Research Cooperative Membership Approved

The College of Science and Mathematics and the Institute for Coastal Plain Science recently submitted a successful application for Georgia Southern membership in the Piedmont-South Atlantic Coast Cooperative Ecosystem Studies Unit (PSAC-CESU). The PSAC-CESU is one of 17 cooperative research units across the United States that provides research, technical assistance and education to resource and environmental managers at such federal agency partners as the U.S. Geological Survey, National Parks Service, U.S. Forest Service, U.S. Army Corps of Engineers and National Oceanic and Atmospheric Administration. Though they are called "ecosystem studies" units, work within this cooperative ranges from anthropology to zoology. As a member, University faculty and students will be provided with unique opportunities to conduct research on federal and state projects, and will have significantly enhanced opportunities for research funding. Georgia Southern is one of only four institutions in Georgia approved for membership in the PSAC-CESU.

Bo Ginn National Fish Hatchery

The College of Science and Mathematics signed a memorandum of understanding with the U.S. Fish and Wildlife Service to use and conduct research at the Bo Ginn National Fish Hatchery. Located
near Millen GA, the 127-acre hatchery is adjacent to Magnolia Springs State Park, and consists of 25 earthen fish production ponds and four artificial stream raceways. Use of this site will allow Georgia Southern faculty and students to conduct large-scale, replicated studies in a variety of aquatic habitats and on a wide range of topics. Therefore, this arrangement will greatly enhance research and funding potential for our faculty and students.

**Faculty Highlights**

**Ryan Fortenberry**
**Dr. Ryan Fortenberry** of the Department of Chemistry was featured in a story published in Scientific American titled, The Hunt for Alien Molecules.

**Karelle Aiken**
**Dr. Karelle Aiken** received the Women in Chemistry Committee Rising Star Award from the American Chemical Society.

**Ed Mondor**
**Dr. Edward Mondor** received an NACADA Outstanding Faculty Advising Award at the 2015 meeting in Las Vegas. NACADA is an organization that promotes and supports quality academic advising at institutions of higher education.
Department of Biology

Professor Heralds Unsung Pioneer of Evolutionary Biology in LeConte Lecture

The Department of Biology and the Institute for Coastal Plain Science hosted Dr. James Costa, the 25th LeConte Scholar, on September 28th. Dr. Costa presented an afternoon seminar “Beyond Selfish Herds: A Caterpillar’s-Eye-View of Sociality” and an evening presentation “Indefatigable Naturalists: Wallace and Darwin on the Evolutionary Trail.” A reception followed at Dr. Jim Oliver’s home. The LeConte Scholar’s Program is the oldest endowed visiting scholars program at Georgia Southern. The program was named for Joseph LeConte, a prolific naturalist and scholar who was born and raised in nearby Liberty County. Dr. Costa is an accomplished scholar, author of several books, faculty member of Western Carolina University and Director of the Highlands Biological Station [http://highlandsbiological.org/](http://highlandsbiological.org/) in North Carolina.

Biology Students Recognized

Undergraduate and graduate students were recognized in a variety of venues. New Irene Burt Boole Scholars (Botany) are James Long and McKayla Noble. Ashley Williams working with Dr. Vinoth Sittaramane received the best poster presentation award at the National Organization for the Professional Advancement of Black Chemist and Chemical Engineers National Conference in Orlando, FL. Ashley also spoke at the COSM Advisory Board meeting in October.
Five new Chandler Research Scholars were named in January, **Sydney Doolittle, Karen Campbell, Laina Latzsch, Isabel Moran, and Ashley Williams.**

**Grad Students Volunteer**

Biology graduate students have engaged in several volunteer efforts including volunteering at Pioneer Days at the Okefenokee National Wildlife Refuge, clearing brush from canoe trails in the Okefenokee Swamp, planting wiregrass in a local restoration effort and helping in a cleanup Skidaway Island State Park.

Biology graduate students recently volunteered at Pioneer Days at Okefenokee NWR. They helped make puppets for children at an endangered species exhibit. **L to R:** Elizabeth Baker, George Todd, Brianne Varnerin, Matt Carey, Marina Osier, Stefan Petersen, Jackman Eschenroeder, and Shelby Rudolph.
Jody Warwin received the 2015 Sturgis McKeever Scholarship in Zoology and Lauren Neel received the 2015 Jim Spence Scholarship in Ornithology.

