A quarterly publication of the Louisiana Sea Grant College Program at Louisiana State University, Baton Rouge

LaDIA Faculty Fellows Application Period Open

The first cohort of Louisiana Discovery-Integration-Application (LaDIA) Faculty Fellows has nearly reached the end of their journey – receiving training on how to communicate their research at a workshop on Grand Isle, and coaching on how to work with the media at a retreat at LUMCON. Their final meeting will take place in May in the Chenier Plain.

"The LaDIA workshop has helped me to think about ways to improve my communications skills," said Tracy Quirk, an assistant professor in the Department of Oceanography and Coastal Science at Louisiana State University. "Being able to effectively communicate with people is an essential part of my work.

"The locations of our workshops along the coast and interactions with local stakeholders and politicians also has allowed me to better understand the unique coastal issues in south Louisiana, which motivates my research," she added.

LaDIA Faculty Fellows receive training from experts in science communication and outreach, as well as broaden their knowledge of coastal concerns, during three workshops over the course of the academic year. The workshops are held along the coast so the Fellows can experience the coastal environment, meet and interact with local community leaders, and initiate a rapport with those communities.

"As the second retreat came to an end, most of us agreed that it was one of the best and most productive workshops we have ever attended," said Malay Ghose-Hajra, an assistant professor in the Department of Civil and Environmental Engineering at the University of New Orleans.

"By encouraging interdisciplinary efforts and strong links with coastal communities, the LaDIA Program connects the dots between science, communication, coastal residents and policymakers," he added. "The evening icebreaker at Grand Isle was our first chance to meet with fellow educator-classmates, colleagues and mentors, many of whom started long-lasting professional relationships."

Fellows for the 2015-16 academic year are:

- Aly Mousaad Aly, assistant professor, Department of Civil and Environmental Engineering, Louisiana State University
- Katie Costigan, assistant professor, School of Geoscience, University of Louisiana at Lafayette
- Malay Ghose-Hajra, assistant professor, Department of Civil and Environmental Engineering, University of New Orleans
 - Chris Green, associate professor, Aquaculture Research Station, LSU AgCenter
 - · Giulio Mariotti, assistant professor, Department of Oceanography and Coastal Science, LSU
 - Brian Marks, assistant professor, Department of Geography and Anthropology, LSU
 - · Candace May, assistant professor, Department of Sociology and Anthropology, ULL
 - · Celalettin Emre Ozdemir, assistant professor, Department of Civil and Environmental Engineering, LSU
 - Tracy Quirk, assistant professor, Department of Oceanography and Coastal Science, LSU
 - Illya Tietzel, associate professor, Department of Natural Sciences, Southern University New Orleans
- Wei Xu, assistant professor, Aquaculture Research Station, LSU AgCenter

Faculty interested in more information about LaDIA, or interested in applying for the 2016-17 academic year, should visit *www.laseagrant.org/outreach/ladia/fellowships/*. Applications currently are being accepted.



Fellows Malay Ghose-Hajra, Wei Xu and Tracy Quirk (from left) work through exercises contemplating the role of advocacy in their careers.

2016 Fisheries Summit

This year's Louisiana Fisheries Forward (LFF) Summit featured new, practical demonstrations to help fishermen, dealers, processors and others in the seafood business be more efficient, economical and ultimately successful. More than 300 people participated. The event was held March 1 at the Pontchartrain Center in Kenner and included boating safety demonatrations and a cook-off. The previous three years, the Summit had been held in Houma. A collaboration of the Louisiana Department of Wildlife and Fisheries and the Louisiana Sea Grant College Program, LFF was established with the goal of improving the economic success and environmental sustainability of Louisiana's commercial fishing industry. For more information, visit *www.lafisheriesforward.org*.



2016 Undergraduate Research Opportunity Projects Selected

Louisiana Sea Grant is funding 12 Undergraduate Research Opportunity Program (UROP) projects in 2016. UROP provides talented undergraduate students interested in pursuing advanced studies in marinerelated disciplines with hands-on research experience. Projects receive funding in the range of \$1,500-\$2,500. Students and projects to be funded include:



Ryan Brown, biology major, Department of Biological Sciences, Nicholls State University (NSU) Faculty advisor: Raj Boopathy, Department of Biological Sciences Does Salinity Have an Impact on Antibiotic Resistant Bacteria and Antibiotic Resistance Genes in the Bayous of Southeast Louisiana? There is an increasing amount of antibiotic

resistance in various bacterial species. This

project will test for antibiotic-resistant bacteria and antibiotic-resistant genes at three sites with various salinity levels on Bayou Petit Caillou in southeast Louisiana. The research group also will analyze the differences in antibiotic resistance and fecal coliform bacteria levels among different salinities in the bayou.



Coleen Cecola, biology major, Department of Biological Sciences, Louisiana State University (LSU) Faculty advisor: Morgan Kelly, Department of Biological Sciences *Testing for Local Adaptation among Populations of Eastern Oysters* (Crassostrea virginica) Inhabiting a Natural Salinity

Gradient in the Gulf of Mexico C. virginica is an ecologically and

economically important species whose current distribution in the Gulf of Mexico is determined primarily by salinity, an environmental variable that is expected to change over the coming century. The project will test whether oyster stocks differ in their salinity tolerances, with the goal of providing support to coastal restoration efforts by identifying adaptive variation among stocks that could be targeted for selective breeding.



