

EVOLUTIONS

A Newsletter of the Department of Biology & Geology

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South Carolina Academy of Science

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Chancellor Hallman, Natalia Surzenko,
Rebecca Napier, Dr. Jackson

USC Aiken was well represented at the South Carolina Academy of Science Annual Meeting on April 16th at the College of Charleston. Two students from the Department of Mathematical Science and ten students from the Department of Biology and Geology presented their data at the meeting. Those giving presentations from the Department of Biology and Geology were Lauren Booth, *Non-native Invasive Terrestrial Plant Species of Hitchcock Woods* (Harry Shealy); Brian Nevius, *Characterization of Microbial Communities in TCE-Contaminated Seep Zone Sediments* (Garriet Smith); Natalia Surzenko, *Creating a Retroviral Expression Vector for Delivery of Ribozymes into Eukaryotic Cells* (William Jackson); Stephanie Suarez, *Introduction of Recombinant Plasmids into LS2 Cells* (James Yates); Erin Jones, *Amplification of LB400 Genomic Sequences* (James Yates); Rebecca Napier, *Design and Synthesis of Hammerhead Ribozyme Targeted to Nucleotide 5127 of HIV-1 Vif* (William Jackson); Jacklyn Davis, *Construction of HIV-1 tat Expression Vectors* (William Jackson); Zachary Wilson, *Design and Cloning of an anti-HIV-1 rev Hammerhead Ribozyme* (William Jackson); Vanessa Guy, *Testing Anti-Tat Ribozymes by in vitro Cleavage Assay* (William Jackson); and Timothy Pearson,

Regional Geologic and Hydrologic GIS Coverages for use in Accelerated Clean-up and Siting Studies (William Pirkle).

Awards were given for the best presentation in each area of study, which included chemistry/biochemistry, physics/astronomy, geography/geology/meteorology, medicine/public health, and several areas of biology. Two of our students, Natalia Surzenko and Rebecca Napier, brought home the awards for the Molecular Biology I and Molecular Biology II sessions respectively. Both of these young women worked over the past year in the lab of Dr. Bill Jackson on projects involving the use of ribozymes to inhibit HIV replication.

Natalia, a native of Estonia, moved to the area in 2000 and transferred to USCA in the Fall of 2002, after taking several courses at Aiken Technical College. Natalie's work over the past year in the research laboratory has been to create a retrovirus-based gene delivery vector that can be used to express ribozymes in eukaryotic cells by taking advantage of a RNA Polymerase I expression cassette. An excellent student, Natalie has been accepted into the Ph.D. program in Interdisciplinary Biomedical Sciences at the University of North Carolina-Chapel Hill.

Rebecca earned an Associates degree in Technical Nursing in the Spring of 2002 while continuing to pursue a B.S. in biology. Over the past year, Rebecca's research has been to generate several reagents that can be used to test ribozyme activity. Namely, she designed and cloned a ribozyme targeted to HIV vif mRNA, which functions to increase viral infectivity. In addition, she was able to clone the vif gene into a plasmid that can be used to directly assess ribozyme cleavage ability. Also an excellent student, Rebecca is continuing to work in the field of nursing while planning to apply to medical school in the Fall.

Important Dates

- Maymester—May 10-26
- Summer I—May 27-June 30
- Summer II—July 1-Aug 5
- July 4th holiday observed July 5
- Fall semester begins—Aug 19
- Labor Day—no classes—Sept 6
- Fall Break—Oct 14-15
- Election Day—no classes—Nov 2

Editor: Carol Cutsinger

From the Chair...

USCA's reputation is based on the success and achievement of our graduates. As faculty members we try to prepare those graduates, in major courses, in general education and service courses, and through independent study. Students define what their goals are and the successes they want to achieve. Our job is to help prepare them for the challenges and opportunities they will meet. We have about 200 majors in Biology, Geology and B.I.S. programs involving those areas. 50-60 students will enter this fall declaring a Biology major. We lose a certain fraction of these when they come to understand, for example, biology is more than memorizing all the bones in the skeleton. We gain quite a few from other USCA programs however. More than a dozen transfer in from other colleges at all levels of the curriculum each year. Over the past five years we have graduated about 150 students with the B.S. degree, and the first several B.A. Biology students.

What happens to those graduates when they leave? Three or four enter medical, dental, or P.A. school the fall after graduation; probably another three or four will enter one or two years after graduation. We have been very successful over the past four years with our students who matriculate in Vet School, with seven currently enrolled at UGA, Tuskegee, Mississippi State, and Tennessee. Another three or four will enter M.S. and Ph.D. programs representing the complete range of Life Science areas – wildlife and landscape ecology, zoology, microbiology, genetics, public health, and molecular biology. After some time working, more of our graduates enter graduate programs. An increasing number of our students seek to teach science in the secondary schools; a number of these are in Aiken and Edgefield County Schools. Many students go on to work in medical labs, specifically at MCG or in a variety of capacities at environmental consulting firms. A certain fraction leave science altogether: these students' goal was to earn a Biology degree, and they have since entered business, law school, military service or other fields. The leadership potential of these students is significant. We face a variety of problems as a society that demand a science literate public. Citizens who understand these issues, what science can and can't do and the limitations of scientific interpretation, and who can act and make decisions based on that knowledge may be our most important legacy.

I hope your experience at USCA prepared you for the challenges and opportunities you have faced after graduation. I can testify that the faculty here is devoted to the success of its students, and the continuing improvement of the programs for those students. It has been my pleasure to serve the faculty and the students, our future graduates for the past six years. Don't be a stranger, come back and see us, and meet our current students. We are very proud of them.

A llen J . D ennis

Editor's note: Dr. Dennis will step down as chair of the department on June 30th after six years of service, returning to full time teaching. Watch for the Fall issue with news of our new chair!

Congratulations May & August Graduates!

May:

Miranda Boerema, *cum laude*
 Jacklyn Davis, *cum laude*
 Autumn Dunn
 Takelya DuPont
 Vanessa Guy, *cum laude*
 Holly Hair
 Michael "Cory" Hall, *magna cum laude*
 Regina "Nicky" Hawkins

Rebecca Napier, *magna cum laude*
 Timothy Pearson
 Kayce Singletary
 Melissa "Cameron" Storey, *cum laude*
 Natalia Surzenko, *magna cum laude*
 Jacqueline Tilsner, *magna cum laude*
 Lacy Youmans

August:

Maya Allen
 Lauren Booth
 Kristen Frye
 Fallon Hampton
 Allison Newby
 Beth Schlachter, *cum laude*
 Tracey Whitesides, *magna cum laude*
 Heather Wilson

Outstanding Students in Biology and Geology

Two students were honored by the Department of Biology and Geology at the Academic Convocation on April 15th. *Jacklyn C. Davis*, graduating in May with a B.S. in Biology, was chosen by the faculty as Outstanding Biology Student of the Year. Jackie hails from Williston, South Carolina and graduated from Williston-Elko High School in 2000. She got a head start on her college career by taking courses at USC Salkahatchie during her senior year. She began college as an exercise science major, changing to biology after a year. Jackie has been a fixture in the department ever since. She prepped labs for ABIO 101 and 102, spending many hours figuring out what needed to be ordered and filling microscope slide boxes. She has worked in the lab of her advisor, Dr. Bill Jackson, for 2 1/2 years, as well as doing some work for both Dr. Hanlin and Dr. Dyer on grants. Dr. Jackson's citation for the convocation ceremonies read: "Jackie Davis is our outstanding biology student not only because of her work in the classroom but also because of her service to the department. For two years, one of her most important services was as our ABIO 101 laboratory coordinator. She continues to spend much of her time in the research laboratory working on a project designed to create several reagents for use in anti-HIV studies." This work was presented in departmental seminar and at the South Carolina Academy of Sciences Annual meeting in Charleston. Jackie's ready smile and pleasant disposition will be sorely missed in the department! She intends to pursue a career as a Physician's Assistant and is engaged to Jason Hall, a 2002 graduate of our department.

