Ms. Audrey Hendley, a Spring 2009 graduate of the Department of Biology and Geology was honored with the University’s Student of the Year award at the May commencement ceremonies. Graduating summa cum laude with a perfect 4.0 grade point average, Audrey also received the award for Biology major of the year at the Academic Convocation in April. A graduate of Francis Hugh Wardlaw Academy, Audrey was born in Nebraska, but being raised in an Air Force family meant travel, and Audrey lived in Mississippi, Italy, Germany, and Sumter, SC before settling back in her parents' hometown of North Augusta. Staying near home, saving money, and the quality of the biology program at USCA gave her plenty of reasons to enroll here in the Fall of 2005. At her first meeting with advisor Dr. Bill Jackson, he asked her what she wanted to do, and she surprised him with her answer—"Get a Ph.D. in genetics!" Few freshmen are as focused and determined as Audrey, but she will be on her way to fulfilling that ambition as she enrolls in just such a program at Johns Hopkins University in the fall.

(continued on p. 3)

New Herp Habitats

What’s a biology department without some live specimens for students to observe and study? The greenhouse is full of many different kinds of plants, and over the years there have been various "critters" in residence in the Science Building. During the past year instructor and lab manager Brad Reinhart has been constructing displays for our current collection of critters:

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As I write these columns, I generally reflect on the year that was and look forward to the year ahead. In many ways this year was a great one. Three biology alumni recently completed their graduate work. In December, Pam (Wall) Steen (2003) completed her PhD at the Medical College of Georgia. I was fortunate to attend Pam’s defense of her dissertation entitled *Neutrophils in the injured taste system*. This summer Brian Nevius (2005) and Adam Hoffman (2005) earned Master’s degrees from the USC Arnold School of Public Health. I was also fortunate to attend Brian’s defense of his thesis entitled *Sorption of charged nanoparticles to aquatic biofilm systems*. Most recently, Adam successfully defended his thesis entitled *Growth and developmental enhancement of poplar (P. deltoides x nigra OP367) by associated endophytic bacteria*. Congratulations to each of you! We will look back on the 2008-2009 academic year with great pride and great sadness. Of the 37 graduates this past year, four completed their college career with a perfect 4.0 GPA. In what may be a record, six spring graduates (Keith Boyd, Christine Gross, Ashley Ferguson, Audrey by Dr. William Jackson

USCA Research Day

Our department was well-represented at USC Aiken’s second Research Day on April 17th with two oral presentations and six posters. Lindsey Padgett’s poster, “Cloning and initial testing of a retroviral vector expressing an anti-HIV-1 hammerhead ribozyme” was awarded the Gold medal for best poster, Annie Whitley's poster, "Characterizing Changes in the Bacterial Community in a Developing Constructed Wetland Using Lipid Biomarkers" won the bronze medal for posters, and Dana Hailat’s oral presentation, “Biophysical Analysis of the Opportunistic Pathogen LS2” was chosen for the bronze medal in the oral presentation/performance category. Lindsey worked in the lab of Dr. Bill Jackson for the past two years helping to develop a retroviral vector that expresses an anti-HIV ribozyme. Her most recent work involved developing a procedure to generate retrovirus particles for use as gene delivery vehicles in studies designed to measure inhibition of HIV gene expression. She graduated *summa cum laude* in May and will begin a doctoral program in immunology this Fall at the University of Alabama-Birmingham.

Dana spent the semester in the lab of Dr. James Yates examining how bacteria obtain nutrients. She analyzed how a bacterium called LB400 is able to sequester and use an energy source that is almost insoluble in water. She graduated *magna cum laude* in May and is pursuing admission into Dental School at the Medical College of Georgia. Both Dana and Lindsey graduated from the USCA Honors Program.

Annie worked at the Savannah River Ecology Lab under the direction of Dr. Gary Mills and Dr. Michele Harmon collecting and analyzing samples. She will graduate in December 2009 with a double major in biology and chemistry.

