

Dr. Laura Regassa, GSTA 2015 Teacher of the Year

January 15, 2015



The Georgia Science Teachers Association announces the winners of the Science Teachers of the Year. Dr. Laura Regassa, a professor at Georgia Southern University, has been selected as the 2015 University Science Teacher of the Year for the state of Georgia by the Georgia Science Teachers Association. Dr. Regassa joined the Department of Biology at Georgia Southern University in 1999, where she is a Professor and the Director of STEMstars. Regassa said, "My goal is to help students learn by doing science". Dr. Regassa leads an educational research program at the university and partners with regional school districts to deliver inquiry-based STEM content in K-12 classrooms. Her outreach efforts are

coordinated through the STEMstars program and funded by the National Science Foundation and Georgia Southern University (www.georgiasouthern.edu/STEMstars). Each year GSTA recognizes excellence in science teaching. The Science Teacher of the Year award recognizes ongoing excellence in science education and the commitment to its improvement. Outstanding achievement in elementary, middle, high school and university science teaching is recognized with the selection of a state winner. All GSTA award winners will be honored at a special awards banquet on February 6, 2015. This award and recognition program are part of the annual GSTA Science Conference in Macon on February 5-7, 2015. The Georgia Science Teachers Association is a professional organization dedicated to improving science teaching at all levels, pre-school through university. The mission of GSTA is to provide leadership and service for science education. The current membership of over 2,000 includes science teachers, science supervisors, administrators, scientists, and representatives of business and industry.

The Department of Biology receives the Kay T. Reissing Terrestrial Snail Collection

February 2, 2015

The Department of Biology is fortunate to have recently received the Kay T. Reissing Terrestrial Snail Collection. Through the generosity of Mr. and Mrs. Ted and Kay Reissing, this collection will now be available for study by Georgia Southern University faculty and students. Such an expansive

collection is rare and indicates the passion Mrs. Reissing has for these interesting mollusks—a passion that extends for over 60 years. We look forward to cataloging the collection and then securely displaying parts of the collection to students and to the public in the future. The collection is a great addition to our other vertebrate and invertebrate collections.



Image courtesy of Wikipedia

Biology Professor Invited to United Nations Meeting in Rome

September 24, 2014

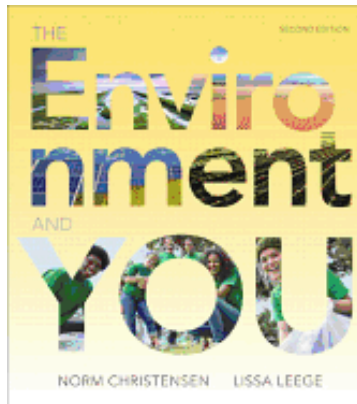
The Food and Agriculture Organization (FAO) of the United Nations (UN) hosted the International Symposium on Agroecology for Food Security and Nutrition last week (September 18 – 19) at its headquarter in Rome, Italy. At this meeting, over 50 experts including academic professors, government officials, private sector, researcher and leaders of civil-society organizations made presentations from different corners of the globe. Dr. Subhrajit Saha of the Biology Department was invited to this meeting to present his agroecological research at the global platform of FAO. The high-level round-table discussion panel of this meeting included the agricultural ministers of France, Japan, Senegal, Algeria, Costa Rica, and the Director-General of FAO. With the threat of global warming, agroecology is being recognized more and more as a climate-smart way of agriculture and is also being highlighted at the UN Climate Summit this week in New York. Dr. Saha's agroecology research is focused on climate change mitigation through carbon sequestration, agroforestry, organic farming and bioenergy production and apart from Georgia; he has research projects in Germany, Mexico and India. Dr. Saha's participation at this meeting has not only represented his research at a United Nations platform, but, also exposed Georgia Southern's agricultural research initiatives to a global community of researchers, officials, policymakers and international agencies & organizations.