Receiving the award for Geology Student of the Year was *Dwight L. Jones*. Originally from Pocatello, Idaho, Dwight has lived in Aiken for 13 years. Dwight's story is quite an inspiration. By his own admission, he just was not ready for college at

the end of his high school years and his first attempt was not successful. He worked for Namco Cyberainment, first in Aiken, and then as a District Manager in Atlanta. Inspired by a brother who earned a degree in engineering and went to work designing cars for the Ford Motor Company, Dwight decided the retail industry was not for him, and he returned to Aiken to pursue further education. After proving himself with a year of classes at Aiken Technical College, he was admitted to USC Aiken in the Fall of 2003. Dwight is a rising junior, interested in geology and archeology/anthropology. He is particularly interested in ancient civilizations: "I've always wanted to work in all those places I've read about in the history books," said Dwight. He has been a leader in the Physical Geology, Historical Geology and Geographic Information Systems in the Sciences classes over the past year. This summer Dwight will continue his work with ARC/GIS at the Savannah River Site as a USCA-WSRC Research Intern.



Jackie Davis, Dr. Allen Dennis, Dwight Jones

Outstanding Student in Philosophy



Dr. Blanche Premo-Hopkins with
Vanessa Guy

Let it not be said that our biology graduates are science nerds! May biology graduate Vanessa Guy was honored at the Academic Convocation on April 15th with the award for Outstanding Student in Philosophy. Originally from Columbia, Vanessa has lived in Aiken for 7 years and graduated from South Aiken High School in 2000. She attended one semester at Coker College

before transferring to USC Aiken in the Spring of 2001. Vanessa has worked in the lab of Dr. Bill Jackson, serving as a research tech on his NIH grant *Analysis of Ribozyme Targets within the HIV-1 Genome*. She successfully presented her results both in departmental seminar and at the South

Carolina Academy of Science meeting.

The philosophy award was presented to Vanessa by philosophy professor Blanche Premo-Hopkins: "Vanessa Guy has distinguished herself in her philosophical studies. A paper on Kierkegaard that she wrote for her ethics class, for example, was subsequently published in the 2003 edition of the *Humanities and Social Sciences Journal*. The connection between ethics and the life sciences is a critical one for exploration in the 21st century, and Vanessa is poised to make a contribution to this line of intellectual inquiry as she pursues her complementary study of biology and philosophy."

This summer Vanessa will be a volunteer for the Frontier Nursing Service courier program in Windover, Kentucky, serving southeastern Appalachia. She will shadow nurse practitioners and home health nurses, and tutor students in the adult education center. There are also opportunities to volunteer in a nursing home and in the public schools. She is very interested in pursuing a career teaching high school science, even though everyone keeps telling her she should go to graduate school!

Faculty Focus: Dr. James Yates

Dr. James Yates, Associate Professor of Biology at USC Aiken, lends a New York air to the department. Originally from upstate New York, Dr. Yates earned his B.S. (1977) in biology from the State University of New York College at Oneonta, and went on to earn his M.S. (1980) in cell biology and Ph.D. (1988) in molecular biology from SUNY at Albany. During his graduate school years he was employed first as Senior Laboratory Technician with the New York State Department of Health and then at General Electric as Staff Scientist, where he continued working through 1989. He came to USCA in January of 1990 as an assistant professor and was tenured and promoted to associate professor in 1996.

Dr. Yates teaches several sections of ABIO 101—Biological Science I—each Fall term. He also teaches ABIO 302 and 502—Cell and Molecular Biology I and II, as well as ABIO 541 and 542—Biochemistry I and II. Students who have worked in Dr. Yates' lab have gone on to graduate work at such institutions as University of North Carolina Chapel Hill, Yale, University of Georgia, University of Pittsburgh, University of Tennessee Memphis, USC Medical School, and Medical University of South Carolina.

The research in Dr. Yates' lab focuses on bacterial genetics—studying the structure and function of bacterial genes. One particular application of this study lies in his work with the bacterium known as LB400. This bacterium and others like it have the ability to remove contaminants (PCBs) from the environment. Understanding the mechanisms of this process has been the goal of his lab for many years. Much of his research involves analysis of a group of genes called the *bph* cluster. Work to date has identified the bacterium (as LB400) as well as other bacteria that have a similar genetic structure. The origin of the *bph* gene cluster has been determined along with the process allowing this gene cluster to move from one bacterium to another. Current work is looking at the mechanisms that control expression of these genes. It is hoped that understanding the *bph* cluster better could help find ways to make the bacteria much more effective at neutralizing the PCBs.

Dr. Yates is nearing the completion of a three-year grant from the National Institute of Environmental Health Science (NIH) in support of this work. Over his years at USCA he has been awarded \$735,000 from various funding sources, including General Electric, Westinghouse/DOE, and Frisby Technologies.

Having worked in both industry and higher education, Dr. Yates says he definitely prefers higher ed because there is much more opportunity for freedom and creativity. "It's nice to be able to pick a scientific problem that you think is important to work on and share that with undergraduates." He likes being



Dr. James Yates

able to integrate teaching and research as well. He can talk about theoretical concepts in lecture and then apply them in lab.

An avid tennis player, Dr. Yates is assistant coach for the Men's and Women's Tennis Teams and travels with the teams. He is married to Dr. Margaret Riedell, a professor in the School of Education.

Recent Faculty Publications

Paller, MH, CH Jagoe, **H Bennett**, HA Brant, JA Bowers. Influence of methylmercury from tributary streams on mercury levels in Savannah River Asiatic clams, *Science of The Total Environment*, Volume 325, Issues 1-3, 5 June 2004, 209-219.

Dennis, AJ, JW Shervais, J Mauldin, HD Maher, Jr., JE Wright. Petrology and geochemistry of Neoproterozoic arc terranes beneath the Atlantic Coastal Plain, Savannah River Site, South Carolina. *GSA Bulletin*, May/June 2004, 572-593.

Dyer, AR. Dormancy-inducing factors in *aegilops triuncialis* suggest multiple germination strategies, *Plant Ecology*, 2004, 172:211-218.

Tuck, DM, GM Iversen, **WA Pirkle**. Organic dye effects on dense nonaqueous phase liquids (DNAPL) entry pressure in water saturated porous media, *Water Resources Research*, 39 (8), 1207, doi:10.1029/2001WR001000, 2003, p. SBH 5-1—SBH 5-13.

Alumni Focus: Renee Givens McHenry

We are proud of the success of 1993 Biology Student of the Year, Renee Givens, who is now a veterinarian and owner of the Barnwell Veterinary Clinic. Originally from Williston, SC, she graduated from Williston-Elko High School in 1989. Her family has deep roots in Williston—both her parents attended WE High School and her mother also taught there. She entered USC Aiken in the Fall of 1989 and began working in the Barnwell Clinic in 1990, first as kennel help and working her way up to vet tech. Her favorite class at USCA was Dr. Hanlin's Comparative Vertebrate Anatomy. She graduated *cum laude* with a degree in Biology in May of 1993. She continued working at the Barnwell Clinic during her undergraduate years. She attended the University of Georgia Veterinary

School, receiving the degree Doctor of Veterinary Medicine in 1998.

The new Dr. Givens returned to her roots and purchased the Barnwell Clinic from Dr. Mary Anne Wenck in October



Dr. Givens McHenry with patient Mossimo

of 1998. She describes it as a fairly small clinic, working only with cats and dogs. Her most difficult challenges come from having to diagnose terminal diseases and tell the animal's owners, and her most satisfying moments from working with very ill or injured patients and seeing them recover and go home.

Renee was married to John McHenry on June 28, 2003. A graduate of Clemson, John is vice president of Enterprise Bank in Barnwell, where the couple resides. Renee has 3 cats, 4 labradors, and a horse, but she says the labs and the horse still live on the farm with her parents. She and John share a "nonviolent" football rivalry, going their separate ways most Saturdays in the Fall to watch the Tigers and Gamecocks play ball.

Spring 2004 Independent Research Projects

Research continues to be an integral part of our department's program. Students pursue independent study projects under the tutelage of faculty members, and those pursuing a B.S. degree are required to complete a senior research project. Listed below are projects for Spring 2004.

Independent Study Projects

Jeremy Brumfield: *Significance of water temperature and the use of soap on effective handwashing technique.* Advisor: Dr. Durward Pridgen.

Brandon Busbee: *Molecular Genetics.* Advisor: Dr. James Yates.

Carol Journey: *Structural analysis of HIV-1 tat RNA using Rnase digestion.* Advisor: Dr. William Jackson.

Erin Walker: *Design and cloning of anti-HIV-1 Nef ribozymes.* Advisor: Dr. William Jackson

Senior Research Projects

Maya Allen: *Do created wetlands become jurisdictional wetlands?* Advisor, Dr. Harry Shealy.

Miranda Boerema: *Resource variation and annual grassland community composition.* Advisor, Dr. Andy Dyer.

Jacklyn Davis: *Construction of an HIV-1 tat eukaryotic expression vector.* Advisor: Dr. William Jackson

Autumn Dunn: *Competitive ability among seed types of Aegilops triuncialis.* Advisor, Dr. Andy Dyer.

Takelya DuPont: *Local variation in germination of goatgrass.* Advisor, Dr. Andy Dyer.

Kristin Frye: *Variation in maternal effects on goatgrass germination.* Advisor, Dr. Andy Dyer.

Vanessa Guy: *Catalytic activity of anti-HIV-1 tat ribozymes.* Advisor, Dr. William Jackson.

Holly Hair: *Expression of the bphB gene in the bacterium LB400.* Advisor, Dr. James Yates.

Fallon Hampton: *Microbiology of corals* Advisor, Dr. Garriet Smith.

Jessica Lewis: *Microbiology of corals.* Advisor, Dr. Garriet Smith.

Rebecca Napier: *Design and cloning of an anti-HIV tat ribozyme targeted to tat 5940.* Advisor, Dr. William Jackson

Timothy Pearson: *Creation of an Aiken County natural resource GIS database.* Advisor, Dr. Andy Dyer.

Beth Schlachter: *Herpetofaunal diversity among landcover types at SRS.* Advisor, Dr. Hugh Hanlin.

Natalia Surzenko: *Retroviral vectors expressing RNA Pol I expression cassettes* Advisor, Dr. William Jackson.

Jacqueline Tilsner: *Expression of HIV-1/FLAG fusion genes in HeLa cells.* Advisor, Dr. William Jackson.

Heather Wilson: *Response of upland herpetofauna to Carolina Bay restoration.* Advisor: Dr. Hugh Hanlin

Julie Zachry: *Plastic response in goatgrass germination.* Advisor: Dr. Andy Dyer

University of South Carolina Aiken

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ALUMNI UPDATE

We would love to include information in future issues about where our graduates are and what they are doing. Please take a moment to send this form to: EVOLUTIONS, Dept of Biology & Geology, USC Aiken, 471 University Parkway, Aiken, SC 29801, or e-mail the information to carolc@usca.edu.

Name _____ Year graduated _____

Current Address _____

Current position or program of study _____

What news would you like to share with USCA and other former students? _____

You can also update your information online at: <http://www.usca.edu/alumni>

SEMINAR SERIES

In an effort to improve our Friday Seminar Series, we hope to create an endowment that will allow us to enhance our current series. Attending the seminar series is a requirement for our Senior Research students, but the lectures are free and open to the public. The current schedule is available on our website at <http://www.usca.edu/biogen>.

Enclosed is my contribution of \$ _____ (Please make checks payable to the Aiken Partnership with Biology Seminar Fund on the memo line). You can double your gift if you or your spouse is employed by a company having a "Matching Gift Program." Please enclose your company's matching gift form, available from your Human Resources Office.

Send to: EVOLUTIONS, Dept of Biology & Geology, USC Aiken, 471 University Parkway, Aiken, SC 29801