Looking at Life in the East  
Dr. Jeff McKinnon, chair

Since I arrived at ECU in 2008, the Department of Biology has hired 12 tenure-track faculty members, not counting the three hires we are completing this year. In a buyer’s market and with a program rising rapidly in reputation and stature, we have been able to hire incredibly talented young faculty members—and dramatically increase faculty diversity at the same time.

We are now starting to see the fruits of this effort, as the department’s culture has been given a powerful shot in the arm. In particular, the new faculty members have more thoroughly incorporated our students, especially the graduate students, into the intellectual and social life of the department—and we are better for it. For example, we recently hosted our first major speaker chosen and recruited by our students, Dr. Hopi Hoekstra of Harvard University. She gave a stellar presentation and, even more important, the obvious delight she takes in her science rubbed off on all of us. She also helped lead a well attended session on women and science that shifted into a more general discussion of balancing family responsibilities with an academic life. Similarly, some junior faculty members recently worked with more senior colleagues, and also our grad students, to lead a wonderfully successful symposium on biodiversity and climate change.

All the turnover and new additions do present challenges, however. We have had to ask more of our facilities and of the aging Howell Science, and meeting some needs has been difficult. Retention has also been a concern in a time of infrequent pay raises. These issues are significant, but for me, the progress the department has made remains undeniable. Additional challenges will surely arise, but I remain confident that this talented group of people will overcome them.

Problem Based Learning Classroom  
Open for Business
Howell Science Complex Renovations Continue

A new era of instruction was begun when the Department of Biology officially opened the Problem Based Learning classroom in October, 2013. The classroom is located in room N102 in the Howell Science Complex, and was completely redesigned to facilitate groups of students working together while the instructor is able to easily communicate with a few or all students.

Renovations of Howell Science research labs S105 and S115 (those of Krista McCoy and Mike McCoy) were also completed, allowing these faculty members to continue their research in up-to-date facilities.
Dave Kimmel was recognized with a 2013-14 University Research/Creative Activity Award in the Five-Year Achievement category. His research explores how human-driven environmental changes impact estuarine, coastal and marine populations.

“North Carolina is a good ‘ground zero’ for global environmental change impacts on a coastal region,” Dr. Kimmel said. “I foresee my research continuing to investigate the changing food-web dynamics in coastal North Carolina as the environment continues to change.

Dr. Kimmel’s research has focused primarily on zooplankton but has expanded to include the climate’s effect on oyster populations in Chesapeake Bay, to assist in oyster restoration. Dr. Kimmel also studies jellyfish populations in the Neuse River and how humans and jellyfish interact.

“The coastal areas of North Carolina are a network of complex habitats that are under threat from climate change and are also home to a growing human population,” he said.

Since joining ECU’s faculty in 2008, he has published 20 peer-reviewed journal papers and book chapters, and has authored 18 contributed papers and posters at national and international conferences. He has secured nine research awards from funding agencies including the National Science Foundation (NSF), NOAA Coastal Ocean program, North Carolina Sea Grant and PCS Phosphate Corporation. Kimmel has secured four awards from the NSF Biological Oceanography program since 2008.

“I especially enjoy mentoring young scientists,” Dr. Kimmel said, “and helping them through the formative years of their careers.”

Sue McRae Recognized with 2014 ECU Scholar-Teacher Award

The ECU Scholar-Teacher Award recognizes outstanding faculty members who integrate scholarship and teaching. Dr. McRae presented a talk entitled “Infusing Teaching with Scholarship: Taking the Student Out of the Classroom and into the Real World” at the 2013-2014 ECU Scholar-Teacher Awards and Symposium. This symposium was held during the Annual Research & Creative Achievement Week, 2014.

David Chalcraft’s research honored

A research paper by ECU Biology professor Dr. David Chalcraft was designated as one of 100 Influential Papers published in British Ecological Society journals. The article, “Functional diversity within a morphologically conservative genus of predators: implications for functional equivalence and redundancy in ecological communities,” originally appeared in Functional Ecology.