Dr. Subhrajit Saha

Biology Professor coauthors environmental science textbook

February 2, 2015



Lissa Legee, Professor of Biology and Director of the Center for Sustainability at Georgia Southern University coauthored an environmental science textbook, Christensen and Legee. 2016. Environment and You, 2nd Edition. Pearson, San Francisco. 700pp. that is now available for college level, non-majors, environmental science courses across the country. Legee has worked on the text over the past 1.5 years including a semester long educational leave in Fall 2013. "I am thrilled to be a part of this project with esteemed co-author Norm Christensen, the founding dean of the School of the

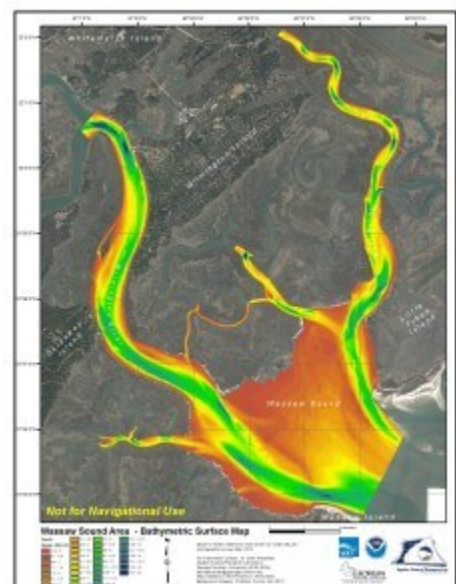
Environment at Duke University. This text not only presents an in-depth look at environmental issues, but it inspires students to be part of the solution. Examples of "Agents of Change" on college campuses around the country, and a positive, solutions-oriented approach sends the hopeful message I have been trying to promote in my classes for years." Georgia Southern University is featured in the final chapter, as are several case studies from around the state. Legee has been teaching Environmental Biology at Georgia Southern University for 17 years.

Georgia Southern scientists map Wassaw Sound

January 28, 2015

A research team from the Georgia Southern University [Applied Coastal Research Laboratory \(ACRL\)](#) has completed the first high-resolution, bathymetric (bottom-depth) survey of Wassaw Sound in Chatham County.

Led by Georgia Southern ACRL director and geology professor Clark Alexander, the team produced a detailed picture of the bottom of Wassaw Sound, the Wilmington River and other connected waterways. The year-long project was developed in conjunction with the Georgia Department of Natural Resources (DNR) and in partnership with UGA



Skidaway Institute of Oceanography. The ACRL is located on the Skidaway Institute campus, and Alexander holds a joint appointment there.

The survey provides detailed information about the depth and character of the sound's bottom. This information will be useful to boaters, but boating safety was not the primary aim of the project. The primary objective was to map bottom habitats for fisheries managers. DNR conducts fish surveys in Georgia sounds, but, according to Alexander, they have limited knowledge of what the bottom is like. "One of the products we developed is an extrapolated bottom character map," Alexander said. "This describes what the bottom grain size is like throughout the sound. Is it coarse, or shelly or muddy? This is very important in terms of what kind of habitat there is for marine life."

A second goal was to provide detailed bathymetric data to incorporate into computer models that predict storm surge flooding caused by hurricanes and other major storms. Agencies like the United States Army Corps of Engineers, the Federal Emergency Management Agency and the National Oceanographic and Atmospheric Administration use mathematical models to predict anticipated storm inundation and flooding for specific coastal areas. A key factor in an accurate modeling exercise is the bathymetry of the coastal waters.

"You need to know how the water will pile up, how it will be diverted and how it will be affected by the bottom morphology," Alexander said. "Since we have a gently dipping coastal plain, storm inundation can reach far inland. It is important to get it as right as we can so the models will provide us with a better estimate of where storm inundation and flooding will occur."