Dana Hailat
Audrey began working in Dr. Jackson’s lab the summer following her freshman year where her several projects involved the cloning and testing of anti-HIV hammerhead ribozymes. She presented her results at the South Carolina Academy of Science annual meetings in 2007, 2008, and 2009 and participated in USCA’s Research Day in both 2008 and 2009. In 2008 she was awarded a Magellan Scholarship by the University of South Carolina to fund her research of \textit{in vitro} cleavage analysis of anti-HIV ribozyme activity and measurement of anti-\textit{vif} activity in a tissue culture model. These results were presented at USC’s Discovery Day in April 2009. She was also a research technician for Dr. Chad Leverette of the Department of Chemistry and Physics in the summer of 2008 working on a project entitled "Optimization of the GLAD instrument and fabrication of nanostructured SEIRA-active substrates." And, along with all these activities, Audrey also found time to provide service to the department by prepping labs for microbiology and genetics.

Dr. Jackson praised Audrey as "one of the finest students the university has produced...and one of the most productive undergraduates I have ever had in the classroom and laboratory." When asked what she valued most about her time at USCA, Audrey did not hesitate to say that the people she met and developed friendships with and the faculty and all she had learned from them were the most important things she was taking away with her. She is "super excited" to be starting a program in Human Genetics at Johns Hopkins this fall, and is anxious to see where life takes her from there. We are all very proud of Audrey and look forward to following her career.
**Olfaction Studied in Vieyra Lab**

Dr. Michelle Vieyra is a sensory biologist interested in how animals use their senses to interact with the world. Her lab at USC Aiken has been studying how important the sense of smell is for reptiles and birds. This has been studied fairly well in fish and mammals and we know that being able to smell things is very important for finding food, avoiding being eaten, finding mates, choosing a good home and communicating with members of your group. It is not clear how important the sense of smell is for birds and reptiles. One way to estimate how important smell is to an animal is by looking at the genes that code for the special proteins in the nose that detect odors. The number of unique genes reflects the number of unique nose proteins and thus the number of unique odors they can detect. There are two ways to study these genes. The first way is to wait for someone to figure out the entire genome of an animal and then search the data file of that genome electronically for odor genes. Jinni Irons Carrick did this work on Zebra Finch. The Zebra Finch genome was released in 2006 and she found the odor genes hidden in that huge file of As, Ts, Gs and Cs.

The second way to find these genes is to collect tissue from an animal and use the Polymerase Chain Reaction (PCR) to pull out the genes you are interested in. Several students, including Catherine Freiler, Amanda Robinson and Taylor Byerly, have found odor genes from four species of snake using this method. So far it looks like the sense of smell is really important for these animals but work is still ongoing.

Amanda and Taylor have both been named USC Magellan Scholars to work on this project with Dr. Vieyra. Amanda received her award to work on the King snake in the Spring of 2009, and Taylor’s award began in May to work with Copperhead snakes. The Magellan Scholars program is designed to provide undergraduates an opportunity to explore an area of research in-depth with the help of a faculty mentor.

**Alumni Update Online**

**Did you know?**

You can update your address and let us know what you’ve been doing since graduation online! Just go to www.usca.edu/biogeo/alumni.html. We’d love to share your news!

Carl Williams (May 2005) is employed by University Hospital, Augusta in the IT Department. He and his wife Tracy welcomed a son, Harrison David, on January 24, 2008. Tracey is a teacher at Wagner-Salley High School.

Tina Tucker (May 2005) teaches science at Lloyd Kennedy Charter School in Aiken.

Matthew Brewer (May 2006) is employed as an Environmental Health Manager at the South Carolina Department of Health and Environmental Control.

Amanda Robinson and Taylor Byerly, have found odor genes from four species of snake using this method. So far it looks like the sense of smell is really important for these animals but work is still ongoing.

Brian Nevius (Dec 2005) and Adam Hoffman (Dec 2005) received Master of Science degrees from USC’s Arnold School of Public Health, May 2009.

Jackie Davis Hall (May 2004) will begin the Clinical Nurse Leader Master’s program at the Medical College of Georgia this Fall.

Dawn Sarka Drasher (August 2007) is a USC Aiken public safety officer.
Tonya Friar, a senior biology major from Johnston, SC, was chosen by the faculty as this year’s student of the year in geology. Tonya has elected to do the cognate in geology that has been offered by the department since 2007 and has completed the prerequisite AGLY 101 as well as AGLY 102 (Historical Geology) and AGLY 401 (Environmental Geomorphology). In the fall she will complete the 12 hour requirement with AGLY 311 (Paleontology). Dr. Allen Dennis, who has been her instructor in two geology classes says of Tonya: "Tonya has distinguished herself in class and lab with her diligent preparation and her ability to work with mineral, rock, and fossil samples, and topographic and geologic maps. She has consistently been one of the most observant students in the field. Tonya enjoys studying the relationship between geology, climatology and life to make the world we see today."

