

MES Program Annual Report



2008-2009

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I. Executive Summary

The MES Program shows strength and vitality after a year full of accomplishments and of change, including a move to new offices and the appointment of a new program director, **A. Kem Fronabarger**.

MES students received 10 travel funding awards this year, both from the MES Program and from **Graduate Research and Presentation Grants** provided by the Graduate School Office, to attend conferences and to make research trips. Four students had their work featured at the College of Charleston's **Graduate Research Poster Session**, where second-year student **Guinn Garrett** (supervising faculty: **Vijay Vulava** and **Timothy Callahan**) won a **Graduate Research Poster Award**. Other student accomplishments include a **2009 National Science Foundation Graduate Research Fellowship**, awarded to first-year student **Sarah Latshaw**.

Ninety-three students were enrolled and/or worked on internship and thesis projects during the year. Twenty-two students started the MES Program in the fall and 10 students started in the spring, with out-of-state students making up 41% of the total. Students enrolled in 18 courses in the fall and 19 courses in the spring (excluding Independent Study, Internship, and Thesis hours).

Nineteen students graduated from the MES Program this year, including five students in the summer, four in December, and 10 in May. MES graduates produced an impressive variety of theses and internship reports, with MES faculty directing a total of 11 internship projects and eight theses to completion. **Ludivine Renaud** and **Gabe Sataloff** received the **MES Outstanding Graduate Student** award in the fall, and **Emily Long** and **Nikki Seibert** received the award in the spring. **Jennifer Scales** received the eighth annual **Dana Beach Outstanding Service Award**.

The MES Program and the MES Student Association organized a number of activities throughout the year. Students, faculty, and alumni were brought together for the annual **Oyster Roast** in December and for a **Spring Fling** in April. MESSA continued its focus on community service, sponsoring events such as the seventh annual **MESSA 8K for H₂O** which raised an outstanding **\$3,500** for the **Coastal Conservation League**. In addition, the students participated in the first **Charleston Green Fair**, the **Charleston Earth Day Festival** at Park Circle, and the **Keep Charleston Beautiful / Earthforce 'Green and Lean' 5K**. MESSA also sponsored **Adopt-A-Highway**, volunteered for the **SC Oyster Restoration and Enhancement Program**, and took part in the **SCDNR Beach Sweep**, among other activities.

More than 20 faculty and internship advisors participated in a one-day workshop designed to solicit feedback and suggestions, and they reiterated that the interdisciplinary nature of the MES Program is its greatest strength. Overseeing the program, the MES Steering Committee consisted of **Mitchell Colgan** (*Geology*), **Jon Hakkila** (*Physics*), **Jaap Hillenius** (*Biology*), **Phil Jos** (*Political Science*), **Robert Mignone** (*Mathematics*), and **A. Kem Fronabarger** (*Director, MES Program*).

II. Enrollment Management

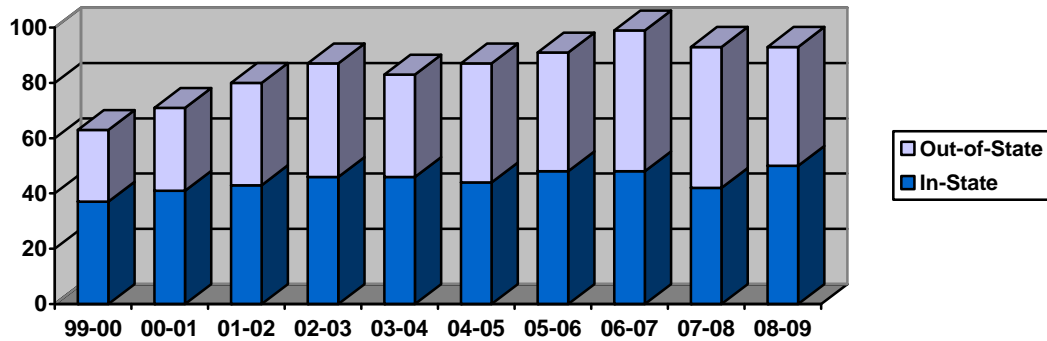
A. Enrollment History

Enrollment in the MES Program held steady, with 93 students enrolled and/or working on internship and thesis projects during the past year. The ability of the MES Program to provide students with a comprehensive background in both Policy and Science remains an attractive feature for prospective students, as does the ability of recent graduates to quickly find career positions in their areas of interest.

B. Total Student Enrollment

A total of 32 new students enrolled in the MES program in the 2008-2009 academic year, nearly 20% more than in 2007-2008. Out-of-state students made up 41% of this total, a significant decrease from the 57% of new students who were out-of-state in the previous year. This may be attributed to the current economy, which could lead prospective students to place additional weight on tuition costs when considering out-of-state schools. Overall, only 46% of the total number of students in the MES Program were out-of-state students during the year, and we may see this number decrease further in the future:

	MES Total Students	MES In-State Students	MES Out-Of-State Students	Out-Of-State as a Percentage of Total Students
1999-2000	63	37	26	41%
2000-2001	71	41	30	42%
2001-2002	80	43	37	46%
2002-2003	87	46	41	47%
2003-2004	83	46	37	45%
2004-2005	87	44	43	49%
2005-2006	91	48	43	47%
2006-2007	99	48	51	52%
2007-2008	93	42	51	55%
2008-2009	93	50	43	46%



Up to 25 new students will enroll in the fall 2009 semester, raising our total enrollment for the coming 2009-2010 academic year above its current high level. As we have seen in the past, the MES Program continues to face increased competition from other Environmental Studies programs with greater financial resources, and providing adequate financial support to our students remains a priority.

C. Graduates

This year, 19 students graduated from the MES Program. Of these 19 graduates, 11 completed internships and eight completed theses. Graduating students receiving awards and honors this year included **Ludivine Renaud** and **Gabe Sataloff**, recipients of the **MES Outstanding Graduate Student** award in the Fall, and **Emily Long** and **Nikki Seibert**, who received the award in the Spring. **Jennifer Scales** received the eighth annual **Dana Beach Outstanding Service Award**.

III. Program Activities

A. Administrative Activities

A. Kem Fronabarger served as Program Director for 2008-2009, with **Mark McConnell** as Program Coordinator.

B. Campus & Public Service

This year the MES Program joined in sponsoring several lectures through the Department of Philosophy. In February, **J. Baird Callicott**, Regents Professor of Philosophy and Chair of the Department of Philosophy at the University of North Texas, gave a lecture entitled "**From Land Ethic to Earth Ethic: Aldo Leopold in the Time of Climate Change**". In April, **Christopher J. Preston**, who teaches philosophy at the University of Montana in Missoula, gave a

lecture entitled "**Saving Creation: Nature and Faith in the Life of Holmes Rolston III**".

In addition, in March the MES Program and the Department of Mathematics sponsored a lecture by **Oliver Komar**, Science Director of SalvaNatura, on "**Conservation Biology in The Tropics**".

These events and others are described in further detail on the MES Calendars of Events for 2008-2009. The calendar for the fall semester can be found online at www.cofc.edu/~environ/calendar087.htm, and the calendar for the spring semester is online at www.cofc.edu/~environ/calendar091.htm

C. Recruiting Activities

The MES Program continued its recruitment efforts through mailings of the MES brochures and the distribution of MES recruiting posters to colleges and universities across the country. In addition, the MES Program maintained its presence on internet sites such as GradSchools.com and Peterson's online. During the past year, a large portion (36%) of applicants to the MES Program reported that they had discovered the program online. As we expand these and other recruiting efforts, we are working with the Graduate School Office on the development of new materials and strategies.

D. Assessment

It can be difficult to ensure that all of the MES Program stakeholders are consulted on a regular basis. At the start of the year, Fronabarger brought together more than 20 faculty and internship advisors in a one-day workshop designed to solicit feedback and suggestions. Over the course of the meeting, those advisors reiterated that the interdisciplinary nature of the MES Program is its greatest strength, and proposed various ways in which to further improve the program. As Program Director, Fronabarger has worked with the MES Steering Committee to implement those suggestions, from clarification of Internship and Thesis guidelines, to the implementation of firm deadlines, to a further emphasis on the interdisciplinary nature of the MES Program

IV. Student Activities and Achievements

A. Student Government

The **MES Student Association (MESSA)** provided outstanding service to the MES Program, the campus, and the community throughout the year. MESSA encourages its members to participate in service activities as a way to promote public service throughout the community. By doing so MESSA hopes to serve as a role model for the College of Charleston, as well as for citizens

and organizations around the, city, county, and state. MESSA works to build a foundation of community service by setting a positive example and by raising community awareness about environmental issues through direct action. Among their many activities and accomplishments, the students:



- Maintained the student chapter of the **Coastal Conservation League (CCL)**, with a mission "to promote environmental awareness and activism among college students by providing an outlet through which students can become aware, concerned, and involved in local and campus issues"
- Participated in **SCORE (South Carolina Oyster Restoration and Enhancement Program)** by monitoring the water quality at one of 100 constructed reef sites. Volunteers from MESSA visit the Bowen's Island reef each week to measure such variables as water and air temperature, pH, salinity, turbidity and dissolved oxygen. This data is entered and submitted online in order to track these variables throughout the year and to evaluate the health of the reefs.
- Joined with the **Charleston Clean City Commission / Keep Charleston Beautiful** in environmental cleanup activities, including the **Keep Charleston Beautiful / Earthforce 'Green and Lean' 5K**.
- Volunteered on the **Adopt-A-Highway** project, maintaining a stretch of Highway 61 from where it leaves Highway 17 after crossing the Ashley River, to its intersection with Wesley Drive.



- Took part in the **South Carolina Beach Sweep/River Sweep**, the largest day of cleanup in South Carolina
- Handed out informational material on many environmentally related topics during **Earth Day** events, and the **Charleston Earth Day Festival** at Park Circle.
- Participated in the first **Charleston Green Fair**.

In these activities, MESSA worked with undergraduate environmental groups on campus. MESSA also brought faculty, alumni, and students together at the annual **Oyster Roast** in the fall at **Fort Johnson**, and at the annual **Spring Fling** in April.

In February, MESSA organized the seventh annual **8K for H₂O** at Folly Beach. The event was a great success, raising an outstanding **\$3500** for charity. The proceeds were donated to a local non profit organization, **Coastal Conservation League (CCL)**, a group with a mission to “protect the natural environment of the South Carolina coastal plain and to enhance the quality of life of our communities by working with individuals, businesses and government to ensure balanced solutions.”



MESSA elected new officers in December:

President:	Aaron Petty
Vice President:	Paul Haywood
Treasurer:	Amy Gutierrez
Secretary:	Lindsey Graham
Social Chair:	Katie Snipes
Public Liaison:	Stefanie Simpson
Outreach Coordinator:	Kelly Sloan

B. Theses and Internships

Students in the Environmental Studies Graduate Program may choose to complete either a thesis or an internship. Students choosing the thesis option are required to write a thesis that demonstrates their familiarity and competency with basic scientific methodology. The thesis is designed to document the student's ability to conceive, implement, analyze and report on his/her original individual or collaborative research.

Students may also perform an internship as part of their academic course of study. Students completing an internship work in an applied setting under the direct supervision of an approved mentor. As part of his/her internship experience, the student works 600 hours or more in the internship setting and

is expected to complete an academic assignment, approved by his/her Program of Study Advisory Committee. Completion of the academic assignment and 600 work hours transfers to six credit hours.

This year, eight theses were completed, and 11 students graduated with completed internship projects. The student's names, project titles, and supervising faculty members are listed below.

Theses

Catherine Booker: Managing Coral Reef Resilience: A Comparison of Patch Reef Communities and Coral Lesion Regeneration in Protected and Unprotected Areas of the Exuma Cays (advisor: Phillip Dustan) Date of Graduation: December, 2008.

Sarah Cech: Invasive Plants in Private Neighborhoods: Does Governance Make a Difference? (advisor: Joel Gramling) Date of Graduation: May, 2009.

Blaik Pulley: *Emerita talpoida* and *Donax variabilis* Population Distribution throughout Crescentic Formations; Pea Island National Wildlife Refuge (advisor: Dennis Stewart) Date of Graduation: August, 2008.

Andrew Ray: The effects of simple management techniques on microbial community dynamics within biofloc-based culture systems and the relationship to shrimp (*Litopenaeus vannamei*) production (advisor: John Leffler) Date of Graduation: August, 2008.

Ludivine Renaud: Methane and Nitrous Oxide Emmissions from Bottomland Hardwood Wetlands in Francis Marion National Forest, SC (advisor: Carl Trettin) Date of Graduation: December, 2008.

Gabe Sataloff: Using a GIS for Simulation, Modeling, and Analysis of Bobcat (*Lynx rufus*) Habitat Utilization on Kiawah Island, SC (advisor: Norm Levine) Date of Graduation: August, 2008.

Stacy Stefan: Seabirds in Coastal South Carolina: An Analysis of Banded Royal Terns and Eastern Brown Pelicans (advisor: Briget Doyle) Date of Graduation: August, 2008.

Suzanne Whitney: The Effects of Habitat Alteration and Disturbance on Nesting Bald Eagles (advisor: Tom Murphy) Date of Graduation: December, 2008.

Internships

Craig Bachman: Enhancing the Educational Components of a Nature-Based Tourism Business (advisor: Andrea Canberg) Date of Graduation: May, 2009.

Tony Gonzalez: A Comparison Study of the Disposal Methods, Processes, and Economic Efficiency of Hazardous Wastes of the United States Coast Guard Sector Charleston and the Local Fishing Industry (advisor: A. Kem Fronabarger) Date of Graduation: August, 2008.

Emily Long: Methods and Technologies for Reducing Particulate Matter Pollution from Port Facilities in Charleston, South Carolina (advisor: Lindeke Mills) Date of Graduation: May, 2009.

Anna Martin: Stakeholder Analysis of the ACE Basin Coastal Training Program: Evaluating Program Impacts within Coastal Decisionmakers' Communities in Southern Coastal Counties of South Carolina (advisor: Lindeke Mills) Date of Graduation: May, 2009.

Jen McCarthy: Program Coordinator for the Citizen Science for Swallow-tailed Kites Program (advisor: Maria Whitehead) Date of Graduation: May, 2009.

Chris McCoslin: The Execution of the Environmental Management Standard ISO 14001:2004, and the Professional Certification for the Medical University of South Carolina, University Risk Management (advisor: Lindeke Mills) Date of Graduation: May, 2009.

Nikki Seibert: From Discourses to Doorknobs: The "Construction" of Green Affordable Housing (advisor: Marcia Snyder) Date of Graduation: May, 2009.

Gregg Swanson: Stakeholder Participation and Public Outreach in the Fisheries Management Process (advisor: Lindeke Mills) Date of Graduation: May, 2009.

Tim Willard: Testing the Efficiency of Residential Energy Conservation Kits in Reducing Monthly Consumption of Water and Energy (advisor: Lindeke Mills) Date of Graduation: May, 2009.

Rachel Worthen: Marine Spatial Planning in the Carolinian Ecoregion: An Assessment of Federal and State Management (advisor: Lindeke Mills) Date of Graduation: May, 2009.

Brittanie Young: Citizen Scientist Based Aquatic Monitoring in Congaree National Park, SC (advisor: Timothy Callahan) Date of Graduation: December, 2008.

C. Departmental and Grant Funded Assistantships

Three of the five departments that make up the MES Program offer a limited number of Teaching Assistantships for MES students: Biology provides at least four, Geology and Environmental Geosciences provides at least two, and Physics and Astronomy provides at least two. Students are reviewed, considered, and awarded these positions at the departments' discretion. In addition to these guaranteed Teaching Assistantships, more TAs can become available each semester as the individual departments determine their teaching needs on a term-by-term basis, and as TAs guaranteed to other programs, such as Marine Biology, go unused. While these additional assistantships are a welcome source of funding for the MES students, their unreliability does not allow the MES Program to use them as recruiting tools, or to provide a solid basis of funding for existing students in the program.

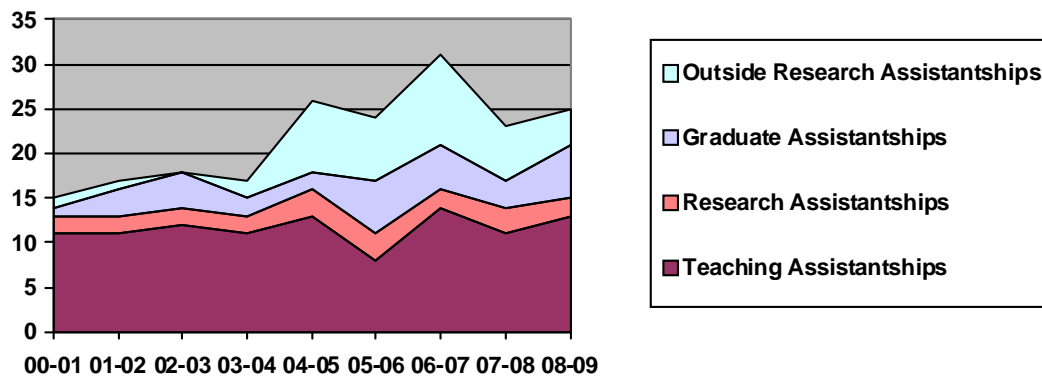
Individual faculty members also provide Research Assistantships acquired from external grants to fund MES students who are working with them on research projects. While these awards are not a guaranteed source of funding, they are appreciated as a additional source of student financial support. Typically, students start the MES Program and by their second semester are working on research projects with faculty who may be able to provide them with Research Assistantships.

Graduate Assistantships are another source of funding for the MES students. These assistantships are provided for non-research related tasks, and are funded through individual programs. The MES Program currently awards two full Graduate Assistantships each year.

Full-time Assistantships are established as 20-hour / week positions through the academic year. Assistantships may also be awarded as half-time or as quarter-time positions. During the past five years, the overall number of assistantships reported by the Graduate School for the MES Program has stayed relatively stable.

MES Student Assistantships:

	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09
Teaching Assistantships	11	11	12	11	13	8	14	11	13
Research Assistantships	2	2	2	2	3	3	2	3	2
Graduate Assistantships	1	3	4	2	2	6	5	3	6
Outside Research Assistantships	1	1	0	2	8	7	10	6	4

**D. Student Conference Participation**

Each year the MES Program provides some financial support for students who participate in field-related conferences, a vital component in the professional development of graduate students. Throughout 2008-2009, funding through the MES Program and several ongoing initiatives from the Graduate School Office allowed a number of students to participate in conferences in their discipline. Due to the diverse nature of the MES Program, first and second year students attend a wide variety of conferences. This year, for example:

- **Melisa Bimbi** received funding to present her research in a paper entitled *The Effect of Relocation and Key Environmental Factors on Loggerhead Sea Turtle (*Caretta caretta*) Nests on Cape Island, South Carolina, USA* at the international **29th Annual Symposium on Sea Turtle Biology and Conservation** in Brisbane, Australia.
- **Guinn Garrett** received funding to present her paper *Application of Geochemical End-Member Mixing Analysis to Delineate Water Sources in a Lowland Watershed* at the **Joint Meeting of the Geological Society of America** in Houston, Texas.

- **Paul Haywood** received funding to conduct his thesis research on *Environmental and Habitat Variable Influence on Tropical Terra firma and Tributary Stream Fish Assemblage Structures* at **El Imposible National Park** in El Salvador.
- **Carolyn Hendrix** received support to present her paper *Retention of Three Tag Types Applied to Adult Red Drum in South Carolina Waters* at the annual meeting of the **SC American Fisheries Society and the SC Fisheries Workers Association** in Clemson, South Carolina.
- **Tyler Lawson** received support to present his research entitled *Los Efectos del Habitat en *Agalychnis moreletii*, una Rana en Peligro de Extincion* at the **XII Congreso Sociedad Mesoamericana para la Biología y la Conservación** in San Salvador, El Salvador.
- **Jennifer McCarthy** received funding to present her research entitled *Citizen-Science for Swallow-tailed Kites: Integrating Citizen Science and Research* at the **Partners in Flight Conference** in Columbia, South Carolina.
- **Jeffrey Medves** also received support to present his research entitled *Use of Enhanced NEHRP Soil Maps for Hazus-MH Analysis in Charleston, South Carolina* at the **Joint Meeting of the Geological Society of America** in Houston, Texas.
- In addition, **Medves** received funding to present *Enhancing NEHRP Soil Classifications for Hazus-MH Analysis and Mapping in Charleston, South Carolina* at the **2009 Annual Meeting of the Seismological Society of America** in Monterey, California.
- **Nicole Seibert** received support to present *Critical Analysis of US Greenbuilding Council* at the **Greenbuilding Expo (US Greenbuilding Council)** meeting in Boston, Massachusetts.
- **Kate Skaggs** received funding to present *Examining Market-based Solutions for Conservation Governance in the Lowcountry* at the **Association of American Geographers 2009 Annual Meeting** in Las Vegas, Nevada.

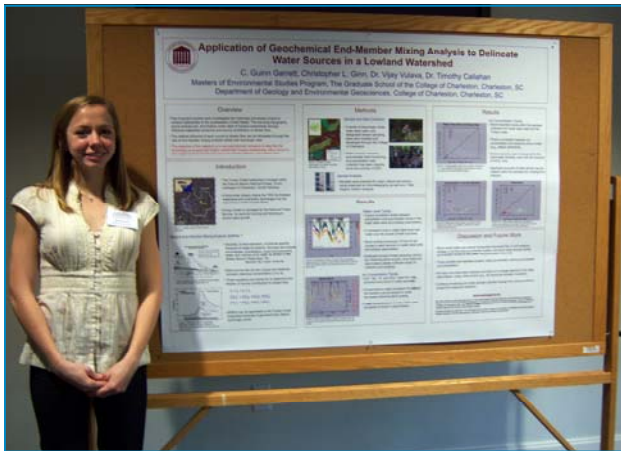
E. Scholarships and Awards

Two College of Charleston scholarships, the **Barbara Lindstedt Trust Award** and the **Environmental Protection Agency Fellowship**, are awarded each year to MES students. For the 2008-2009 academic year, the **Barbara**

Lindstedt Trust Award was awarded to first-year students **Chrissie Lanzieri** and **Tiffany Norton**. The **EPA Fellowship** was awarded to first-year students **José Goncalves** and **Meredith Moore**.

MES students also received **Summer Research Awards in Environmental Studies**, offered through the Graduate School at the College of Charleston. These awards provide MES students with much needed research support during the summer terms. Available funding provided summer support for second year students **Tyler Lawson**, **Katie Luciano**, and **Jen McCarthey**, and for first-year recipients **Sarah Hunter**, **Meredith Moore**, and **Emma Paz**.

In addition to these scholarships, 2008-2009 marked the continuation of a program through the Graduate School Office to provide research support for graduate students. MES students took advantage of the opportunity to apply for **Graduate Research and Presentation Grants**, and several were awarded funding for their work.



The Graduate School Office also hosted the Third Annual Graduate Research Poster Session on January 29th in order to highlight the research projects of the seventeen Master's Programs at the College of Charleston. A number of posters were presented, including four student presenters from the MES Program. A selection team of deans, faculty, and staff reviewed these posters, and presented a

Graduate Research Poster Award to MES student **Guinn Garrett** (supervising faculty: **Vijay Vulava** and **Timothy Callahan**) for her poster entitled *Application of Geochemical End-Member Mixing Analysis to Delineate Water Sources in a Lowland Watershed*.

MES students earned awards from other agencies and organizations as well. First-year student **Sarah Latshaw** was awarded a **2009 National Science Foundation Graduate Research Fellowship**, which carries with it an annual stipend of \$30,000, a \$10,500 cost-of-education allowance for tuition and fees, and a one-time \$1,000 travel allowance. Sarah is one of three students in South Carolina who received the NSF Graduate Research Fellowship this year, along with Clemson University student Lauren Cairco (Human Computer Interaction)



and Clemson University student Laura Datko (Bioengineering and Biomedical Engineering). Sarah is working on her project **Restoration of Maritime Habitats on a Barrier Island Using the Painted Bunting (*Passerina ciris*) as a Flagship Species**, and her primary academic advisor is **Paul Nolan**.

MES second-year student **Kate Skaggs** was awarded a student research grant from the **Qualitative Research Specialty Group** of the **Association of American Geographers**. This national-level award will assist Kate with her research project entitled **Implications of Emerging Neoliberal Politics on Conservation Governance in the South Carolina Lowcountry**.

In addition, MES second-year student **Chris Henson** and first-year student **Tessa Rattenbury** were awarded prestigious scholarships to attend **Summer Statistical Genetics** workshops at the **University of Washington**. These modules are taught by the leaders in this field, and participants in the modules include graduate students from around the world, post-docs and faculty.

V. Faculty

A. Participating Faculty

The MES faculty consists both of roster members of the College of Charleston faculty and of individuals who are accepted for participation in the program. Currently, there are 62 roster faculty members and 91 adjunct faculty members who actively teach and advise in the MES Program. Adjunct faculty members are affiliated with a wide variety of institutions, including:

- Center for Coastal Environmental Health & Biomolecular Research
- Center for Forested Wetlands Research
- The Citadel
- Grice Marine Laboratory
- International Paper
- MUSC
- Nature Conservancy
- NOAA National Ocean Service
- NOAA Coastal Services Center
- SC Department of Natural Resources
- SC Sea Grant Consortium
- South Carolina Aquarium
- Southern Division Naval Facilities Engineering Command
- US Army Corps of Engineers

- USDA Forest Service
- USDA Vegetable Laboratory

A complete list of the MES Program faculty is located on the program web site at <http://www.cofc.edu/~environ/faculty.htm>

B. Teaching Evaluation

All MES Program instructors are evaluated through the College of Charleston student evaluation process. These evaluations are kept on file at the MES Program office.

C. Faculty Research

Information on the research activities of faculty members participating in the MES program is available in the faculty/staff section of the MES Program web site at: www.cofc.edu/~environ/faculty.htm

VI. Curriculum

A. Curricular Changes

The MES Program saw continued development during the 2008-2009 academic year with the addition of new courses, including **Climate Change Modeling** and forthcoming courses **Ecopreneurship** and **Global Climate Change**.

B. Course Offerings - Fall 2008

CORE COURSES			INSTRUCTOR	MES ENROLLMENT
EVSS 601.090	<i>Economic Theory for Policy Analysis</i>	3 hrs	Marcia Snyder	17
EVSS 602.001	<i>Public Policy</i>	3 hrs	Lindeke Mills	15
EVSS 610.090	<i>Environmental Biology</i>	3 hrs	Courtney Murren	9
EVSS 640.090	<i>Earth Systems Science</i>	3 hrs	Steven Jaume	15
EVSS 641.001	<i>Aqueous Geochemistry</i>	4 hrs	Vijay Vulava	7
EVSS 646.090	<i>Graduate Core Seminar</i>	1 hr	A. Kem Fronabarger	15
EVSS 680.090	<i>Case Studies on Environmental Issues</i>	4 hrs	M. Colgan / B. Leigh	14
ELECTIVE COURSES				
EVSS 605.090	<i>Environmental Law & Reg. Policy</i>	3 hrs	Lindeke Mills	11
EVSS 608.090	<i>Perspectives on Public Admin.</i>	3 hrs	Phil Jos	2
EVSS 626.001	<i>Environmental Immunology</i>	4 hrs	Karen Burnett	1
EVSS 627.001	<i>Marine Tetrapod Biology</i>	4 hrs	David Owens	9

EVSS 628.001	<i>Plant Ecology</i>	3 hrs	Courtney Murren	3
EVSS 633.N90	<i>Urban Planning</i>	3 hrs	Layne West	8
EVSS 649.001	<i>Geographic Information Systems</i>	4 hrs	Norman Levine	3
EVSS 649.002	<i>Geographic Information Systems</i>	4 hrs	Norman Levine	11
EVSS 695.002	<i>Wildlife Law</i>	3 hrs	Lindeke Mills	8
EVSS 724.001	<i>Ichthyology</i>	4 hrs	Tony Harold	5
EVSS 746.090	<i>Aquatic Toxicology</i>	4 hrs	Paul Pennington	5

EVSS 601 ECONOMIC THEORY FOR POLICY ANALYSIS

This course develops and applies microeconomic models and theories to the analysis of contemporary public sector issues. Attention is given to the conceptual and practical problems associated with resource allocation decisions when there is conflict among efficiency, equity and limited information in policy making. The foundations of welfare economy and techniques and applications of cost-benefit analysis as they relate to specific policy areas and programs are examined as well.

EVSS 602 PUBLIC POLICY

This course seeks to develop a firm understanding of the public policy making process in the United States. Students study policy making through various perspectives on implementation. The roles of major institutions including the Executive, Legislative, and Judicial branches of government, the bureaucracy and interest groups in this process are addressed. Integrated within this study of the process are various perspectives and interpretations of policy making, including incrementalism, rationalism, pluralism and elitism. Selected areas of public policy, including transportation, poverty, energy and the environment are used to illustrate both the process and the different perspectives.

EVSS 605 ENVIRONMENTAL LAW & REGULATORY POLICY

This course concentrates on the development of environmental laws and regulations in this country. The course is taught by an attorney and will help students develop an understanding of the scope and substance of environmental laws and the methods by which these statutes address environmental issues using different regulatory techniques.

EVSS 608 PERSPECTIVES ON PUBLIC ADMINISTRATION

The study and practice of public administration in the United States in the 20th century and today. This course examines the historical development

of the field of public administration and current approaches to the study and practice of public administration.

EVSS 610 ENVIRONMENTAL BIOLOGY

This course emphasizes the application of fundamental toxicological and microbiological concepts to problems which exist in the real world. The course should prepare the student interested in environmental problems with the necessary practical information to make sound judgments in assessing meaningful solutions to existing environmental problems.

EVSS 626 ENVIRONMENTAL IMMUNOLOGY

This course provides an introduction to the field of basic immunology, an understanding of scientific approaches and techniques used for assessing the effects of environmental stressors on human and wildlife populations, and training in the critical review and presentation of literature in the areas of immunotoxicology, clinical and comparative immunology.

EVSS 627 MARINE TETRAPOD BIOLOGY

This lecture, laboratory, and field course emphasizes both the diversity and common themes of the physiological, behavioral, and anatomical adaptations that characterize certain lineages of reptiles, birds, and mammals that exploit a wide array of marine habitats. Highlighting the faunas of South Carolina, we will evaluate marine tetrapods as models for advanced studies in evolution, physiology, behavior, ecology, and conservation.

EVSS 628 PLANT ECOLOGY

Plant Ecology will explore the population ecology of plants covering the genetic, spatial, age, and size structure of plant populations. The focus will be on understanding the origin of these different kinds of structured, understanding how they influence each other, and understanding why they change with time.

EVSS 633 URBAN PLANNING

This course analyzes contemporary issues/problems in the urban arena and the role of planning in implementing solutions to them. An overview of urbanization and the planning process is given to begin the semester. The majority of the time, however, is spent on studying a variety of issues from economic development through the environment to homelessness. The emphasis is on connecting planning and what planners do with ideas and

events in the larger society; less time is spent on dates and names of federal programs and specifics of the planning process. Students are expected to achieve a knowledge of contemporary urban issues, potential planning solutions, and apply this information to an empirical study in the metropolitan Charleston area.

EVSS 640 EARTH SYSTEMS SCIENCE

This course investigates the interactions among the atmosphere, ocean, ice, solid-Earth and biological systems. Students will study the evolution of solid-Earth, the formation of the atmosphere and oceans, and the origin of life. Rate and scale of changes of the Earth's environment will be examined through an analysis of changing climates. Finally, the course examines human evolution and technological development to gain an understanding of human impacts on the global environment.

EVSS 641 AQUEOUS GEOCHEMISTRY

A detailed examination of the chemical processes that affect ground-and-surface waters, especially those which control the migration of common water contaminants. Topics include mass transport, equilibria, chemical retardation, Eh-pH stability, stable isotopes and geochemical cycles.

EVSS 646 GRADUATE CORE SEMINAR

Seminars on contemporary topics in environmental studies acquaint students with the variety of disciplines and techniques available to natural, physical, and policy scientists working in the environmental field. Designed especially to stimulate new-to-the-program students to choose their thesis topics and/or to determine the focus of their program of study.

EVSS 649 GEOGRAPHIC INFORMATION SYSTEMS

This course will covers spatial types and quality, data input operations, database management, data analysis, and software design concerns. We will also examine institutional and political concerns for using GIS. Computer-based GIS software (Unix, PC, and Mac) will be used throughout the course.

EVSS 680 CASE STUDIES IN ENVIRONMENTAL ISSUES

This course investigates specific case studies. Case studies impart a unique opportunity to explore basic principles of biology, chemistry, geology and physics through practical applications. This approach to problems will be similar to that used by the practitioners of science and public policy.

**EVSS 695 SPECIAL TOPICS IN ENVIRONMENTAL STUDIES:
WILDLIFE LAW**

The course goes beyond the Endangered Species Act to look at other U.S. statutes dealing with wildlife, as well as international treaties and conventions. Topics include public and private interests in wildlife, protection for biodiversity and ecosystems, federal land issues, perhaps some state fish and game law administration, fisheries, and definitely, international wildlife law. This course is of particular interest to students interested in fisheries, turtles, dolphins and endangered species conservation. There are no prerequisites. Although a standard law school casebook will be used, suitable for a graduate level course, it is not necessary to have had a prior law class.

EVSS 724 ICTHYOLOGY

A study of fishes, emphasizing diversity and evolution, morphology, physiology, ecology, life histories, behavior, systematics and biogeography. Laboratory work will focus on groups important in the local fauna.

EVSS 746 AQUATIC TOXICOLOGY

An introduction to assessing the effects of toxic substances on aquatic organisms and ecosystems. Topics include general principles of toxicology, fate and transport models, quantitative structure-activity relationships, single-species and community-level toxicity measures, regulatory issues, and career opportunities. Examples will be drawn from marine, freshwater and brackish-water systems.

C. Course Offerings - Spring 2009

CORE COURSES			INSTRUCTOR	MES ENROLLMENT
EVSS 601.090	<i>Economic Theory for Policy Analysis</i>	3 hrs	Marcia Snyder	13
EVSS 602.001	<i>Public Policy</i>	3 hrs	Lindeke Mills	12
EVSS 646.090	<i>Graduate Core Seminar</i>	1 hr	A. Kem Fronabarger	12
EVSS 650.090	<i>Energy Prod. & Resource Mgmt.</i>	3 hrs	Jim Neff	12
EVSS 659.090	<i>Environmental Statistics</i>	3 hrs	Martin Jones	26
EVSS 680.090	<i>Case Studies on Environmental Issues</i>	4 hrs	S. Harris / A. von Lehe	12

ELECTIVES				
EVSS 607.001	<i>Administrative Law</i>	3 hrs	Lindeke Mills	4
EVSS 619.001	<i>Biology of Coral Reefs</i>	3 hrs	Phil Dustan	3
EVSS 624.001	<i>Biometry</i>	4 hrs	Allan Strand	3
EVSS 629.001	<i>Conservation Biology</i>	4 hrs	Robert Franklin	1
EVSS 630.090	<i>Natural Resource Law and Policy</i>	3 hrs	Lindeke Mills	10
EVSS 642.090	<i>Remote Sensing</i>	4 hrs	Robert Nusbaum	1
EVSS 645.001	<i>Coastal Issues and Processes</i>	3 hrs	Scott Harris	14
EVSS 649.001	<i>Geographic Information Systems</i>	4 hrs	Norman Levine	8
EVSS 695.001	<i>Political Ecology</i>	3 hrs	Annette Watson	8
EVSS 695.002	<i>Advanced Geographic Info Systems</i>	4 hrs	Norman Levine	7
EVSS 695.003	<i>Climate Change Modeling</i>	4 hrs	Laney Mills	6
EVSS 721.090	<i>Aquaculture</i>	3 hrs	John Leffler	4
EVSS 726.090	<i>Fisheries Science</i>	3 hrs	M. Reichert	4

EVSS 601 ECONOMIC THEORY FOR POLICY ANALYSIS

This course develops and applies microeconomic models and theories to the analysis of contemporary public sector issues. Attention is given to the conceptual and practical problems associated with resource allocation decisions when there is conflict among efficiency, equity and limited information in policy making. The foundations of welfare economy and techniques and applications of cost-benefit analysis as they relate to specific policy areas and programs are examined as well.

EVSS 602 PUBLIC POLICY

This course seeks to develop a firm understanding of the public policy making process in the United States. Students study policy making through various perspectives on implementation. The roles of major institutions including the Executive, Legislative, and Judicial branches of government, the bureaucracy and interest groups in this process are addressed. Integrated within this study of the process are various perspectives and interpretations of policy making, including incrementalism, rationalism, pluralism and elitism. Selected areas of public policy, including transportation, poverty, energy and the environment are used to illustrate both the process and the different perspectives.

EVSS 607 ADMINISTRATIVE LAW

A study of the legislative, adjudicatory, and general policy-making powers of administrative agencies and regulatory commissions, and the scope of

judicial review of administrative action. The course is directed primarily toward an analysis of the political nature of the bureaucracy, and secondarily toward the procedural requirements for administrative policy-making.

EVSS 619 BIOLOGY OF CORAL REEFS

An introduction to the biology and ecology of reef-building corals and coral reefs. Topics to be covered include coral ecology (nutrition, reproduction, growth, population structure), taxonomy and systematics, distribution, reef-building processes, and natural and human induced disturbances.

EVSS 624 BIOMETRY

This course is intended to provide a broad treatment of statistics concentrating on specific statistical techniques used in biological research. Topics covered include sampling procedures and analysis of distributions (binomial, poisson, and normal), hypothesis testing and estimation with emphasis on analysis of frequencies, regression and correlation. Several nonparametric and multivariate methods are also discussed. Emphasis is on application of statistical techniques and not theory; knowledge of mathematics through calculus is expected.

EVSS 629 CONSERVATION BIOLOGY

A course exploring the origin, maintenance, and preservation of biodiversity at all levels: genetic, population, community, ecosystem and biosphere. The focus will be on applying ecological, genetic, and evolutionary principles to problems in conservation. The lab component of this course will consist primarily of field trips that emphasize local and regional conservation issues.

EVSS 630 NATURAL RESOURCE LAW AND POLICY

This course is about the laws and policy that regulate and affect the use of natural resources including: (1) air, water, and sensitive ecosystems; (2) range land, wilderness areas, endangered species, fish and wildlife; (3) gold, silver, iron, copper and other "hard rock" minerals; (4) forest land and timber; (5) water in rivers, lakes, marshes and underground reservoirs; (6) energy sources such as oil, gas, coal, uranium and falling waters; (7) alternative energy sources such as geothermal resources, wind and biomass; and (8) most importantly, land. This survey/overview course will include an introduction to the administrative law of federal agencies that regulate the use of public lands and resources.

EVSS 642 REMOTE SENSING

Course will cover the fundamentals and applications of remote sensing. Topics include: remote sensing theory, data collection, reduction and application, computer software tools, data acquisition and ties to geographic information systems (GIS). The course emphasis is on environmental problems.

EVSS 645 COASTAL ISSUES AND PROCESSES

This course will provide an in-depth understanding of the coastal environment, including coastal policies and environmental issues that result from the activity of humans. Subjects that will be covered include: origin of coastlines, physical processes, coastal hazards, and coastal zone management.

EVSS 646 GRADUATE CORE SEMINAR

Seminars on contemporary topics in environmental studies acquaint students with the variety of disciplines and techniques available to natural, physical, and policy scientists working in the environmental field. Designed especially to stimulate new-to-the-program students to choose their thesis topics and/or to determine the focus of their program of study.

EVSS 649 GEOGRAPHIC INFORMATION SYSTEMS

This course will covers spatial types and quality, data input operations, database management, data analysis, and software design concerns. We will also examine institutional and political concerns for using GIS. Computer-based GIS software (Unix, PC, and Mac) will be used throughout the course.

EVSS 650 ENERGY PRODUCTION AND RESOURCE MANAGEMENT

A study of the nature of energy and scientific issues relating to its production, storage, distribution and use from a physics perspective. Production methods to be studied include: Hydroelectric, fossil fuel, fission, fusion, wind, photovoltaic, biomass and solar-dynamic. Scientific issues will be related to the cultural and philosophical framework surrounding energy infrastructure and policy.

EVSS 659 ENVIRONMENTAL STATISTICS

This course provides an introduction to environmental statistics and risk assessment. Topics include probability, correlation, regression, hypothesis testing, analysis of variance, model testing, residual analysis, and non parametric models. Environmental applications will be provided throughout the course.

EVSS 680 CASE STUDIES IN ENVIRONMENTAL ISSUES

This course investigates specific case studies. Case studies impart a unique opportunity to explore basic principles of biology, chemistry, geology and physics through practical applications. This approach to problems will be similar to that used by the practitioners of science and public policy.

**EVSS 695 SPECIAL TOPICS IN ENVIRONMENTAL STUDIES:
ADVANCED GEOGRAPHIC INFORMATION SYSTEMS**

Advanced study of spatial types and quality, data input operations, database management, data analysis, and software design concerns. We will also examine institutional and political concerns for using GIS. Computer-based GIS software (Unix, PC, and Mac) will be used throughout the course.

**EVSS 695 SPECIAL TOPICS IN ENVIRONMENTAL STUDIES:
CLIMATE CHANGE MODELING**

An introduction to the study of the physics of the Earth's climate. Topics include climatic change and classification; the spectrum of radiation; absorption; scattering; transmission; radiation; the tropospheric balance; the energy balance at the Earth's surface; time variations in the energy balance; apparent forces in a rotating coordinate system; the horizontal and vertical equations of motion; the continuity equation; the primitive equations; thermally driven circulation; the atmospheric transport of energy; the atmosphere as a heat engine; the ozone problem.

**EVSS 695 SPECIAL TOPICS IN ENVIRONMENTAL STUDIES:
POLITICAL ECOLOGY**

This class critically examines the relationship between humans and their environments, focusing on the politically volatile nature of human resource use, how resource distribution occurs (evenly or unevenly), who controls the distribution, and how the distribution impacts local and global economic, social, and ecological systems .

EVSS 721 AQUACULTURE

This course will take a holistic perspective on aquaculture and how it is practiced in both freshwater and saltwater, domestically and globally.

EVSS 726 FISHERIES SCIENCE

A general introduction to methods of harvesting aquatic resources and collection and evaluation of biological data to effectively manage these resources. Topics include age and growth analysis; mortality, recruitment, and yield; production and early life history; stock assessment techniques; and detailed study of certain important fisheries.

VII. Needs and Priorities

As discussed in previous annual reports, a number of needs and priorities were laid out by the most recent comprehensive review of the MES Program, and many have been addressed. One concern that remains is that the MES Program continues to face increased competition from other Environmental Studies programs with greater financial resources, and providing adequate financial support to our students remains a priority.