Masters of Disguise: Camouflaged Cuttlefish

Dr. Christine Bedore’s recent article on cuttlefish behavior was recognized in a variety of national news outlets. Cuttlefish and other cephalopods are known for exquisite camouflage abilities. Dr. Bedore and collaborators found that cuttlefish can mask their bodies electrical fields.

Biology Professor Featured on Cover of Systematic & Applied Acarology

Dr. Lance Durden’s and collaborator’s research on ticks and quail was also featured on the cover of Systematic & Applied Acarology.

Biology Grad Student Receives Funding

Biology Graduate Student Jade Boykin received The Society for Integrative & Comparative Biology (SICB) Grants-in-Aid of Research (GIAR) Award. Jade will be able to use her $1,000 grant towards research expenses related to her project, "The Biochemical and Genetic Effects of Sleep Deprivation in Zebrafish (Danio rerio)". Sleep is a universal phenomenon in vertebrates (animals and humans!) and lack of sleep has been linked with various abnormal behaviors and serious negative health effects. As continual stress has also been linked to adverse health implications, it is likely that negative health effects associated with sleep deprivation is a direct result of elevated stress. Using zebrafish as our model system, the objective of our study is to determine if sleep deprivation causes increased stress, exhibited by changes in levels of stress hormones and behavioral changes. Additionally, we will investigate changes in the production of genes (DNA) regulating the production of stress hormones and mechanisms of circadian rhythm.

Special Thank You to Dr. Daniel Hagan and Miriam Hagan

The Department of Biology is very grateful to Dr. Daniel Hagan and Miriam Hagan. Dr. Hagan is an Emeritus Professor in Biology and a former Alumnus of the Year. The Hagans made a significant contribution towards endowing a foundation account to support our Distinguished Biology Alumnus of the Year program, the longest-standing alumni-recognition program at Georgia Southern. Their gift will help make sure this program is supported in future years.
The Department of Chemistry

Mole Day & National Chemistry Week Celebration 2015

Slime!
Grad Students making Slime

Dippin' Dots!
SAACS members use liquid nitrogen to make Dippin' Dots.

Prep!
Students and staff prepare the slime.

Celebrate!
Students celebrate National Chemistry Week.

Yum!
Children enjoying Dippin' Dots.

Learning!
Learning Chemistry is fun!
Student Affiliates of the American Chemical Society members who organized demonstrations and participated in the National Chemistry Week/Mole Day celebration.

**Chemistry Student Presents at Annual Biomedical Research Conference**

**Christopher Mays** had the opportunity to give a platform talk at the annual biomedical research conference for minority students held in Seattle WA from Nov 11-14, 2015. Only 10% of abstracts submitted were assigned platform presentation. Christopher’s project investigated the correlation between environmental chemical exposure in early years of life and type 1 diabetes. This project was partially funded by COUR, Georgia Southern University. **Dr. W. Eric Gato** also attended this conference where he judged student presentations.
The Department of Geology and Geography

Dr. Anke Hildebrandt Talk

WHEN
Thursday, Feb. 11th, 4-5pm

WHERE
Herty Building, Statesboro, GA, United States (Room 2112) Statesboro, GA

MORE INFORMATION

Dr. Anke Hildebrandt is Junior Professor for Ecological Modelling at the Institute of Geoscience at Friedrich-Schiller University and Max Planck Institute for Biogeochemistry in Jena, Germany. As Group Leader for the Ecohydrology working group, her current research integrates modeling and field methods to investigate feedbacks between water and vegetation from the top of the canopy to the bottom of the rooting zone.

Dr. Hildebrandt is visiting Georgia Southern University as a collaborator on a recently funded National Science Foundation grant seeking to determine how hydro-meteorological processes in forests are altered with urbanization. Although much is known about how urbanization affects routing of water at and below the surface, little work has quantitatively characterized how urban alterations to forest canopy structure influences the amount of water available to the surface and subsurface. Working with Georgia Southern professors, Drs. Van Stan and Underwood, and other international scholars (Jan Friesen – Helmholtz Centre for Environmental Research, Jean-Francois Cote – Natural Resources Canada) on this project, Dr. Hildebrandt will assist in developing models to allow water resource managers to better predict precipitation inputs in forested urban watersheds.