Funded by an \$80,000 Coastal Incentive Grant from DNR, Alexander and his research team, consisting of Georgia Southern alumnus Mike Robinson and Claudia Venherm, used a cutting-edge interferometric side-scan sonar system to collect bathymetry data. The sonar transmitter/receiver was attached to a pole and lowered into the water from a 28-foot research vessel. Unlike a conventional fishfinder, which uses a single pinger to measure depth under a boat, the Edgetech 4600 sonar array uses fan-shaped sonar beams to both determine water depth and bottom reflectivity, which identifies sediment type, rocky outcroppings and bedforms, in a swath across the boat's direction of travel.



The actual process of surveying the sound involved long hours of slowly driving the boat back and forth on long parallel tracks. On each leg, the sonar produced a long, narrow strip indicating the depth and character of the sound bottom. Using high-resolution Global Positioning System data that

pinpointed the boat's exact location, the system assembled the digital strips of data into a complete picture of the survey area.

All the other sounds on the Georgia coast were mapped in 1933, but for some reason data from that time period for Wassaw Sound were unavailable. When the team began this project, they believed they were conducting the first survey of the sound. However, just as the researchers were finishing the project, NOAA released data from a 1994 single-beam survey that had been conducted in advance of the 1996 Olympic yachting races that were held in and near Wassaw Sound.

"This worked out very well for our project, because we are able to compare the differences between the two surveys conducted 20 years apart," Alexander said. "We see areas that have accumulated sediment by more than 2 meters, and we also see areas that have eroded more than 2 meters since 1994. Channels have shifted and bars have grown or been destroyed."

Because of advances in technology, the current survey is significantly richer in detail than the one conducted in 1994. "We can zoom down to a square 25 centimeters (less than a foot) on a side and know the bottom depth," Alexander said.

The survey produced a number of findings that were surprising. The intersection of Turner Creek and the Wilmington River is a deep, busy waterway. Although most of the area is deep, the survey revealed several pinnacles sticking up 20 feet off the bottom. "They are round and somewhat flat, almost like underwater mesas," Alexander said.

The researchers determined that the deepest place mapped in the study area was a very steep-sided hole, 23 meters deep, in the Half Moon River where it is joined by a smaller tidal creek. They also found several sunken barges and other vessels.

The survey data set is available to the public on the Georgia Coastal Hazards Portal at <http://gchp.skio.usg.edu/>. Alexander warns that while boaters will find the survey interesting, the information is intended for habitat research and storm surge modeling, not for navigation. "Because the bottom of Wassaw Sound is always shifting and changing, as our survey showed, don't rely on the data for safe navigation," he cautioned.

Alexander has already received a grant for an additional survey, this time of Ossabaw Sound, the next sound south of Wassaw Sound. He expects work to begin on that survey in early 2015.

The Applied Coastal Research Laboratory (ACRL) is a field unit of the College of Science and Mathematics within Georgia Southern University, located on Skidaway Island near Savannah. The mission of the ACRL is to provide logistical support to students and faculty for education and research in the coastal zone. Georgia Southern partners with Skidaway Institute of Oceanography,

Grays Reef National Marine Sanctuary and the University of Georgia Marine Extension Service to provide collaborative opportunities for students and faculty.

Student News, Fall 2014

January 28, 2015

Our students began the fall 2014 semester with a welcome back event hosted by the Student Chapter of the Mathematical Association of America (MAA). The group held regular meetings throughout the semester and ended with a finals week lunch of pizza and sub sandwiches.

The officers and sponsors of the group applied for and received funds for ten students to attend the Georgia Mathematics Conference in October. The conference is for K-college mathematics teachers, and is held each year at the Rock Eagle 4-H camp in Eatonton, GA. Our students had a chance to attend outstanding talks and network with teachers of all levels.

Students will also have a chance to attend the MAA – Southeast Section Meeting in March. The department will sponsor at least one team to compete in Math Jeopardy at the conference. Chasen Smith will coordinate the team training for that event.

Two students, Charles Lanning and Bridgette Presley, participated in the Putnam exam which was held on December 6th. The Putnam exam is a weekend-long event where teams of students compete. Dr. Goran Lesaja coordinated the exam preparation which began in October. Results of the competition will be announced later in the spring.

Georgia Association of Museums and Galleries

February 2, 2015

The Georgia Southern Museum was proud to host the Annual Conference of the Georgia Association of Museums and Galleries this year in mid-January. Nearly one-hundred and twenty-five museum professionals from across the state gathered for the three day workshop filled with presentations and spurts of entertainment as attendees reach to grow in their respective museum professions. One of the highlights of the event is a progressive dinner on opening night of the



workshop. Dessert was to be held in the Georgia Southern Museum and fitting into the Mad Scientist exhibit was our Physics Department yet again demonstrating the physics of liquid nitrogen ice cream making. Guests gathered around as Physics Major, Dillon Marcy, and Instructor, Ms. Ashley August, gave an explanation of the physics behind the culinary treat. Guests were also encouraged to participate in an interactive demonstration with Mr. Marcy regarding how liquid nitrogen affects other objects besides just milk and sugar. The event was a great success thanks to Dr. Brent Tharp, Director of the Georgia Southern University Museum. In the future months, Dr. Tharp and Ms. August plan on hosting an outreach event for local students utilizing the resources at the museum as well as the in the Physics Department.

Updates from the Physics Nanotechnology Computational Group

February 2, 2015

The COSM Physics Department Nanotechnology Group, led by Professor Maxim Durach, conducted research of plasmonic drag effects in metals with nanostructured surfaces. They established that the two known mechanisms of plasmonic drag are important in different power regimes and are currently investigating in detail the weak-power plasmonic pressure mechanism. They have also been investigating optical properties of metal

metasurfaces and discovered new hyperbolic resonances of those metasurfaces and metasurface cavities with unique polarization and power-distribution properties and anisotropic dispersion.

These results have been published in a number of peer reviewed journals and presented at several conferences, including the Frontiers in Optics Conference by major David Keene and the Georgia Undergraduate Research Conference by major Matthew Lepain.

To fund this research a grant titled "Collaborative Research: Coupling of Plasmonic and Electric Effects in Nanostructured Metal" has been submitted to the National Science Foundation (NSF).



In the Nanotechnology Computational Lab: from left to right - Emile Maroha, Dr. Maxim Durach, Matthew LePain, and David Keene.

Updates from the Astrophysics Group

February 2, 2015

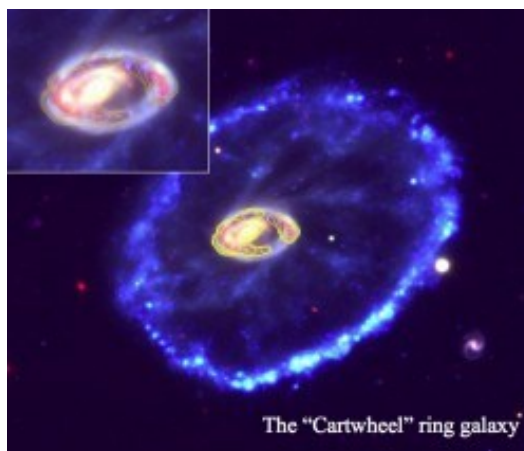
ALMA

To the right are the results of observations taken with the Atacama Large Millimeter Array (ALMA) high in the Chilean Andes by Drs. James & Sarah Higdon of the COSM Physics Department to measure the distribution and motions of cold molecular gas in the Cartwheel ring galaxy. Ring galaxies are created when a small neighbor galaxy crashes through the center of a large spiral galaxy. Such a collision creates a series of rings that move outward at speeds in excess of 150,000 mph. The Cartwheel's ring appears bright blue in the optical photograph due to the presence of large numbers of young massive stars. These stars form out

of giant clouds of cold gas and the ALMA observations will shed light on how stars form. Surprisingly cold gas was only found in the galaxy's small nucleus and inner ring, which are forming stars slowly. The distribution of gas is shown using yellow contour lines. Additional analysis of the ALMA data have uncovered very small amounts of cold molecular gas in the blue outer ring, which tells us that the rings of these systems form stars very efficiently and have nearly exhausted their gas reservoirs. These results will appear in the Astrophysical Journal Letters.

In addition to observing with ALMA remotely, Georgia Southern Physics Department Professor James Higdon traveled to the high Atacama Plain (3.2-miles above sea level) in September and November 2014 to study star formation in extremely distant galaxies using Zeus-2, a sensitive spectrograph operating at sub-millimeter wavelengths. This project, in collaboration with Cornell University, is intended to better understand the history of star formation in the universe. The September trip was funded by a COSM travel grant. Dr. Higdon also traveled to the National Radio Astronomy Observatory's headquarters in Charlottesville, Virginia to conduct the initial analysis of the ALMA observations of the Cartwheel galaxy. This work of Drs. Sarah and James Higdon was funded by an NSF grant to study star formation and the interstellar medium of nuclear starburst rings using observations over a wide range of wavelengths, including ALMA.

GRAM



Alma observatory results of the Cartwheel ring galaxy by Drs. James & Sarah Higdon of the COSM Physics Department. The distribution of gas is shown using the yellow contour lines.

Professor Monique Aller took a group of physics department majors (Will LePain, DJ Cistola, Julian Hershey, and Billy Brewer) to the 2014 Georgia Regional Astronomers Meeting (GRAM) held at the Tellus Museum in Cartersville on Saturday, October 25, 2014, where she presented a talk on "Interstellar Silicate Dust Properties in Quasar Absorption Systems at Redshifts $z < 1.4$ ". This annual meeting of astronomers, astrophysicists, and planetary scientists of all backgrounds and expertise featured planetarium demonstrations, scientific posters, talks on topics ranging from cutting-edge research to programs for students, and sunspot viewing through the Tellus Observatory 20" telescope.

Professor Aller has also begun working on a project to study the co-evolution of dust and gas in distant galaxies, as part of a 3 year (mid 2014-mid 2016) NASA Astrophysics Data Analysis Program grant (\$313k) entitled "Connecting the Interstellar Gas and Dust Properties of Distant Galaxies". Dr. Aller is the science-PI of this project and is leading the study of dust grain properties in distant galaxies over the past 10 billion years, in collaboration with Dr. V.P. Kulkarni (University of South Carolina, PI), who is leading the associated study of the galaxy gas properties, and Dr. E. Dwek (NASA-GSFC, co-I), who will be developing models to explain the observed gas-dust connections in the context of galaxy evolution.

Professor Aller presented her latest results at the 225th Meeting of the American Astronomical Society held January 4-8, 2015 in Seattle, WA where she presented a poster on "Interstellar Silicate Dust Grain Properties in Distant Galaxies Probed by Quasar Absorption Systems".

Georgia Southern Physics team attends Math and Science Night

December 2, 2014

In November, May Howard Elementary School, located in Savannah, hosted their Annual Math and Science Night event. Volunteers from all over brought demonstrations, activities, and crafts for the five hundred students that attend, with a common goal of inspiring the creative side of the students. A team from the Physics Department at Georgia Southern brought innovative and intriguing demonstrations to the event; the main demonstration was making liquid nitrogen ice



cream with the students. The team from Georgia Southern explained to the students physics concepts while assuring parents of their children's safety; that the liquid nitrogen would be evaporated by the time the students would enjoy their creation due to an energy transfer. Overall, the event was a huge success and we look forward to going back again next year. Special thanks to the student volunteers: William LePain, Gil Salazar, and Gabriel Sisson. The volunteers were coordinated by Physics Instructor, Ms. Ashley August.