The department welcomed two new geology faculty members this year, Dr. Kelly Gibson in the position previously filled by Prof. Karin Willoughby and Dr. Jessica Sullivan, filling the vacancy created by Dr. William Pirkle's retirement. We invite you to get to know these two newest members of our departmental family.

When Dr. Kelly Gibson was offered the position as Instructor of Geology in the department, her first request was to ask for a delay in her start date. You see, she was scheduled to be on a ship in the waters of the western equatorial Pacific on a research expedition with the International Ocean Discovery Program (IODP) funded by NSF in the Fall of 2016. Her request was granted, and so she spent two months with 30
I was recently asked by our dean to make a list of external entities that provide research funds to biology and geology professors in our department. The list is impressive. The Department of Energy continues to fund our Environmental Remediation and Restoration Program, which includes research funds for Dr. Harmon and a number of scholarships for students in the ERR concentration. Both of our new geologists, Drs. Jessica Sullivan and Kelly Gibson, have received external funding to support their research. Dr. Sullivan, who studies the temporal and spatial variability in floodplain circulation, is funded by the National Aeronautics and Space Administration (NASA). Dr. Gibson, who studies marine fossils and sediments to construct patterns of past climate change, is funded by the National Science Foundation (NSF). Dr. Nathan Hancock recently received a prestigious NSF CAREER grant to fund his plant genetics work. Dr. Virginia Shervette has funding from both the Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) to fund her fisheries work. The biomedical research of Drs. April DeLaurier, Nathan Hancock, and myself is funded through the National Institutes of Health (NIH). These awards not only support our research interests, but also directly impact more than 30 of our students who work in our research labs in support of this work.

Our most important departmental development is that we will move into the coming academic year without our long-time Administrative Assistant, Carol Cutsinger, who is retiring June 30. While we all knew this day would come, many of us did not want to consider the reality. Carol began her time as our Administrative Assistant in 1998 and has become, for many, the face of our department. Of our current departmental makeup, only four of us were here prior to Carol! During this time, she has been an invaluable member of our department and the informal “mom” for many of our students. Our students call her “Miss Carol” and know that she is their first stop in getting help of all kinds. Registration periods are always crazy, but Carol has been a calming influence when students felt the stress of trying to create a perfect schedule. Carol’s cure has been to sit the student down, and very patiently help them work out a workable schedule. In this way and innumerable others, Carol has positively affected the lives of so many of our students. Our department has also seen great changes during this time, growing from 11 to 15 faculty members and implementing several new degree programs. Carol has helped guide us through implementation of everything from new university policies/procedures (e.g., DegreeWorks, the Banner System, and People Soft) to each of our new degree programs. She has done so in a manner that prevented generalized panic on the part of students and downright obstinacy on the part of the faculty!

Most importantly, she is part of our family. We have watched her children grow into adults, and she ours. We have shared good times and difficult ones. And she never missed a department member’s birthday – always bringing a cake or a pan full of her famous oatmeal mint cookies! On July 1, we will welcome Mrs. Arlene DiPeitro as our new Administrative Assistant. I have often said in this column that change is good. However, in this case it is also bittersweet. Carol, we will miss you and hope that we have made your time at USC Aiken as memorable for you as it has been for us.
Kenneth Glenn, a senior who grew up in Beech Island, SC and attended Midland Valley High School, has been selected by the faculty as this year's Outstanding Biology Student of the Year. Kenneth said he knew he wanted to pursue a profession in a medical field ever since he was in the second grade, when he dressed up in his mom's scrubs for a dress-up day at school. His mom is an alumna of USCA with a BSN degree, and later pursued a master's degree to become a nurse practitioner. As time went on, his interest turned to dentistry, which he hopes to make his career.

Kenneth was named a USCA scholar in high school, and matriculated with biology as his major. In the Spring of his sophomore year, Kenneth was taking Dr. Dyer's botany class, and Dr. Dyer encouraged him to find a lab to do research in. He talked with Dr. DeLaurier, with whom he had taken BIOL 121, and joined her Developmental Biology lab. He has been in her lab ever since, and he explains that Dr. D, as her students call her, tied in his interest in dentistry with special emphasis on the jaw of their model organism, the zebrafish.

Dr. DeLaurier, who nominated Kenneth for this award, praises him as "an extremely diligent and focused student who has been a great asset to the department and to my lab. He has demonstrated a profound and life-long passion for science, an ability to be a leader and teacher to his peers, and a tremendous integrity of spirit."

Kenneth was awarded an INBRE Primer grant and has been named a Magellan Scholar, both in recognition and support of his research projects. He will be working as a research technician in the lab of Dr. Nathan Hancock in the coming year and hopes to attend dental school in 2018. The department congratulates Kenneth and will follow his career with interest.
other scientists collecting sediments from the sea floor in the Indo-Pacific Warm Pool, an area that has the warmest sea surface temperatures on the planet. This big source of heat and water vapor contributes to the global hydrologic cycle and is an important area of study for understanding past and future climate change. The expedition was just the beginning of what could be decades of research as the collected samples are analyzed and the data scrutinized. Dr. Gibson will be traveling to College Station, Texas in June to work with the samples. And so in January 2017, she arrived on campus ready to begin her teaching duties.

Born in Arlington, VA, Kelly grew up primarily in a suburb of Philadelphia. She was exposed to a wide range of interests by her father, a radio-pharmacologist working on nuclear imaging, and her mother, a philosophy major who had worked on Capitol Hill and as a paralegal and was into history. Kelly played both soccer and the cello in high school and loved being outdoors. Summers were spent at the Jersey shore with family, including a half-brother, Donovan, and lots of cousins.

She matriculated at the College of William and Mary in Williamsburg, VA with a primary interest in anthropology. But she loved the geology department and the professors at this school, which was focused on undergraduate education. She took a class in marine geology in the spring of her sophomore year taught by two professors from the Virginia Institute of Marine Science and then participated in a summer field camp on the geologic history of the Colorado Plateau. She completed her B.S. degree in geology in 2004 and moved on to graduate studies in paleoclimate, marine sedimentology, and geochemistry in the Rosenstiel School of Marine and Atmospheric Science at the University of Miami, earning a Ph.D. in Marine Geology and Geophysics in 2012.

Dr. Bob Thunell at USC-Columbia was the outside committee member on her dissertation committee, and he recruited her as a Postdoctoral Associate in his lab in Earth and Ocean Sciences at USC, where she spent the next three years. In addition to her current position as Instructor of Geology at USC Aiken, she is also an Adjunct Assistant Professor in the School of the Earth, Ocean, and Environment at USC.

With one semester of teaching Physical Geology and Integrated Earth Science at USCA under her belt, she is looking forward to teaching Paleontology in the Fall. Kelly says she has received an extraordinarily warm welcome from the faculty and staff in the department and school as a whole and has begun to set up her lab where she hopes to recruit students who are interested in using marine fossils and sediment to reconstruct patterns of past climate change.

In her spare time, Kelly enjoys yoga, photography, hiking and camping, particularly with her four-legged friend, Harlee, who has been a constant companion through graduate school, postgraduate work, and now teaching at USCA. She has a constant travel bug and is always on the lookout for the next opportunity to explore a new place, near or far – particularly if it lets her go SCUBA diving or snowboarding.
Scholar Showcase

This year USC Aiken's 10th annual Research Day, rebranded Scholar Showcase, was held on April 13th and 14th in the Gregg-Graniteville Library. Co-sponsored by the Center for Research Excellence and the Center for Teaching Excellence, the new name was intended to reflect the breadth of student work across campus. A new logo was crafted in Dr. Michael Fowler's Graphic Design class by students Lauren Carver and Linh-Da Nguyen.

The event began on Thursday afternoon with a reception and keynote address by Dr. Michael Barresi, an associate professor of biology at Smith College in Northampton, Massachusetts. His timely message was entitled, "Merging Research and Teaching with Course-Based Research Experiences to Tackle Wicked Problems and Foster Deep Student Learning." Dr. Barresi was also on hand on Friday to listen to oral presentations and examine student posters, where he posed thought-provoking questions and offered new insights to our students.

A total of 45 USC Aiken students gave oral presentations in three morning sessions, and 72 posters were displayed during two afternoon poster sessions.

Dr. Tim Lintner, Assistant Vice-Chancellor for Academic Affairs, sums up this year's successful endeavor: "USC Aiken is unwavering in its commitment to undergraduate research. One way in which undergraduate research is put front-and-center is through Scholar Showcase. This year saw more oral and poster presentations than ever before. From science to education, from creative arts to the humanities, Scholar Showcase offers all students an opportunity to present their research agendas and, in doing so, craft their communication and leadership skills. It was—and always is—one of the most important and exciting days on campus. Yet at its core, Scholar Showcase is about relationship-building. Peeking behind the proverbial curtain, students work with faculty on existing or often new research lines. Such collaboration is a cornerstone of undergraduate education here at USC Aiken."

Dr. Bill Jackson, Co-Director of the Center for Research Excellence, sums up: "Moving Scholar Showcase to the library was a great success. By doing so, we not only celebrated the accomplishments of all participating USC Aiken students, but did so in arguably the most important academic building on any university campus. For the second year we moved all of our senior biology major 499 talks to Scholar Showcase, taking up two sessions of the Friday morning oral presentations. We also had a large number of biology and geology students participate in the two poster sessions held on Friday afternoon."
Dr. Jessica Sullivan is truly a Carolina girl and is very happy to be a member of the faculty at USCA. Born in Charleston, she grew up in Ehrhardt, SC, where she attended Bamberg-Ehrhardt High School. She was the first in her immediate family to graduate from a major university, earning an associate’s degree in science at USC Salkahatchie, then a bachelor’s degree and Ph.D. at USC Columbia. Jessica remembers that she and her older sister, Erin, were always outside exploring, looking for and making new trails and curious about the world around them. “I guess it stuck with me,” Jessica says, “and my early scientific interest centered around meteorology. I wanted to be a storm chaser!” She also remembers a trip to the coastal barrier islands in her middle school years when she observed rain in the salt marshes, which kindled an interest in how the weather affected the environment, though she says she wouldn’t have been able to put it like that at 12! When she got to USC Columbia, she was delighted to learn there was a career path to match her interests, and she earned her Bachelor’s degree in Marine Science with a concentration in Physical Oceanography.

Jessica’s undergraduate research was heavily involved in GIS (Geographic Information Systems), and upon graduation she did an internship with the South Carolina Regional Climate Center in Columbia. Next she was hired as a GIS analyst for the City of Charleston. Her heart led her back to Columbia, however, where her future husband, Robert, was working as a Sheriff’s Deputy for the Richland County Sheriff’s Department, and she was hired as a GIS analyst for the City of Columbia. Jessica and Robert’s romance had begun at USC Salkahatchie when they were chemistry lab partners, and they went on to USC Columbia together. Robert, hailing from Fairfax, earned his degree in Criminal Justice and then attended the police academy.

Jessica decided to return to school and had begun a master’s degree in geography when she met Dr. Raymond Torres, who was serving as graduate director for the Department of Earth and Ocean Sciences at that time. During an interview for summer teaching he suggested she consider a Ph.D. in geological sciences studying surface processes in salt marshes, and the rest, as they say, is history. She jumped at that opportunity and was a research assistant for Dr. Torres and teaching assistant during her graduate years. She and Robert married in 2012, had their first child, Hannah, in 2013, and she completed her Ph.D. in 2015.

Jessica’s first post-graduate position was as a scientist with the South Florida Water Management District in West Palm Beach, FL, but she soon knew she wanted to return to academia and began searching out jobs. When she came upon the advertisement for USC Aiken’s position, she thought nothing could be more perfect, and after her interview, the department felt the same way about her. Robert was quickly snapped up by the Aiken County Sheriff’s Department, they moved to Aiken on June 13, 2016, and their son Ethan was born at Aiken Regional on June 27th! Dr. Jackson remembers contacting Jessica to see whether she wanted to come by and see her new office. She responded from the hospital across the street that she was a little busy at the moment!

Her first year teaching at USC Aiken has been
very busy and rewarding for her. Asked to reflect on her experiences this year, Jessica responded, “I knew it would be busy, but I was surprised by how challenging it is to be in the driver’s seat, to be leading the students in research and getting them to think deeper about the world around them. I realized how much I was still learning along with them. This job allows you to continually learn – every day – every minute – from the students and from my peers – and from my own mistakes!”

In addition to teaching Environmental Earth Science and Geomorphology this year, Jessica jumped right into research with five students working in her lab. She is collaborating with Dr. Torres and Dr. Lakshmi of USC Columbia on a grant funded by NASA looking at inundation, circulation, and residence time for the river floodplain at Congaree National Forest. She has also begun a collaboration with scientists from the University of Tennessee surveying the Sand River in Hitchcock Woods with remote sensing and GPS to estimate the mass balance between the erosive canyon and the downstream depositional environment.

In her spare time, if you can imagine she has any, she loves going to the beach, hiking in the mountains, camping, weather photography, introducing her kids to new places and things, and local markets. We welcome Jessica to USCA and her family to Aiken!

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A note from Carol

One often hears people speak of “major life events”—events such as births, deaths, new jobs, marriage, divorce, and moving to new locations. I am facing such a major life event called retirement. As I write this, tomorrow will be my last day in the office as the administrative assistant for the biology/geology and chemistry/physics departments. It is a job I have done for a little over 19 years. I have seen hundreds of students come and go and quite a number of faculty and staff either retire or move on to other jobs. I changed from a woman with school aged children to a grandmother in those years. One of my faculty members has jokingly called me an enabler, meaning perhaps that I have allowed people to become lazy or irresponsible by doing too much for them. I prefer to think (and hope), rather, that I have enabled people, in the best sense of the word, to become better students, more effective faculty members, kinder, more understanding colleagues. The students, faculty, and staff of USC Aiken have been my work family for all these years. It is not so easy to leave. But I am ready for the next chapter of my life to unfold. Just as I have watched countless students graduate and go on to great things, I hope to find meaningful fulfillment in the years I have ahead of me. But a piece of my heart will always remain in the Science Building, as I wish the generations past, present, and future the gift of becoming enablers who will make this a better world. A favorite quote of mine is from a 19th century Christian saint, St. Seraphim of Sarov, “Acquire inner peace and thousands around you will be saved.”
Magellan Scholars

The department is proud to announce that four of our students have been named Magellan Scholars in the 2016-17 academic year, and four more were awarded Mini-Magellan grants to fund their research projects. Magellan scholars are awarded up to $3,000 to fund their research, and the mini-Magellan awards $1,000. Congratulations to these students and their research mentors.

Developing a tool for transposon mutagenesis in zebrafish (D. rerio)
Alec Jones, mentors Dr. DeLaurier & Dr. Hancock

The goal of this project is to demonstrate the successful in vivo transposition of the mobile element mPing, from Oryza sativa (rice), in zebrafish. mPing is a 430-bp, class II miniature inverted-repeat transposable element (MITE), which is mobilized by two enzymes: ORF1, which contains a DNA recognition domain, and Pong TPase, which contains a catalytic domain. mPing, like many invertebrate transposons, has yet to be tested for activity in a vertebrate organism, yet may serve as an effective tool for transposon mutagenesis in vertebrates, such as zebrafish. An iTol2 expression vector, driving expression of mmPing20x interrupted mCherry, will be co-injected with mRNAs for both Tol2 transposase and ORF1-T2A-TPase. The expression vector also contains a cmlc2:eGFP transgenesis marker labelling cardiac cells, to check for plasmid integration. Successful rates of transposition will be determined in injected F0 fish by the percentage of mCherry expressing fish among those with cardiac eGFP expression. This will also permit us to determine the rate of transmission among F1 fish, and to potentially establish a line of fish containing mmPing20x, and remobilize this element in subsequent generations via injection of ORF1-T2A-TPase mRNA. The results of this study will form the basis to future research to use mmPing20x as an activation tag in zebrafish for novel gene discovery.

Generating mef2ca and mef2cb transgenic zebrafish lines using BAC-mediated recombination and CRISPR/Cas9-mediated integration
Kenneth Glenn, mentor Dr. DeLaurier

The genes mef2ca and mef2cb (myocyte enhancer factor 2c a and b) are important for craniofacial, muscle, and heart development in zebrafish. The goal of this project is to generate transgenic zebrafish lines expressing fluorescent markers under the control of endogenous regulatory elements for mef2ca and mef2cb. Using BACs (bacterial artificial chromosomes) containing mef2ca and mef2cb, Phusion PCR products containing the fluorescent reporter genes EGFP and mCherry will be integrated near the start codon of mef2ca and mef2cb using homologous recombination. Likewise, CRISPR/Cas9 will be used to ‘knock-in’ a fluorescent transgene into mef2ca and mef2cb in vivo so that endogenous regulatory sequences drive transgene expression. These lines will allow us to study the pattern of expression of mef2ca and mef2cb in development and track the function of these factors in specific tissues and cells in embryos.
Understanding the replicative transposition mechanism of the transposable element mPing
Lisette Payero, mentor Dr. Hancock

Transposable elements are mobile segments of DNA that “hop” from one genomic location to another. Their activity can induce mutations, making these elements important drivers of genome evolution. My research examines the transposable element mPing. This element has been shown to increase in copy number over time despite utilizing a “cut and paste” transposition mechanism with no obvious replicative step. My project investigates the potential role of the homologous recombination (HR) repair mechanism in mPing replication. My project requires multiple strains of yeast, some of which were made HR deficient by knocking out the Rad51 gene. An ADE2 reporter system is used in an assay to monitor mPing transposition and possible replication. After this assay, sequencing is utilized to determine the total copy number of mPing within each yeast strain.

Testing for field effects and maternal effects in seeds of the invasive annual grass, Aegilops triuncialis
Melissa Groleau, mentor Dr. Dyer

My Magellan project is focused on the phenotypic traits of invasive plant species. Models of plant invasions assume a population must adapt to invade. However, there are some plant species that invade rapidly without apparent adaptation. My model organism, Aegilops triuncialis (barbed goatgrass), is ideal because of low genetic variation and outcrossing, which should prevent rapid adaptation. Dr. Dyer’s lab found that even though populations represent only two genotypes, seed traits vary significantly within and among populations. We suspect the variation is due to maternal effects on phenotypic expression and not due to genetic variation. If true, we should be able to eliminate maternal effects using common growing conditions and then determine whether the differences seen in genetically identical populations are permanent genetic differences or transient plastic differences. Early data suggest that the differences are transient, which supports our hypothesis of Trans-Generational Plasticity (maternal effects) related to growing conditions, and TGP could represent a possible mechanism for the rapid invasion of plant species.

Magellan Mini-Grants


Mary Beth Roby, *Testing Strategies to Produce Targeted Insertion of mPing*, Mentor: Dr. Nathan Hancock.
Student Awards

South Carolina Academy of Science Annual Meeting awards for outstanding undergraduate research, Coastal Carolina University:

Natalie Arthur, 1st place, Molecular Biology Oral Session, Generating a HIV-1 dependent chimeric vector to deliver a pro-apoptotic gene, mentor Dr. William Jackson.

Jazmine Benjamin, 1st place, Cellular Biology Oral Session, Determining the sequences involved in mPing transposition, mentor Dr. Nathan Hancock.

Shaquanda Ross-Simmons, Outstanding Female Scientist and 1st place, Medicine/Pharmacology/Public Health Oral Session, Effects of head impact on neurocognitive functions and balance, mentor Dr. Michelle Vieyra.

Brianna Snelling 2nd place, Molecular Biology Oral Session, CTSK:mCherry-ITOL-2 – A transgenic construct to study the role of osteoclasts during zebrafish development, mentor Dr. April DeLaurier.

London Vickers, 2nd place, Medicine/Pharmacology/Public Health Oral Session, The effects of caffeine and a high sucrose diet on adipose tissue accumulation, memory, and anxiety in rats, mentor Dr. Michelle Vieyra.

Alec Jones, 1st place, Cellular Biology Poster Session, mPing as a tool for transposition mutagenesis in zebrafish, mentor Dr. April DeLaurier.

Kirstyn Denney, 1st place, Molecular Biology Poster Session, Cloning a siRNA targeted to HIV-1 vif, mentor Dr. William Jackson.

American Society of Plant Biologists Southern Section, Orlando, Florida:

Lisette Payero, 1st place, Undergraduate Poster Session, Determining the role of homologous recombination in replicative transposition of mPing, mentor Dr. Nathan Hancock.

SE Regional Society for Developmental Biology meeting at Kennesaw State University, Kennesaw, Georgia:

Kali Wiggins, first place, undergraduate poster session, Determining the role of ldlrap1a in zebrafish skeletal development, mentor Dr. April DeLaurier.

USC Discover Day, USC Columbia:

First Place Biology & Biomedical Sciences Poster Session F
Rebecca Beaudry, Biology
Mentor: Dr. William Jackson
Development of a bicistronic vector system to test anti-HIV 1 siRNAs that target the accessory protein VIF.

Biology and Biomedical Sciences Poster Session G
Christian Fay, Biology
Mentor: Dr. William Jackson
siRNA mediated downregulation of HIV-Tat in anti-Tat siRNA protected Lymphocyte populations.

Biology and Biomedical Sciences - Poster Session H
Erin McLaughlin, Biology, Honors, Magellan Scholar
Mentor: Dr. William Jackson
Expression of Vif-resistant ApoBEC3G from a HIV-1-dependent lentiviral vector Biology.

Second Place Biology and Biomedical Sciences - Poster Session H
Natalie Arthur, Biology, Honors
Mentor: Dr. William Jackson
Generating a HIV-1-dependent chimeric vector to deliver a pro-apoptotic gene.

STEM – Oral Session C
Jazmine Benjamin, Biology
Mentor: Dr. Nathan Hancock
Determining the Sequences Involved in mPing Transposition.

STEM – Oral Session E
Tiana Chandler, Biology
Mentor: Dr. C. Nathan Hancock
Development of an mPing-based Activation Tag for Zebrafish Mutagenesis.

STEM – Oral Session A
Kenneth Glenn Biology
Mentor: Dr. April DeLaurier
Generating mef2ca and mef2cb transgenic zebrafish lines using BAC-mediated recombination.

Biology and Biomedical Sciences - Poster Session E
Lisette Payero, Biology
Mentor: Dr. William Jackson
Determining the role of homologous recombination in replicative transposition of mPing.

Honorable Mention Biology and Biomedical Sciences Poster Session F
Johnny Carroll, Biology
Mentor: Dr. William Jackson
T-Bid expression in ptBidTNG(INS2)R to induce Apoptosis in a HIV infected Cell.

Biology and Biomedical Sciences Poster Session F
Lauren Spires, Biology
Mentor: Dr. William Jackson
Developing a HIV-1 Dependent Lentiviral Vector that Expresses an Innate Human Anti-Retroviral Gene.
Geology Student Of The Year

Stephen Smith, an Air Force veteran who has returned to school on the GI Bill as a Mathematics/Computer Science major, got turned on to geology in Dr. Allen Dennis's Physical Geology and Historical Geology classes this year. He is now considering a minor in geology, or perhaps even a switch to a geology major. "Dr. Dennis's passion for the subject is inspiring," Steve said. "I hadn't experienced a professor like that before, and it made me want to do something I am passionate about, that will make a difference and contribute to the greater good. Dr. Dennis is always saying, 'Take care of each other and keep it positive!'"

Steve grew up in Virginia, then spent seven years in the Air Force, five of those in Okinawa, Japan, ending as a Staff Sergeant in charge of F15 fighter aircraft. His next seven years were spent working for Enterprise where he became the Branch Manager of the Aiken store. He earned a Bachelor's degree in Business Management with a minor in Strategic Entrepreneurship along the way. And now he has become a full-time student at USCA. "It's my full-time job," Steve says. "I dedicate 60 hours a week to this, just like any other job I have had." He plans to enroll in both Paleontology and Geographic Information Systems in Fall 2017.

Dr. Dennis says, "Steve is an independent learner and has been a leader in discussion and classwork in Physical and Historical Geology, and helpful in course related field work as well."

Steve and his wife, Marlayna, an account specialist with TravelClick, live in Graniteville, SC. Congratulations, Steve, and we look forward to your continuing interest in Earth and Planetary Science.

Selected Grants awarded:
  Hancock, C.N. Revealing the mechanisms that determine how an active DNA TE impacts the genome.
- RISE: Developing a non-invasive technique for monitoring nests of the threatened wood stork (Mycteria americana) USC Office of Research, PI Kristina Ramstad.
- RISE: Determination of the lionfish species invading offshore waters of South Carolina and Florida, USC Office of Research, PI Virginia Shervette.

Selected Publications:

Congratulations to Dr. Nathan Hancock, tenured and promoted to Associate Professor of Biology!
Breakthrough Stars

Each year, approximately one dozen of Carolina's junior faculty are selected as Breakthrough Stars. To be considered, candidates must be tenured or tenure-track assistant or associate professors, relatively early career, and demonstrate considerable contributions to their fields in terms of research and scholarly activity while at USC. This award is open to junior faculty working in all disciplines and campuses.

This year the Department of Biology and Geology was honored to have two of our assistant professors, Dr. Nathan Hancock and Dr. Virginia Shervette, chosen for this award.

Dr. Nathan Hancock, an assistant professor at USCA since Fall 2011, earned his Ph.D. in biochemistry at the University of Georgia. He studies the biochemical and genetic mechanisms of transposable elements, more simply known as transposons or "jumping genes." These pieces of DNA move from one part of the genome to another, often resulting in significant mutations to the organism. Learning how they do what they do has applications for agriculture, medicine, or pretty much any field affected by genetic mutations. "The first question is, how do they move around?" says Hancock, whose lab studies transposons found in rice. Instead of moving transposons around within their natural genome, Hancock and his undergraduate researchers move them to entirely different organisms, such as soybeans and even zebrafish. "When a transposon makes mutations, it breaks things, so you get weird looking organisms." Hancock explains. "Then you can go back and say 'OK, what gene got broken?' Since we know the sequence of the rice transposon, we can figure that out. It's kind of like figuring out how a car works by breaking one piece at a time."

Dr. Hancock's research is funded by grants from the NSF Plant Genome Research Program, CoPI (2016 - 2018), "A resource for functional genomics to support soybean genetics and breeding" and NSF "Genetic Mechanisms CAREER" (2017 - 2021), revealing the mechanisms that determine how an active DNA TE impacts the genome. He was also chosen to receive USCA's Scholarly Activity Award this year and will be tenured and promoted to Associate Professor in Fall 2017.

(continued p. 13)
Dr. Virginia Shervette has been with the department since January 2012 as an assistant professor with a degree in Wildlife and Fisheries Science from Texas A&M University. Her research with fish populations ranges from NOAA funded projects, “Filling critical life history information gaps of data-poor fisheries in U.S. Caribbean waters: Age, growth, and reproduction of queen triggerfish and four species of parrotfish,” "Assessment of maturity in commercially and recreationally important reef fishes from the U.S. Virgin Islands," and "Determination of Spawning Season and Size at Sexual Maturity for 13 Targeted Reef Fishes in the U.S. Virgin Islands and Puerto Rico," to more locally funded projects like the USEPA/Gills Creek Watershed Association's “Exposure to mercury through subsistence fishing: Assessment and community outreach in lower Gills Creek, SC.”

"Part of the goal of the group in the Caribbean that I work with is to ensure that fishermen are part of the process and that we utilize their expertise," Shervette says. "We're not coming in as scientists who know everything and are telling them what to do."

Lately, Shervette's studies have expanded to lionfish, an invasive species in the Atlantic Ocean that has no natural predators and damages other fish populations. The solution to containing lionfish might simply be to eat them. "There are these lionfish rodeos up and down the coast to get people to eat them to build up a commercial market so people will want to buy them," Shervette says, but acknowledges that catching them is tricky because of their venomous spines. "The main way to get them is to go offshore and spear them. But once they are killed, the venom dissipates quickly and the fish can be fileted and enjoyed."

Dr. Shervette was awarded USC Aiken's Scholarly Activity Award in 2016, as well as two internally funded RISE grants and a Flood Research grant in the past two years.
Newest Alumni

Alumni News

Samantha (Hodges) Houston, 2012, is the Food & Feed Safety Plan Reviewer and Outreach Liaison for the State of South Carolina Department of Agriculture in Columbia, SC. She was married to Jonathan Houston (2011, Accounting) in May 2016.

Alyssa Smith, 2013, M.S. in Invasive Plant Ecology at Virginia Tech, May 2017. Alyssa will be entering a Ph.D. program in the Ecology & Evolution Department at the University of Arizona in Tucson this fall. She received a Graduate Research Fellowship from the National Science Foundation to continue her studies.

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 http://www.usca.edu/alumni/about/index.dot

Rebecca Beaudry and Natalie Arthur
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 2016 and Spring 2017.

**Fall 2016 Senior Research Projects**
Chris Fitzgerald: *The germination characteristics of solo seeds in Aegilops triuncialis*. Dr. Andy Dyer
Warren Gallman: *Caribbean grouper conservation*. Dr. Virginia Shervette
Rachael Jackson: *Developing molecular constructs for testing mPing transposition in Arbidopsis*. Dr. Nathan Hancock

**Spring 2017 Senior Research Projects**
Natalie Arthur: *Transposon-mediated delivery of a HIV-1-dependent lentivirus expressing Bax*. Dr. William Jackson
Rebecca Beaudry: *Developing a reporter assay to measure HIV-1 Vif siRNA activity*. Dr. William Jackson
Jazmine Benjamin: *Determining which sequences are involved in mPing transposition*. Dr. Nathan Hancock
Tina Chandler: *Zebrafish activation tagging*. Dr. Nathan Hancock
Rosario Curiel: *Age and growth of Caribbean fishes*. Dr. Virginia Shervette
Kenneth Glenn: *Engineering construct to test tissue-specific promoters on zebrafish*. Dr. April DeLaurier
Melissa Groleau: *Maternal effects among genotypes and populations of Aegilops triuncialis*. Dr. Andy Dyer
Frances Loyo-Rosado: *Understanding the function of components of the PHF21A complex using CRISPR/Cas9*. Dr. April DeLaurier
Erin McLaughlin: *HIV-1-dependent expression of A3G from a lentiviral vector*. Dr. William Jackson
Kara Norris: *Investigating local pollution and remediation issues*. Dr. Michele Harmon
Hillary Rich: *Queen triggerfish reproductive biology*. Dr. Virginia Shervette
Mary Beth Roby: *Testing strategies for targeted transposition insertion*. Dr. Nathan Hancock
Shaquandra Simmons: *The effects of head impact on neurocognitive functions*. Dr. Michelle Vieyra
Brianna Snelling: *Engineering constructs to test tissue-specific promoters on zebrafish*. Dr. April DeLaurier
London Vickers: *The effects of sugar and caffeine on rat health, memory and anxiety pt.2*. Dr. Michelle Vieyra
Julia Vu: *Patterns of induced dormancy in Aegilops triuncialis*. Dr. Andy Dyer

In the Spring of 2013, a new course was introduced to offer another option for our majors to gain research experience - BIOL 498 Research Design, Implementation, and Analysis. It is required of those earning a Bachelor of Arts degree in biology. Those pursuing a Bachelor of Science degree can choose either BIOL 498 or 490/499 to fulfill this requirement. Students in both classes attend our weekly Friday afternoon seminars. Dr. Andy Dyer, the instructor for BIOL 498, describes the content of this class: "This course is designed to offer an in-class research experience to graduating seniors who are not engaged in laboratory research. The course has two objectives: the first is to learn the important basics of experimental design, and the second is to apply that information. To accomplish the second goal, we use the death certificate database from Ancestry.com to test hypotheses related to mortality patterns in South Carolina from 1915 to 1960. We ask questions about types and numbers of infectious diseases, cardiovascular disease and cancer; we compare data between years, urban and rural counties, men and women, racial groups, and especially age groups. After gaining expertise reading doctor’s handwriting, we review hundreds to thousands of death certificates, compile and analyze the data, produce graphs, look up background literature, and finally produce a research poster. With this course, all of our seniors have had an opportunity to produce and defend a supervised research project before they graduate from the Department of Biology & Geology."
Alumni Focus
The Arthur Sisters

Three sisters from Graniteville, eleven years apart, all biology majors at USC Aiken, all worked in Dr. William Jackson's research lab, and all worked in the departmental office for Mrs. Cutsinger. It is the end of an era, as 2017 graduate Natalie is the youngest of nine children, most of whom attended USCA. And of course, Mrs. Cutsinger will no longer be in the office, either.

Connie, 2006, followed her older sisters to USCA, but was the first to major in biology. She explains her choice, "I've always felt the desire to be useful and do something that matters and that is what led me to science. It seemed like the best chance I had to be useful was to really develop a legitimate understanding of this world and how it works, so science seemed like the only choice really." Originally planning on becoming a physician, she fell in love with research in Dr. Jackson's lab. "I love the logical flow of research and how honest it is, allowing me to question and challenge the world I am presented constantly."

So she changed course and attended graduate school at Emory University, where she earned a Ph.D. in Biochemistry. She is currently completing her second post-doctoral fellowship at Emory, doing research related to glycobiology, immunology, and transfusion medicine. Connie sums up, "Some days I can get caught up in the drudgery of the day-to-day demands of research...but when I step back and look at the big picture, at the story I'm shaping by asking questions nobody ever thought to ask and discovering things nobody knew until I found it out, I remember why I love what I do and why I keep doing it."

Asked about her experience at USCA, Connie responded, "All of the professors in the Biology/Geology department were wonderful, but I should give a special thank you to three. First Dr. Yates, who was always so upbeat and helped to show how much fun you can have doing science. Second, I'm really grateful to Dr. Harmon, who was always ready to listen and help. And finally, I owe a lot to Dr. Jackson, who gave me so many opportunities to learn and love science. Working in his lab literally changed the course of my career. He helped teach me to love research."

Connie loves Atlanta and is very active in her church, working with youth in inner city Atlanta, but she says she will always be a Carolina Girl at heart and Graniteville, with her family, will always be her true home.

Younger sister, Angela, has much the same early story, and followed in Connie's footsteps as a biology major working in Dr. Jackson's lab. "My favorite classes at USCA were Immunology and Virology," Angela said. "These classes delved into material that had first sparked my interest in biology. My most inspiring professor would be Dr. Jackson. He mentored me for three years while I worked on a project in his lab."

Angela attended graduate school at MCG (now Augusta University) for a year before reaching the conclusion that research was not the long-term path she wanted for her life. She came back to USCA to earn her teaching certification and is now a second grade teacher at Hammond Hill Elementary School in North Augusta. She sums up, "I love working with my students and inspiring the next generation."

On May 3rd, Natalie became the last Arthur in her family to graduate from USC Aiken, having followed a very similar path as her two older sisters. Her ultimate goal is to become a physician. We will follow the progress of all three Arthur sisters with pride, knowing their careers were partially crafted in the department, in Dr. Jackson's lab, and even in Mrs. Cutsinger's office!