During her February visit she will present current work on grasslands at Friedrich-Schiller University and Max Planck Institute for Biogeochemistry. Title and Abstract

Researchers Rescue Sea Turtle

An endangered Kemp’s Ridley sea turtle named Catherine holds a special place in the hearts of researchers with the Georgia Southern University Sea Turtle Program at St. Catherines Island. Researchers rescued the four-year-old turtle that had swallowed a fishing hook this summer and assisted in her recovery and recent release back into her natural habitat. For nearly 30 years, the program has been making strides in sea turtle conservation efforts along the Georgia Coast.
The Department of Mathematical Sciences

28th Annual Mathematics Tournament

The 28th Annual Mathematics Tournament was held January 30th on the Georgia Southern campus. 1,040 6th – 12th grade students registered to take the test. Chasen Smith assumed the role of Tournament Chair and did an outstanding job of organizing faculty and students for the event. In addition to the students taking the tests, about 70 teachers were on campus with their students. This is a department effort and we are appreciative of our faculty and students who make this event possible.

Photo courtesy of Dr. Pat Humphrey

Eagle Undergraduate Mathematics Conference

The department and COSM will host the Eagle Undergraduate Mathematics Conference on February 13th on campus. Undergraduate students from around the region will present sessions and participate in a problem solving contest. For those who do not participate in the problem solving contest, two of our graduate students, Moriah Gibson and Matt Just, will discuss various aspects of being a graduate student.

The Department of Military Science

Eagle Battalion to Build New $9.5 Million Building

As part of the state’s $21 billion state budget, $9.5 million was approved to construct a new Georgia Southern University Military Science Building.

Georgia Governor Nathan Deal visited the Georgia Southern campus on April 28, 2014 to sign the budget bill at the foot of the Marvin Pittman Administration Building. The funding will addresses a great need for the Eagle Battalion ROTC Program. Construction is slated to begin in January 2016. The new facility will be located on the corner of Old Register Road and Forest Drive, adjacent to Highway 301.
The building, encompassing 32,000 square feet, will replace a 10,000 square-foot temporary facility that the Battalion has occupied for nearly a decade.

The Department of Physics

Dr. Maxim Durach's Nanotechnology Computational Group

Two major results have been obtained by the Nanotechnology Group, led by Dr. Maxim Durach. In a paper by Applied Physical Sciences graduate students David Keene and Matthew LePain and Dr. Durach it is shown that 30-nm thick monolayer metal-dielectric metasurfaces can drastically modify the properties of radiation passing through them and entirely change the spin state of the constituent photons. In their manuscript (arXiv:1512.08139, "Ultimately Thin Metasurface Wave Plates"), submitted for peer-review, they show that the extreme anisotropy of the proposed metasurfaces sets the ultimate lower limit for the thickness of optical waveplates. This result can be applied to the design of ultrathin wave plates, Pancharatnam-Berry phase optical elements and plasmon-carrying optical torque wrench devices.

Dr. Xiaojun Wang Research in Phosphors

Dr. Xiaojun Wang, Professor of Physics, performed very productive research when he took an educational leave last semester. He attended the 3rd International Workshop on Persistent and Photostimulable Phosphors (Arlington, TX, USA, Nov. 9-13, 2015) and gave an invited talk titled: "Photo-stimulated EPR Studies on the Trapping/Detrapping Processes of Persistent Phosphorescence." He published several papers, including one appearing in the top rated journal, Nanoscale (Nanoscale 7, 14752-9 (2015). DOI: 10.1039/C5NR04125B), and one featured on the front cover of Dalton Transactions (Dalton Trans 45, 1364-72 (2016, front cover). The latter was co-authored with a visiting professor from China, Dr. Yuxue Liu. He also made two publications, one in J Raman Spectroscopy and another in Optics letters (Opt Lett 40, 1434-37 (2015)) with a visiting professor, Dr. Chenglin Sun. After many years' efforts, he published an undergraduate research article (with Dr. Li Ma Professor of Physics, two physics majors (David Keene and Joshua Klingel), and a visiting scholar (Dr. Aijun Li)) in Am J Physics (Am J Phys 84, 32-37 (2016)), the most influential journal in undergraduate physics research.

**Dr. Monique Aller Presents Interstellar Matter Research at the International Astronomical Union**

**Dr. Monique Aller** has been actively pursuing her research program on “CONNECTING THE INTERSTELLAR GAS AND DUST PROPERTIES OF DISTANT GALAXIES” which is in year 2 of a 3-year NASA-ADAP grant funding this research. As part of this research, Dr. Aller attended both the International Astronomical Union (IAU) General Assembly meeting last August in Honolulu, Hawaii and the American Astronomical Society (AAS) meeting in Kissimmee, Florida in early January to present her research on this project.