Biology Professor Receives UNC Board of Governors Teaching Award

The most rewarding thing about teaching biology for Dr. John Stiller is also the most difficult: Helping students reach those “light bulb” moments in which they obviously have grasped the material. After years of helping students do just that, Dr. Stiller has been named one of the recipients of the UNC Board of Governors’ Award for Excellence in Teaching. The award is given annually to one educator from each of the 17 UNC-system schools to honor outstanding contributions in the classroom. For Dr. Stiller, the most important characteristic of a good teacher is that the educator must genuinely care about his or her students and help them reach their intellectual goals. “Not everyone who becomes an instructor is a gifted speaker, can make beautiful, artistic slides, or brings a natural sense of humor into the classroom,” Dr. Stiller said. “Students will forgive many sins in classroom delivery, or in research mentorship, as long as they believe the teacher is genuinely on their side and supportive of their efforts and aspirations.”
Plant Biochemist Added to Interdisciplinary Biotechnology Initiative

Yiping Qi, who earned his Ph.D. in Plant Biological Sciences at the University of Minnesota-Twin Cities in 2009, is an exciting addition to the Department of Biology. His primary research interest is plant disease resistance, which is critical for sustainable crop production. Despite relatively successful disease control (mainly through chemicals which are not environmentally friendly), plant disease still causes a significant global yield loss in crops. While the mechanisms for plant disease resistance can be generally divided into constitutive resistance or inducible resistance, Dr. Qi’s research focuses on inducible resistance, and his lab investigates how the two types of immune receptors (resistance proteins and pattern-recognition receptors) function in plant cells through both genetic and biochemical approaches. He employs a model system where Arabidopsis thaliana is the plant host and Pseudomonas syringae is the bacterial pathogen. He hopes to transfer knowledge gained from basic research to engineering disease resistance crops.

Dr. Qi’s second research interest is precise genome editing in plants. In plant cells, the broken DNA is typically repaired by one of the two repair pathways: non-homologous end-joining (NHEJ) and homologous recombination (HR). The NHEJ pathway is error-prone and can lead to mutations. The HR pathway utilizes a homologous DNA template for repair and allows precise DNA modifications. With “DNA scissors” that can induce DNA double strand breaks (DSBs) in a site-specific manner, targeted mutagenesis (through NHEJ) or gene replacement (through HR) can be achieved. He will use these site-specific nucleases as reverse genetics tools in his studies on plant disease resistance. In addition, he would like to further develop efficient genome modification means in crop species which may change how genetically modified crops are made and how they are perceived by the public.

New Microbial Ecologist with Musical Past Keen to Cross Disciplines

The Research in the Peralta Lab is focused on microbial biodiversity and ecosystem function in human-dominated ecosystems. Questions guiding her research include: How does previous land use management influence ecosystem services mediated by microorganisms? How can desirable functions be restored? Can managing for desirable microbial communities and functions enhance ecosystem services in restored wetlands and increase the sustainability of food systems? To explore these questions, her research bridges microbiology, biogeochemistry, community ecology and the applied disciplines of restoration ecology and agroecology.

Land use history can elicit permanent changes in microbial community structure and function, and can positively or negatively influence ecosystem services. The strength and outcome of these legacy effects may be variable due to the persistence of microorganisms from previous land management. Research in the Peralta Lab explores the following questions:

1) How does past land use impact contemporary microbial community composition and function?

2) How can current management practices enhance microbial ecosystem services?

3) What are social-ecological barriers to managing microbial ecosystem services?

Ariane received her Ph.D. in Ecology, Evolution, and Conservation Biology from University of Illinois at Urbana-Champaign, 2011, and completed her post-doctoral studies at Indiana University in Bloomington, Indiana. Her real claim to fame, however, is as the bassist for the Americana rock/alt country band ‘The Beauty Shop’ - even once opening for the Violent Femmes!

Biology Advancement Council 2013-14 President

Judy K. Heath, MS., of GlaxoSmithKline was elected the 2013-2014 President of the Biology Advancement Council. Judy graduated from East Carolina University in 1984 with a BS degree in Biology and received a Master’s degree in 1989. Judy’s concentration during the Master’s program was microbial ecology under the guidance of Bob Christian. Judy has a 23-year work history with GlaxoSmithKline in Research Triangle Park, NC. Her current role is Team Leader with the RAMOS Clinical Trial division. Judy’s hobbies include acting in community theatre, fishing, gardening, and teaching children about Biology.
Marcelo Ardon’s wetlands research in major publications

Research by ECU professor Marcelo Ardón-Sayao, assistant professor of ecology in the Department of Biology, has appeared in two major science publications in 2013. His work on soil and surface water runoff from natural and restored wetlands in North Carolina has been featured in the journal Global Change Biology and in the science journal Nature.

Dr. Jeff McKinnon, chair of the Department of Biology in the Thomas Harriot College of Arts and Sciences, said Dr. Ardón’s research is directly relevant to the people of Eastern North Carolina, as well as having national and international implications.

“His work highlights the complexity of the effects of more frequent salt-water incursions due to droughts and sea-level rise on both natural and restored wetland ecosystems,” said Dr. McKinnon. Coastal freshwater wetlands diminish nitrogen delivery to sensitive coastal waters, but according to Ardón, increased salinity from droughts and sea-level rise may threaten this important service.

To test for salinity effects on nitrogen cycling, Dr. Ardón and collaborators from Duke University studied two natural and one restored coastal wetland in North Carolina over a period of five years.

Dr. Ardón’s research indicates the wetlands experienced episodes of increased surface water salinity due to droughts that occurred from 2007 to 2012. “The increased salinity caused nitrogen release from all wetlands, with the highest releases in the restored wetland, potentially due to its fertilizer legacy from past agricultural use,” said Dr. Ardón. “Our results suggest that increased salinity in coastal wetlands could lead to large nitrogen losses from freshwater wetlands worldwide.”

ECU Center for Biodiversity at East Carolina University

This March, East Carolina University hosted a two-day symposium on how climate change is expected to affect biodiversity in the southeastern United States. “Biodiversity Responses to Climate Change - Perspectives from the Southeastern US,” was held March 14-15. The symposium was sponsored by the Thomas Harriot College of Arts and Sciences Center for Biodiversity. “Our planet is currently in the midst of two very dramatic global changes - the loss of its biodiversity and a rapid change in its climate,” said Dr. David R. Chalcraft, director of the Center for Biodiversity and Associate Professor of Biology. “The goals of the symposium were to advance our collective understanding of how biodiversity is responding to climate change in the southeastern US, and more broadly, to provide a general framework that could guide researchers, managers and policy makers.” Twelve leading scientists in the field of biodiversity and climate change presented at the symposium, including Dr. Terry Root, of Stanford University, who was a 2007 recipient of the Nobel Peace Prize for her work on the International Panel on Climate Change. She led a discussion on “Changing Climate: Changing Species,” on March 14. Other lecture topics included future climates for the southeastern US; the responses of forests, waterways, insects, avian migration and food webs to climate change; and the short-term and long-term concerns associated with climate change. “It is imperative that we understand the consequences of climate change on biodiversity if we wish to better conserve our remaining biological resources,” said Dr. Chalcraft. “Much of the biodiversity in the US is located in the southeastern part of the country, and this part of the country is thought to be greatly susceptible to the influence of climate change.” More than 90 participants from various institutions across the southeast, including universities, community colleges, state and federal agencies, private companies and politicians attended the two-day event.
Student Achievements

Biology Graduate Receives Brody Medical Scholarship

Mia Marshall of Elizabethtown, was the proud recipient of a Brody Medical Scholarship at the Brody School of Medicine at ECU. She began medical school in August 2013.

Brody Scholars receive four years of medical school tuition, living expenses and the opportunity to design their own summer enrichment program that can include travel abroad.

Marshall is a May 2013 Biology graduate of ECU and a 2009 graduate of East Bladen High School in Elizabethtown.

“The feeling I felt when I received the Brody scholarship was a combination of honor and elatedness,” Marshall said. “Being a Brody scholar means excelling in the three pillars of academics, leadership and service. It consists of acknowledging your passion for the community and being proud of wanting to be a part of something larger than yourself.”

Marshall said she wants to help plan health fairs and educate young people about healthy eating during her four years of study. She hopes to pursue medical residency training in pediatrics after completing medical school.

Student Publications Garner Editor’s Choice Awards

Two students studying in the Biochemical Toxicology lab of Dr. Xiaoping Pan were the first authors of two recently published papers featured by the Editor-in-Chief of the professional journal Archives of Toxicology, a prestigious journal in the field of Toxicology. Yanqiong Zhang, a Ph.D. student in Dr. Pans’ lab, was the lead author of the first of a series of manuscripts from the lab describing some of the environmental impacts associated with the Deep Water Horizon oil spill in the Gulf of Mexico in 2010.

Ryan Polli, an undergraduate student working in Dr. Pans’ lab, was the first author of the second paper of the series, published in the current issue of Archives of Toxicology.

A former MS student of Kyle Summers, James Tumulty, was the first author of a paper published in Behavioral Ecology selected as the Editor’s Choice. The paper was published in 2014.

Graduate Students bring in Multiple Grants

Molly Albecker (Dr. M. McCoy) was the recipient of two awards in support of her study of the long-term ecological consequences of sea level rise and saltwater intrusion into coastal freshwater animal communities. The first was from the North Carolina Herpetological Society, and the second was from the Explorers Club.

Renee Fortner (Dr. Jolls) has been awarded the 2014 Catherine H. Beattie Fellowship for Conservation Horticulture from the Center for Plant Conservation of the Missouri Botanical Garden and the Garden Club of America in support of her work “The Reproductive Ecology of the Federally Endangered Cooley’s Meadowrue (Thalictrum cooleyi).”

Amanda Clauser (Dr. McRae) was awarded the the 2014 GCA Frances M. Peacock Scholarship for her project “Climate-related challenges to reproductive success in coastal populations of a threatened secretive marsh bird, the King Rail” by the Scholarship Committee of the Garden Club of America.
Graduate Program News

We welcome our four 2012-13 graduate scholars Mathew Edwards (Krista McCoy), Morgan Kain (Mike McCoy), William Burns Newsome (Jeff McKinnon), and Jun Ma (Baohong Zhang), each of whom qualified for this award by having an undergraduate GPA of at least 3.3, and a combined verbal and quantitative GRE score of at least 302. Graduate Scholar awards are limited to incoming Master’s students, and each recipient receives $4000 per academic year for 2 years for this award. These four join a splendid group of 15 other MS students who comprise our 2013-14 cohort.

We also welcome 3 new Biology doctoral (IDPBS) students, Zoe Shaner (Yong Zhu), Adam Stuckert (Kyle Summers), and Faten Taki (Baohong Zhang). Both Adam and Faten were formerly MS students of the same faculty mentor.

Honors go to Jaan Kolts for the Teaching Excellence Award, and Michael Reubens for the Gerhard Kalmus Award for Outstanding Academic Performance and Service. Congratulations to 17 of our recent and up-coming graduates with new positions:

- Molly Albecker, Coastal Resources Management PhD program, ECU
- Lyndell Bade, Laboratory Instructor, Bates College, Maine
- William Cagle, Campbell University School of Medicine
- Jon Davenport, SE Missouri State University (Tenure-track faculty position)
- Anne Dowling, Biologist, Division of Marine Fisheries, NCDENR, Wilmington, NC
- Tyler Gelles, Ecologist, Williamsburg Environmental Group
- Ian Huffnagle, Research Technician, Foreman Foundation Melanoma Research Lab,

In closing, the Biology Department has received final approval for the addition of a non-thesis option to our MS Biology graduate program, effective Fall Semester, 2014. We anticipate recruiting high quality students who wish to upgrade their knowledge and understanding of biology to further their current career, and to provide critical training for students desiring entry into professions that do not require participating in an active research program to be successful. These include clinical doctoral programs that are practice-focused (e.g. medicine, dentistry), business applications (e.g. pharmaceutical sales representatives), management, and teaching at the community college or secondary education levels.

Undergraduate Program Continues to Grow

The Biology undergraduate program is doing well and still growing. Our student population comprises 539 declared Biology and 41 declared Biochemistry majors. To these numbers we need to add 436 Biology and 33 Biochemistry intended majors. Biology faculty are very excited about the implementation of the new curriculum (Fall 2014 catalog). Students who started in the Fall of 2013 can elect to change to the 2014 catalog and will graduate in 2017 with a concentration (Ecology/Evolution or Molecular/Cell Biology).

To better prepare our students for success we started offering Biology 1100 as a Problem Based Learning (PBL) in the newly redesigned classroom, N-102. Last Fall, we offered 4 sections reserved for Biology intended majors (224 students) and the instructors, Drs. Stiller and Christensen, enjoyed the teaching experience. They reported that the students felt they had to work harder than in a traditionally taught class but improved on their test scores. For the Fall of 2014, we decided to increase the number of sections; our goal being that in the near future every Biology major will take the PBL version of the class.

The graduating classes of Fall 2013 and May 2014 total 200 students, including 14 Biochemistry majors. One of our Biochemistry majors, Nicholas Reid Thompson, will be recognized during the May commencement and will receive the Robert H. Wright Award. Nick Thompson graduated in December 2013 with a BS in Biochemistry degree in just two-and-a-half years with a 4.0 cumulative GPA. He played on the ECU baseball team for two years and is now pursuing a Master degree at Williams and Mary College.

The undergraduate office has a new administrative support associate, Mrs. Ginger Grimes. Mrs. Grimes started working with us on May 7, 2014. She graduated from ECU and possesses a B.A in chemistry with a minor in Biology.
Our Thanks To Our 2013-2014 Donors

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For endowment of graduate research assistantships and sponsorship of biology classrooms, kindly contact Dr. Jeff McKinnon at mckinnonj@ecu.edu or (252) 328-6204

Biology Awards $28.6K in Student Scholarships
More than twenty eight thousand dollars were awarded to deserving students in the Department of Biology for the 2013/2014 academic year. The recipients of the 19 scholarships and the dollar amounts received are shown below:

Undergraduate Students:  Graduate Students:

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Not Pictured: Tim Meigs, Frank Reilly, Christopher Gauland, Nancy Bray, Allison Peel.
Biologues edited by Patrick Harris