Tonya was named a USCA Scholar in her junior year and has served as a student ambassador with Pacer Spirit this past year. She has also been the student assistant in the Sciences office for the past three years. She coaches a youth softball team in Edgefield County and loves to race Go-Karts. Her ambition since the 6th grade has been to become a pediatrician. She has worked at the pharmacy in Johnston for six years, the last four as a pharmacy tech. She especially values the personal attention available from the faculty at USCA. She will graduate in December with a Bachelor of Science degree in Biology and will be greatly missed in the office.

Recent Faculty Activities

Dr. Allen Dennis presented "A Snowball's Chance in Dixie," at the IGCP (International Geoscience Programme) meeting in Salamanca, Spain in June 2009 and attended the Annual Meeting of the Geological Society of America in Houston, Texas in October 2008.

Dr. Derek Zelmer presented "Evaluating the potential for parasites to indicate ecosystem-level changes in the Edisto River, SC" at the Southeastern Society of Parasitologists meeting in Murray, Kentucky, April 2009.

Dr. Andy Dyer attended a workshop on "Synthesizing Ecology and Evolution for the Study of Invasive Species" in Lake Tahoe, California in April 2009.

Dr. Michele Harmon presented a poster on "Assessment of Copper Bioavailability in Constructed Wetland Effluents using a Water Effects Ratio Approach" at the 29th Annual Meeting of the Society of Environmental Toxicology and Chemistry in Tampa, FL in November 2008.

Dr. Garriet Smith attended a workshop for the World Bank Coral Disease Working Group in Keauhou, Hawaii in February 2009, participated in field work for this project in Mayagüez, Puerto Rico, and presented a paper at the Annual Meeting of the Geological Society of America in Houston, Texas, October 2008.
a red tailed boa, an eastern king snake, a northern pine snake, a corn snake (captured in the basement of the Science Building!), a mud turtle, a banded gecko, a black belly salamander, a tiger salamander, three sirens, along with a few assorted fishes. Brad has built wooden frames to hold aquaria for many of the reptiles and amphibians now on display in the windows facing the hallway of room 102 (the museum). Others line the back counter in room 103, and a 55-gallon tank that will be a combination aquarium/terrarium with recirculated and filtered water is under construction.

Brad is especially interested in having a collection of native species to display, with current animals being swapped out on a regular basis for variety. Some of our specimens have been donated and others were collected by faculty or students. Dr. Hanlin's Vertebrate Zoology and Herpetology classes are required to make collections, and some of these critters make their home in the department, at least for a time. Brad also has a great interest in making the collection interactive and developing an outreach program in the community. "There are plenty of preserved specimens in the museum, but I would like to see lots of live specimens along side of those to capture the students' interest," he commented. If you are in the vicinity, stop by and see what's new in the herp world in the Science Building.

**Historic Birthday**

Dr. Allen Dennis's Historical Geology (AGLY 201) class celebrated the 200th anniversary of the birth of both Charles Darwin and Abraham Lincoln on February 12, 2009.
Research continues to be an integral part of our department’s program. Students pursue independent study projects under the tutelage of faculty members. Those pursuing a B.S. degree are required to complete a senior research project. Listed below are projects for Fall 2008 and Spring 2009.

**Fall 2008 Senior Research Projects**

- **Mary Brown:** *Cinaetute ubteractuibs between wild and cultivated Cyperus esculentus.* Advisor: Dr. Andy Dyer.
- **Tremone Davis:** *Defense mechanisms of Gorgonians.* Advisor: Dr. Garriet Smith.
- **Catherine Freler:** *Isolation and characterization of snake olfactory receptor genes.* Advisor: Dr. Michelle Vieyra.
- **Jennifer Irons:** *Bioinformatic study of bird olfactory receptor genes.* Advisor: Dr. Michelle Vieyra.
- **Lisa James:** *Parasite infracommunities of Siren lacertina from Steel Creek Bay, SRS.* Advisor: Dr. Derek Zelmer.
- **Angelica Mosely:** *Resource foraging in yellow nutsedge, Cyperus esculentus.* Advisor: Dr. Andy Dyer.
- **Courtney Rabun:** *Parasite infracommunities of Siren lacertina from Dry Bay, SRS.* Advisor: Dr. Derek Zelmer.
- **Carlandra Randolph:** *Associative learning in *drosophila.* Advisor: Dr. Michelle Vieyra.
- **Brittany Sandifer:** *Characterization of diazothopic microorganisms.* Advisor: Dr. Garriet Smith.
- **Emily Shubnell:** *The influence of natural organic material on copper toxicity.* Advisor: Dr. Michele Harmon.
- **Kimberly Watson:** *The effect of biotic and abiotic factors on *Brassica* rapa growth.* Advisor: Dr. Andy Dyer.
- **Mitchell Wilcox:** *Using whole genomes to investigate prorostome evolution.* Advisor: Dr. Michelle Vieyra.
- **Sophronia Wright:** *The effect of soil heterogeneity on reproductive allocation in Cyperus esculentus.* Advisor: Dr. Andy Dyer.

**Spring 2009 Senior Research Projects**

- **Hortencia Elizabeth Bauer:** *Chronic toxicity of wastewater effluent from Sumter, SC.* Advisor: Dr. Michele Harmon.
- **Lauren Beasley:** *Pathology of parasitic diseases.* Advisor: Dr. Derek Zelmer.
- **Elizabeth Boyd:** *Molecular genetics and DNA analysis.* Advisor: Dr. James Yates.
- **Keith Boyd:** *Copper in drinking water at USCA.* Advisor: Dr. Michele Harmon.
- **Ryan Buffet:** *Molecular biology.* Advisor: Dr. James Yates.
- **Kristen Cochran:** *Genetic molecular independent biology study.* Advisor: Dr. James Yates.
- **Megan Cooper:** *Analysis of Vif5154 hammerhead ribozyme activity.* Advisor: Dr. William Jackson.
- **Ashley Edmond:** *Isolation and characterization of OR genes in birds.* Advisor: Dr. Michelle Vieyra.
- **Brent Eno:** *Effects of management practices on non-native plants in pine forest.* Advisor: Dr. Harry Shealy.
- **Ashley Ferguson:** *Race and pellagra mortality in South Carolina and the south in the early 20th century.* Advisor: Dr. Andy Dyer.
- **Bridget Gleaton:** *Toxicity identification evaluation of water at USCA.* Advisor: Dr. Michele Harmon.
- **Christine Gross:** *Reduction of HIV-1 vif activity using siRNA.* Advisor: Dr. William Jackson.
- **Sean Grubb:** *Prokaryotic molecular genetics.* Advisor: Dr. James Yates.
- **Dana Hailat:** *Biophysical analysis of the opportunistic pathogen (LS2).* Advisor: Dr. James Yates.
- **Audrey Hendley:** *Reduction of HIV-1 vif activity using hammerhead ribozymes.* Advisor: Dr. William Jackson.
- **Jasmin Hicklen:** *Heredity and associative learning in *drosophila* larvae.* Advisor: Dr. Michelle Vieyra.
- **Domonique Jones:** *The cons-generational persistence of olfactory learning in fruit flies.* Advisor: Dr. Michelle Vieyra.
- **Benjamin Morris:** *Amphibian sampling: the utility of leaf litter bags.* Advisor: Dr. Hugh Hanlin.
- **Christin Noe:** *Toxicity of stormwater runoff from USCA campus parking lots.* Advisor: Dr. Michele Harmon.
- **Lindsey Padgett:** *Optimizing viral titer using an anti-HIV retroviral vector.* Advisor: Dr. William Jackson.
- **Cheryl Parker:** *Toxicity identification evaluation of water at USCA.* Advisor: Dr. Michele Harmon.
- **Holli Pender:** *Multivariate analysis of patterns of similarity.* Advisor: Dr. Derek Zelmer.
- **Kasandra Rivera:** *Patterns of predisposition to parasite infection.* Advisor: Dr. Derek Zelmer.
- **Amanda Robinson:** *Characterization and comparison of OR genes in snakes.* Advisor: Dr. Michelle Vieyra.
- **Laurel Smith:** *Sponge diseases.* Advisor: Dr. Garriet Smith.
- **Kristen Stewart:** *Assessing caloric and nutritional change in food choices.* Advisor: Dr. Michelle Vieyra.
Newest Alumni

May and August 2009 Graduates at the Senior Brunch: L-R Christine Gross, Lindsey Padgett, Carlandra Randolph, Dana Hailat, Kristen Cochran, 2nd row, Elizabeth Boyd, Elizabeth Bauer, Cheryl Parker, Jasmin Hicklen, Lisa James, Angela Moseley, Catherine Freiler, Keith Boyd, Courtney Rabun, Laurel Smith, Audrey Hendley, Ashley Ferguson, Kim Ulmer, Bridget Gleaton, Kasandra Rivera

Future Alumni - Sons of Faculty

L-R, Stephanie Muga with Robert, Jr. (affectionately known as Little Robert), Brad Reinhart with Pete and Brennan, and Derek Zelmer with Eric (aka The Boy)
Catherine Freiler (second from left) was married on June 27th, attended by classmates Lisa James and Courtney Rabun. Also pictured Dr. Michelle Vieyra (center) and Angel Moseley (far right).

Andy Dyer spent the Spring 2009 semester on sabbatical leave from his teaching duties. He was very productive during this time, working on five articles in various stages of preparation for submission, publishing an online article, attending a meeting in Lake Tahoe on the Synthesis of the Ecology and Evolution of Invasive Species, as well as collecting data for two ongoing projects: invasive weeds in commercial potting soil and trans-generational plasticity in yellow nutsedge. He also collected data for the Pine Lawn Cemetery Project database and wrote a preproposal for the Savannah River National Lab’s work on weeds. We look forward to having him back in the classroom this Fall.

Hendley, Lindsey Padgett, and Cheryl Parker) will be continuing their education this fall in various graduate programs and one (Kassandra Rivera) will enter podiatry school. Two recent graduates will also be continuing their education this fall, Jackie (Davis) Hall (2004) into a Clinical Nurse Leadership Program and Michael Drinkwater (2008) to medical school. Please let us know if I have missed anyone! Over the past year the department sponsored three prestigious Magellan Scholars. These awards are given by the USC Office of Undergraduate Research to students pursuing research projects. In fact four of the ten Magellan awards given to USCA students have come to our department.

Unlike other years, this past year also had a tragic side. Not long after graduation we were all saddened by the sudden death of Elizabeth Boyd. When I think of Liz, I will remember her easy smile and quiet demeanor. Most of all I will mourn the loss of a promising young lady who was on her way to bigger things.

In Memorium
Elizabeth Boyd
USCA Biology Graduate
May 7, 1986 - July 27, 2009
Alumni Focus

Pam (Wall) Steen is back in the classroom at USCA, this time as the instructor rather than the student, teaching an evening section of ABIO 121. Pam graduated in May 2003 summa cum laude and was named Biology Student of the Year for 2003. She went on to a Ph.D. program in Molecular Medicine at the Medical College of Georgia, where she received her degree in December 2008.

An Aiken native, Pam attended South Aiken High School. After spending one year at Newberry College in a vet tech program, she transferred to USCA as a biology major. She began working in Dr. Jackson’s lab in the Spring of 2002 and was a research technician on an NIH grant in his lab, making ribozymes against the TAT gene in HIV. “The research experience in Dr. Jackson’s lab convinced me that I wanted to go to graduate school,” she says.

At MCG, Pam worked in the lab of Dr. Lynnette McCluskey doing whole animal research, examining how the immune system can affect taste function in rats. Since defending her dissertation in September 2008 she has been a post-doc in Dr. Ellen LeMosy’s lab where they are studying the development of the dorsoventral axis in Drosophila.

Pam’s favorite class at USCA might surprise some people, but she loved the Photography class she took with Ginny Southworth the most and says it has led to an ongoing hobby she really enjoys. Dr. Hanlin’s Herpetology class, taken her last semester here, turned out to be her favorite biology class. “It was a life changing experience,” Pam recalled. “I’d never been camping and we spent a week cut off from civilization in the Okefenokee Swamp–I loved it! I got to know other biology majors that otherwise I wouldn’t have met and experienced the whole field side of biology that I’d missed in the lab. I think every biology major should have that experience.”

Pam is enjoying teaching undergraduates back at her alma mater and says it gives her an appreciation for how much work goes into teaching a class. She lives in Warrenville (not far from Dr. Hanlin) with her husband Eric Steen and their Molly’s Militia dog Corgan.