**Physics Team Drs. James & Sarah Higdon Study Star Formation in Galaxies**

A study by James & Sarah Higdon investigating the peculiar star formation law of the Cartwheel ring galaxy was accepted for publication by the Astrophysics Journal Letters. Data obtained with the Atacama Large Millimeter Array (ALMA) telescope, located high in the Chilean Andes, played a crucial role in this research. They have been invited to present these (and other) results at a special ALMA workshop organized by the National Radio Astronomy Observatory (NRAO) in Charlottesville, Va. in April.
HST color images of ring galaxies AM 0644-741 and Arp 147 currently being observed with ALMA. The blue rings indicate high rates of star formation, triggered by the collision with a companion galaxy. They are, respectively, 300 and 430-million light years distant.

Also, the team was recently awarded additional observing time with the ALMA telescope to study cold molecular gas in two additional ring galaxies (AM0644-741 and Arp 147) to gain further insight into star formation in extreme environments.

The Higdon’s and their collaborators at Cornell University were awarded time with the Karl Jansky Very Large Array (JVLA), the premiere radio telescope in the world, to probe star formation in galaxies in the very distant universe, corresponding to an epoch only 3.6-billion years after the Big Bang.

In addition, they were also successful in being awarded observing time with NASA’s SOFIA (Stratospheric Observatory For Infrared Astronomy), an infrared telescope mounted in a converted Boeing 747. Our group will be studying star formation in the core of the “nearby” (35.5-million light years) spiral galaxy M 83. Both the JVLA & SOFIA observing proposals were written while visiting Cornell University over the Summer 2015.
Microwave Ovens Are Not Just Kitchen Appliances

While for most of us microwave ovens are nothing but kitchen appliances used to “nuke” our breakfast, for Dr. Amarie’s students in Studio Physics 2 (Electricity, Magnetism and Optics) they are laboratory instruments. For them, the oven is a microwave resonant cavity capable of sustaining stationary electromagnetic waves (schematics, Figure A) in the microwave range characterized by nodes (cold spots) and anti-nodes (hot spots) similar to a vibrating guitar string when we play a note. But how to make the invisible waves visible, is the question? Well, we chose a very delicious approach: a platform covered first with a pattern of marshmallows (Figure B), then with Hershey’s chocolate bars “revealed” the hot spots as they melted (Figure B - inserts) and measurements were possible. To our surprise, given such a crude method, we determined a wavelength of 12.5 cm (5 inches), give or take a marshmallow, which comes within about 2% of the theoretical value of a 2.45 GHz microwave oven. As you can imagine the demo was a blast, we had to take advantage of the situation and since graham crackers started to show up out of the well-prepared students’ backpacks, the s’mores time was on! See? Physics is so sweet!

Society of Physics Students Have Winning Homecoming Float

The Society of Physics Students (SPS) has been increasingly active this past year, and as of last December, is an officially recognized organization through the Office of Student Activities. The SPS won the homecoming float competition in October. They have also been very engaged in outreach activities, which have included helping with the monthly public shows at the Georgia Southern University Planetarium, the September STEMfest, and the November Georgia Southern Open House. SPS members have also been visiting local schools, including the Statesboro High School, to meet with students in elementary through high school classes and to make physics demonstrations on topics like circular motion. Additionally, the SPS members had a demonstration table at the American Physical Society - Division of Plasma Science
Plasma Sciences Expo held in Savannah at the Savannah International Trade and Convention Center on November 19-20.

**Institute for Coastal Plain Science (ICPS)**

*Researcher's Illustration Featured in Journal*

**Dr. Dmitry Apanaskevich and Maria Apanaskevich's** new paper in Systematic Parasitology has been used by Springer to highlight the February issue of the journal. Springer has used one of their drawings as seen below. Preview the abstract at the link included below the picture.

*Description of two new species of Dermacentor Koch, 1844 (Acari: Ixodidae) from Oriental Asia - Springer*
Faculty published in Clinical Microbiology and Infection

Dr. Natalja Rudenko, a visiting scholar in the ICPS, in collaboration with Dr. Jim Oliver, has produced an important paper that was accepted for publication by Clinical Microbiology and Infection (impact factor 5.197). This is milestone work, as it changes significantly the point of view on Lyme disease in the southeastern United States and on the present antibiotic treatments of patients.

The accepted manuscript presents the results of few recent years of their hard work at Georgia Southern in the Institute for Coastal Plain Science (ICPS). This is their first manuscript of clinical character (instead of ecological) that was produced in collaboration with Georgia Southern and there is much more in line to be completed.

Citation: