

EVOLUTIONS

A Newsletter of the Department of Biology & Geology

FALL 2002

Volume 1, Issue 1

New Degree Program in Biology**Inside this issue:**

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Biology majors interested in a more interdisciplinary approach to their degree can now accomplish this through a new Bachelor of Arts program in Biology. This new degree program follows on the heels of recent changes made in the Bachelor of Science program. As a result of suggestions made by our faculty and graduates and following analysis of student assessment data, a Departmental Curriculum committee was formed in October 2000 with the task of creating a workable plan and bringing it to fruition. Beginning with the Fall 2002 semester, these changes are now in effect.

The hallmark of both degree programs is a new core of courses that all students must successfully complete. These courses include two semesters of introductory biology and one semester each of genetics and ecology and evolution. In addition all candidates for graduation are required to participate in a new capstone experience – senior seminar, which will be merged with our current seminar series.

Students interested in pursuing a BA degree will integrate their biology major with a minor of their choosing. While undergraduate

research is not a component of the BA, this option remains for credit towards the major. In lieu of the required independent research project, BA candidates will be required to complete additional coursework in biology. Finally, BA candidates will be required to show how their minor enhances the biology major by maintaining a portfolio showing competency in both areas.

Those interested in the more traditional BS degree will find changes here as well. In addition to completion of the core courses and senior seminar, these students are required to take coursework in physics and organic chemistry towards satisfying their cognate. As in the past, the final requirement of the BS is the completion of an independent research project under the tutelage of a mentor faculty member.

When asked about the new curricula, Dr. William Jackson, the former chair of the Curriculum committee, stated, "We are very excited about these changes to our curriculum and believe they will result in graduates who are better prepared for whatever their next step in life may be."

Important Dates

- Advisement & Priority Registration—Nov. 4-15
- Student 499 Presentations—Nov. 15, 22, and Dec. 6
- December Graduation—Dec. 12
- Spring term begins—Jan. 9th Registration Jan. 8
- Major Field Test for May Graduates—Jan. 17
- Last Day to apply for May graduation and to submit Jr. Writing Portfolio—Jan. 31

Biology Department Awarded Three NIH Grants

In the world of scientific research, money makes the centrifuge go round, and thanks to three AREA grants from the NIH (National Institutes of Health) in the past two years, the labs of Drs. James Yates, David Strom, and William Jackson are whirring with activity.

In April, 2001 Drs. Yates, Strom, and Jackson were awarded a grant from the NIH to study a bacterium that degrades environmental contaminants known as PCBs. Bacteria currently exist that will break down PCBs, but little information is available on how the genes

involved are regulated. The professors believe that once they determine how genes are switched on and off in the bacteria, they can enhance the removal of PCBs from the soil.

PCBs are common contaminants released as waste products from industrial processing, and pose great health risks to humans. Conventional disposal processes are not economically feasible. Therefore, removal of PCBs by bacteria may be the only process that works on a large scale.

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From the Chair...

Greetings and welcome to the inaugural issue of the USCA Department of Biology and Geology newsletter – *Evolutions*. As the name suggests, our department has undergone many changes throughout its lifetime, but more importantly continues to grow and adapt to new challenges. While some changes are incremental in nature, others are dramatic and with change comes opportunity.

Take a look around the department and you will see four new faculty members, each of whom share a love of teaching and bring with them a strong research program. You will see the familiar faces of faculty members who continue to strive for excellence in the classroom and the laboratory. You will notice a new Bachelor of Arts program, as well as a strengthened Bachelor of Science curriculum. You will observe students involved in independent research projects, each of which reinforce biological concepts and provide direct interaction with a mentor faculty member. You will see new course offerings in Virology, Ecology and Evolution, Cancer Biology, Parasitology, Immunology, Pathology of Coastal Organisms, and GIS in Geology. You may notice that student laboratory and research experiences have been enhanced by equipment upgrades and funding of student independent research projects. This program to fund individual student grants was recently instituted, and although these awards are small, it is a beginning. Finally, you will observe that on Friday afternoons, all of our graduating seniors are attending the Biology and Geology Seminar Series. This has become a very successful program that we hope to permanently fund by creating an endowment, which would allow us to offer honoraria and provide a mechanism to invite speakers from more distant institutions.

As described, four new faculty members: Dr. David Strom, Dr. Andy Dyer, Dr. Heather Bennett, and myself, have joined the department in the last four years. These appointments corresponded to the retirement of two faculty members: Drs. John Westbrook and John Spooner, and the loss of Dr. Harold Ornes to a position as the Dean of Sciences at Southern Utah University.

We are excited by our recent successes in obtaining external funding for faculty and student research. Both of these endeavors, which for many years have been one of the hallmarks of this department, have gotten a huge boost with the addition of three National Institutes of Health awards, two US Department of Agriculture awards, a Department of Energy award, and a number of other awards.

These and other “Evolutions” are described in this and future issues. I invite you to join us in celebrating not only our past but our future as well. It looks very bright from here! Moreover, we would love to hear from you. Take a moment to fill out and mail in the information form on the back page of the newsletter, or if you prefer, visit our web site at <http://www.usca.edu/biogeo> and contact us by e-mail. Check out our seminar schedule while you are visiting our web site and drop by to hear a talk. Call it a homecoming- we'll be glad to see you!

William H. Jackson

“I invite you to join us in

celebrating not only our past

but our future as well. It looks

very bright from here!”

Dr. William Jackson

NIH Grants (continued)

Drs. Strom and Jackson also have individual NIH grants to fund research in other areas. The focus of Dr. Strom's three-year grant, awarded in July 2001, is to determine how the protein AML-1B turns on genes that cause cells to divide faster, and to identify the gene that AML-1B acts upon to alter the cell's cycle. In addition, Dr. Strom hopes to determine whether AML-1B is an oncogene, since many known oncogenes cause cells to divide faster. If AML-1B is found to be an oncogene, it can be used as a marker to identify certain types of cancer and potentially serve as a target for chemotherapeutic treatment.

Dr. Jackson's grant, awarded in August 2002, will study the use of catalytic RNA or ribozymes to inhibit HIV replication. The goal of Dr. Jackson's research is to identify HIV mRNAs

that can be efficiently cleaved using ribozymes, thereby inhibiting the HIV replication cycle.

When the ribozymes are identified, they will be cloned into specialized gene delivery vehicles, such as modified viruses. The modified viruses will be used to introduce therapeutic ribozymes into T helper cells to study ribozyme delivery and efficacy, important areas of research in gene therapy approaches.

The NIH's AREA grants (Academic Research Enhancement Awards) serve to fund important research at smaller universities and provide opportunities and funds for students to gain valuable experience working in a research lab. There are presently ten students employed on these projects with Yates, Strom, and Jackson, and many others whose Senior Research Projects are a direct extension of the work being done.

New(est) Faculty...

HEATHER BENNETT

Joined faculty—Fall 2000

Ph.D. (Biological Sciences), University of Rhode Island, 2000

M.S. (Biology), Indiana University of Pennsylvania, 1997



Research interests: Invertebrate zoology, malacology, particularly cephalopod functional morphology and evolution; biological oceanography

Teaches: Introductory Biology, Invertebrate Zoology, Parasitology, and Aquatic Biology

Why I came to USCA: “I wanted to come to a place that would allow me to teach and conduct research, and involve undergraduates in the research. I also liked that USCA had small class sizes and a one-to-one interaction between professors and students.”

WILLIAM JACKSON

Joined faculty—Spring 1999

Ph.D. (Immunology), Medical College of Georgia, 1995, Post-docs in oncology at Univ. of Alabama-Birmingham, 1995-97. Laboratory manager of the Gene Therapy Program at University of Alabama Birmingham, 1997.



Research interests: The use of anti-HIV ribozymes as gene therapy agents to inhibit viral replication.

Teaches: Introductory Biology, Genetics, Immunology, Virology

Why I came to USCA: “In 1997 I had the opportunity to return to my alma mater as a teaching associate and technical assistant, giving me the opportunity to mix teaching with the undergraduate research experience. In 1999, I was hired as an Assistant Professor which enabled me to initiate a much stronger research program. I believe that our ability to teach students in both the classroom and research laboratory is the thing that makes teaching at USCA so enjoyable.”

ANDY DYER

Joined faculty—Fall 2000

Ph.D. (Plant Ecology), Univ. of California-Davis, 1996

M.A. (Wildlife Biology), California State University, Fresno, 1990



Research interests: Population and community ecology, invasive species ecology, and habitat restoration. Current research focuses on population biology of invasive grasses.

Teaches: Introductory Biology, Ecology & Evolution, and Principles of Ecology

Why I Came to USCA: “I liked USCA because it is a small and very friendly campus where faculty work closely with students. Our department is very active and productive and genuinely concerned with excellent teaching and research. Undergraduates get research and learning opportunities here that they would not get at larger schools.”

DAVID STROM

Joined faculty—Fall 1998

Ph.D. (Physiology & Pharmacology), Univ. of California-San Diego, 1990). Post-doc in Tumor Cell Biology at St. Jude Children’s Research



Hospital, Memphis. TN, 1991-95; Research faculty, Dept of Biochemistry/Cancer Center, Vanderbilt University, Nashville, TN, 1995-98.

Research interests: Understanding cell-cycle control & applying this understanding to mechanisms of cancer induction. Also collaborating with Dr. Yates to examine transcriptional controls in bacteria.

Teaches: Biochemistry, Human & Animal Physiology, Cancer Biology, Advanced Cell & Molecular Biology

Why I came to USCA: “I was interested in both teaching and research and USCA had the best opportunity for these pursuits. We have very modern laboratories to perform research and great students to teach.”

Recent Faculty Publications

Dyer, A. R. 2002. Burning and grazing management in a California grassland: effects on bunchgrass seed viability. *Restoration Ecology* 10:107-111.

Dyer, A. R. 2002. Detecting and quantifying unpredictable events in ecological research. *Bulletin of the Ecological Society of America* 83:96-97.

Russell, K. R., **H. G. Hanlin**, T. B. Wigley, and D.C. Guynn. 2002. Responses of isolated wetland herpetofauna to upland forest management. *Journal of Wildlife Management* 66(3):603-617.

Russell, K. R., D. C. Guynn, and **H. G. Hanlin**. 2002. Importance of isolated wetlands for herpetofaunal diversity in managed, young growth forests in the coastal plain of South Carolina. *Forest Ecology and Management* 163(3):43-59.

Cromer, R. B., J. D. Lanham, and **H. G. Hanlin**. 2002. Herpetofauna response to gap skidder-rut wetland creation in a southern bottomland hardwood forest. *Forest Science* 48(2):407-416.

Patterson, K.L., J.W. Porter, K.B. Ritchie, S.W. Polson, E. Mueller, E.C. Peters, D.L.

Santavy, and **G. W. Smith**. 2002. The etiology of white pox, a lethal disease of the Caribbean elkhorn coral, *Acropora palmata*. *Proceedings of the National Academy of Science*. 99:8725-8730.

Bagwell, J.R., LaRocque, **G.W. Smith**, S. W. Polson, M.J. Friez, J.W. Longshore and C.R. Lovell. 2002. Molecular diversity of diazotrophs in oligotrophic tropical seagrass bed communities. *FEMS Micro. Ecology*. 39:113-119.

Faculty News

Grants, Awards and Travel:

Dr. Allen Dennis was appointed the Harold Orville Whitnell Professor of Geology at Colgate University for Fall 2002, and elected Chair of the Southeastern Section of the US Geological Society.

Dr. Heather Bennett was awarded a Research and Productive Scholarship (R&PS) grant entitled "Recirculating seawater system for culture of cephalopod molluscs." Once established at USCA, this will be the only such facility located at a University campus in the state.

Dr. Andy Dyer was awarded a National Wild Turkey Federation grant entitled "The ecology and population biology of chufa, *Cyperus esculentus sativus*," and traveled to Tucson, Arizona in August to deliver a talk on "Population-level variation of induced seed dormancy in an invasive annual grass" at the Ecological Society of America's annual meeting.

Dr. Hugh Hanlin was awarded a subcontract from Clemson University and the USDA entitled "Long term monitoring of reptiles and amphibians at the Savannah River Site," and a US Forest Service and USDA grant entitled "Response of herpetofauna to Carolina Bay restoration: The effect of vegetation composition and

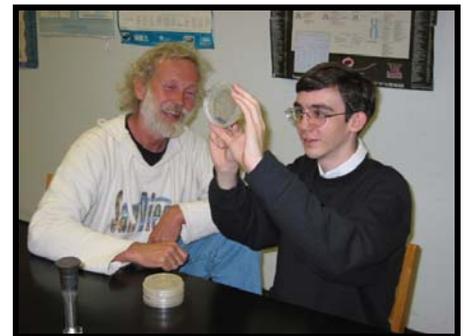
structure of adjacent forests on herpetofauna."

Dr. William Jackson was the 2001 recipient of the USCA Distinguished Alumni Award, and he received an NIH R15 Academic Research Enhancement Award (article pg. 1) entitled "Analysis of ribozyme targets within the HIV-1 genome."

Dr. William Pirkle was reappointed as the SCANA Chair in Physical Sciences, and was the recipient of an Undergraduate Research Program award from Savannah River Westinghouse for SCUREF Summer Interns.

Dr. Harry Shealy was awarded a Forest Service grant entitled "Ecotone restoration and long term vegetation monitoring at Craig's Pond."

Dr. Garriet Smith traveled to Mexico three times in recent months, twice to Akumal as Co-chair of the World Bank sponsored study, *Global causes of Coral Reef Decline*, as well as to Merida for a meeting of the Association of the Marine Labs of the Caribbean. Dr. Smith is part of a 5M grant from NOAA, *Impact of Disease and other Mortality Factors on Coral Reefs*, and is co-director of the *Bahamian Reef*



Dr. Smith with freshman Brian Nevius

Survey sponsored by Earthwatch.

Dr. David Strom was awarded an NIH R15 AREA grant (article pg. 1) entitled "Cell cycle regulation by the AML-1B transcription factor."

Dr. James Yates was awarded an NIH R15 AREA grant (article pg. 1) entitled "Gene regulation of the *bph* cluster."

Professor Karin Willoughby is the coordinator for the Fall 2002 Seminar Series.

Since 2000, faculty members in the Biology and Geology department have received \$635,162 in research grants.

Familiar faces

Everyone looks forward to retirement, but three retired USC Aiken professors have done more than just hang out the "Gone Fishing" sign. Professors John Spooner, Henry Gurr, and John Westbrook are using their retirement to pursue their passions.

When Dr. John Spooner retired from USC Aiken, it didn't mean the end of his research in entomology. While studying two new katydid species in local sandhill communities for a paper he is co-authoring, Dr. Spooner discovered a species of katydid that is new to science. In between recording the morphological measurements of his new species and teaching two anatomy and physiology classes at USC Salkehatchee, Dr.

Spooner is building a three-stall barn with his son. "It's a family joke that his barn will be bigger than his house," Dr. Spooner said.

Drs. Gurr and Westbrook are making use of their flexible schedules to explore books and philosophy. After years of using the non-fiction book *Zen and the Art of Motorcycle Maintenance* as a teaching aid, Dr. Gurr finally got to undertake the journey chronicled in the best-selling book. Although the book had vague descriptions of the places author Robert Persig stopped, Dr. Gurr was able to locate the various spots and take extensive photographs and notes that he later shared with *Zen's* author. Dr. Gurr's recent road trip caught the interest of a Montana

newspaper which featured his odyssey in a front page story.

Dr. Westbrook prefers to stay closer to home to satiate his literary appetites. He enjoys having the time to read an eclectic collection of books over a good cup of coffee, and often livens up the lunch breaks in the science department with frequent visits to discuss current affairs, scientific discoveries, and books.

The love of learning and discovery doesn't end with a career, and if this trio of professors were to post their job description for retirement it would read, "flexible hours, must be willing to follow your bliss."

-Dawn Hawkins

Fall 2002 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 Fall 2002. Those marked with an asterisk * received funding from Departmental or faculty-sponsored grant funds.

Independent Study Projects

Carol Journey: *Design and synthesis of an anti-tat hammerhead ribozyme*. Project advisor, Dr. William Jackson

Eric Doman: *Optimization of phytoremediation using chlorophyll flourometer*. Project advisor, Dr. Andy Dyer.

Ginger Jones: *Introduction to Octopus Biology and Culture*. Project advisor, Dr. Heather Bennett.

Erin Kough: *Introduction to Brooding in Sphaeriid Bivalves*. Project advisor, Dr. Heather Bennett.

Carly McKie: *Introduction to Octopus Biology and Culture*. Project advisor, Dr. Heather Bennett.

Leigh Ryan: *Design, synthesis, and cloning of anti-tat hammerhead ribozymes*.

Project advisor, Dr. William Jackson.*

Cameron Storey: *Introduction to Octopus Biology and Culture*. Project advisor, Dr. Heather Bennett.

Pamela Wall: *Design, synthesis, and cloning of anti-tat hammerhead ribozyme*. Project advisor, Dr. William Jackson.*

Senior Research Projects

Deborah Ard: *Molecular analysis of prokaryotic DNA*. Project advisor, Dr. Jim Yates.*

Jason Baxley: *Distribution and status of Carolina Bays in Barnwell Co, SC*. Project advisor, Dr. Harry Shealy.

Lisa Burhans: *Summary of assistance to private land owners in the US*. Project advisor, Dr. Harry Shealy.

Summer Garrison: *Brooding cycle of Sphaeriid clams*. Project advisor, Dr. Heather Bennett.

Derrick Haltiwagner: *Assessment of in-situ sulfate reduction in a coal pile runoff basin*. Project advisor, Dr. Andy Dyer.

Tyrone Hanberry: *Investigations into tritium levels in lower Three Runs stream*. Project advisor, Dr. Harry Shealy.

Linda Jolley: *Character displacement of cricket frogs, *Acris crepitans* and *Acris gryllus**. Project advisor, Dr. Andy Dyer.*

Gayle Jones: *Reproductive biology of *Plethodon dunii**. Project advisor, Dr. Hugh Hanlin.*

William Kanne: *Occurrence of fire in pine forests in Aiken Co, SC*. Project advisor, Dr. Harry Shealy.

Lane Matheny: *Molecular analysis of prokaryotic RNA*. Project advisor, Dr. Jim Yates.*

Ray McNeely: *Pathology of Pacific sea urchins*. Project advisor, Dr. Garriet Smith.*

Elizabeth Perrow: *Retroviral gene transfer*. Project advisor, Dr. David Strom.*

Katrina Smith: *The influence of annual grass neighborhoods on perennial grass emergence*. Project advisor, Dr. Andy Dyer.

April Tomkinson: *Colonization of temporary habitats by aquatic invertebrates*. Project advisor, Dr. Andy Dyer.

Benjamin Watkins: *Heretofaunal use of Carolina Bay buffer zones*. Project advisor, Dr. Andy Dyer.

University of South Carolina Aiken

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Department of Biology & Geology
471 University Parkway
Aiken, South Carolina 29801

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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