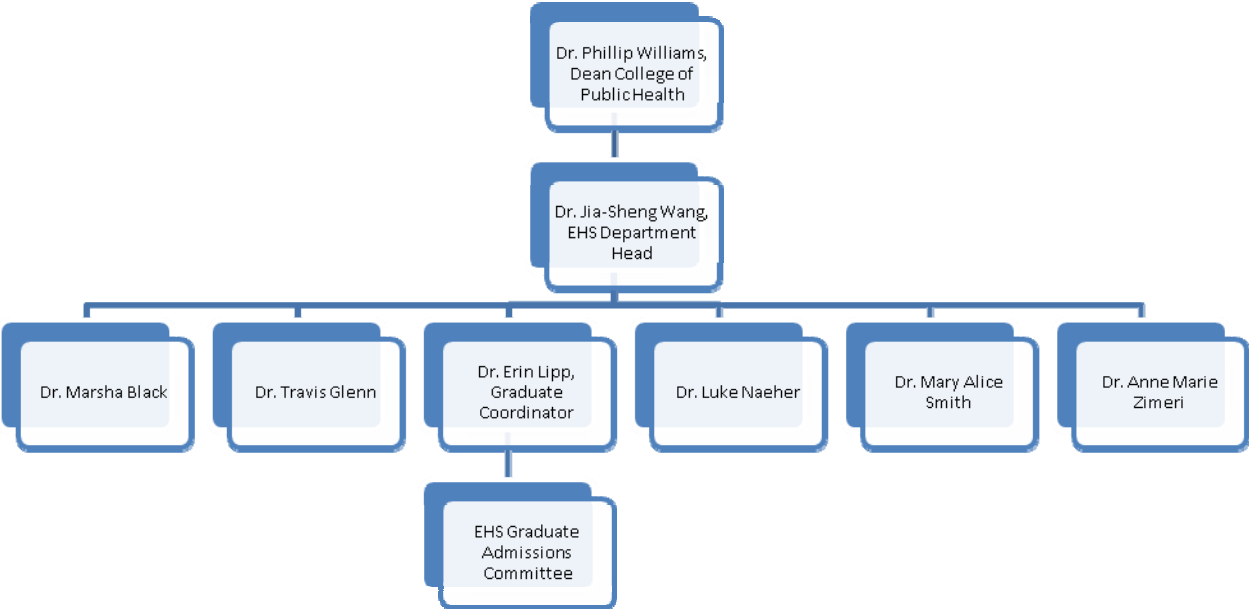


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*Regulatory Toxicology and Pharmacology*  
*Reproductive Toxicology*  
*Reviews in Fisheries Science*  
*Science*  
*Science of the Total Environment*  
*Scientific America*  
*Teratogenesis, Carcinogenesis and Mutagenesis*  
*Toxicity Assessment*  
*Toxicological Sciences*  
*Toxicology*  
*Toxicology and Applied Pharmacology*  
*Toxicology Letters*  
*Toxicology Methods*  
*Toxicon*  
*Water, Air and Soil Pollution*  
*Water Research*  
*Water Science Technology*  
*Xenobiotica*

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**Appendix 5: Organizational Structure of the EHS Department**





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# The University of Georgia

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Interdisciplinary Toxicology Program  
College of Veterinary Medicine  
Department of Physiology and Pharmacology

November 10, 2010

Dr. Erin K. Lipp, Ph.D.  
Associate Professor and Graduate Coordinator  
Department of Environmental Health Science  
College of Public Health

Dear Dr. Lipp,

Thank you for the opportunity to review the proposal by the Department of Environmental Health Science (EHS) to establish a doctoral program in Environmental Health Science. I also asked the executive committee of the Interdisciplinary Toxicology Program (ITP) to review the document and provide feedback. As you are aware, many EHS faculty are members of the ITP and currently participate as mentors for ITP masters and doctoral students in diverse aspects of toxicology, including environmental toxicology. The ITP executive committee recognizes the need for EHS to have a doctoral program that focuses on the environmental aspects (e.g., epidemiology, microbiology, air and water quality, environmental fate) of public health. In reviewing the proposal the committee considered the features/characteristics that distinguish environmental health from environmental toxicology. After careful consideration, the ITP executive committee fully supports an EHS proposal to train doctoral students in aspects of environmental health that lie outside of toxicology, and that clearly limits duplication with the established ITP doctoral program. As always, we look forward to continuing to work with EHS faculty in training doctoral students in toxicology.

Sincerely,

Julie A. Coffield, DVM, PhD  
Associate Professor, Dept. of Physiology and Pharmacology  
Director and Executive Committee Chair  
Interdisciplinary Toxicology Program

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