Viet Dao, environmental sciences major, School of the Coast and Environment, LSU Faculty advisor: Crystal Johnson, Department of Environmental Sciences

Fire and Bacterial Diversity in Marsh Soils

Wildfires, as natural ecological processes, are important for maintaining terrestrial and wetland ecosystems. However, the effects of fires on soil microbes and their roles in nutrient cycling are poorly studied. The project's aim

is to quantify the extent of bacterial diversity before and after fires and compare this diversity to the diversity in non-burned areas.



Cary Michelle Darbonne, environmental science major, Department of Earth and Environmental Sciences, University of New Orleans

Faculty advisor: Malay Ghose-Hajra, Department of Civil and Environmental Engineering

Use of Unmanned Aircraft Systems (UASs) to Monitor Coastal Hazard, Design Mitigation

Measures and Evaluate Long-term Health of Louisiana's Coastline

The objectives for this project include: usage of an unmanned aircraft system (UAS) to conduct a geospatial aerial survey of coastal Louisiana to evaluate and monitor coastal land loss; use a UAS to monitor

performance of coastal protection features like levees, floodwalls and pumping stations; and use the aerial survey data and georeferenced imagery to develop a GIS-based database of coastal features that can be used by researchers, engineers and scientists during the planning, design and construction of coastal restoration and protection projects.



Amanda Fontenot, coastal environmental science major, School of the Coast and Environment, LSU Faculty advisor: John R. White, Department of Oceanography and Coastal Sciences

Fate of Wetland Soil Carbon in Coastal Louisiana's Eroding Coastal Wetlands in Barataria Bay

Wetland soil cores will be collected from eroding coastal marshes. Project objectives

are to determine organic matter decomposition rates by soil depth intervals and then to calculate the annual carbon dioxide (CO_2) release into the atmosphere based on coastal land loss maps. Once that is completed, dissolved organic carbon (DOC) release rates from eroding marshes can be determined.



Jamie Hamilton, coastal engineering major, Department of Civil and Environmental Engineering, LSU Faculty advisors: Navid Jafari and Qin Chen, Department of Civil and Environmental Engineering Effect of Soil Strength and Vegetation on Marsh Edge Erosion for Louisiana Coastal Protection and Restoration

The project's primary objectives are to

identify the soil and vegetation properties that influence marsh edge resistance to erosion and to produce a field-validated marsh edge erosion model for the Terrebonne Bay and Brenton Sound area that incorporates coastal, geotechnical and ecological engineering parameters.



Ryan Hoffman, biological sciences major, College of Science, LSU Faculty advisor: Fernando Galvez, Department of Biological Sciences *Physiological Resilience of Coastal Marine Fish to Hypoxia* Plans to divert fresh water and sediment

Plans to divert fresh water and sediment from the Mississippi River into coastal marsh regions of Louisiana in order to mitigate land

loss are likely to increase the frequency of hypoxia (oxygen deficiency) in those areas. The project will assess the level of hypoxia tolerance in several species of *Fundulidae* (topminnows and killifish) living in southern Louisiana. Understanding the physiological resilience of resident fish species to variations in estuarine oxygen levels may predict the effect of diversions on the aquatic ecosystems.



Sara King, renewable natural resources major, School of Renewable Natural Resources, LSU Faculty advisor: Wei Xu, Department of Renewable Natural Resources Selection of Dermo Disease-Resistant Eastern Oyster (Crassostrea virginica) Strains with Immune Related Markers

Perkinsus marinus, a dermo disease, is responsible for nearly half of the eastern oyster mortalities in the Gulf of Mexico annually. The project's objective is to identify wild, dermoresistant eastern oyster strains that potentially can be used as brood stocks for selective breeding programs.



Shannon Matzke, coastal environmental science major, School of the Coast and Environment, LSU.

Faculty advisor: Tracy Quirk, Department of Oceanography and Coastal Sciences Influence of Nutrient Availability, Sediment Supply and Elevation on Productivity of Spartina patens

The goal of the project is to examine the interaction between nutrient availability, sedimentation and elevation on the productivity of

the marsh plant *Spartina patens* in a controlled greenhouse environment. This research is directly applicable to management considerations involving river sediment diversions and thin-layer dredge sediment application for restoration of coastal wetlands under high-nutrient and increasing water level conditions.

Sarah Soorya, pre-medicine major,

Department of Biological Sciences, NSU

Faculty advisor: Rajkumar Nathaniel, Department of Biological Sciences *Purification and Characterization of Bacteriophage Protein(s) Isolated from* V. parahaemolyticus *in Oysters*

Vibrio parahaemolyticus is a bacterium that is the leading cause of seafoodassociated bacterial gastroenteritis. A previous Louisiana Sea Grant project led to the discovery of a potential novel phage specific to this bacterium. The current project will purify and separate the phage as well as phage-associated proteins so they can be used in the future as immunogens to produce antibodies. Potentially, the virus could be used in aquaculture disease management.

Connor Tiersch, petroleum engineering major,

Petroleum Engineering, LSU

Faculty advisor: Todd Monroe, Department of Biological and

Agricultural Engineering

3-D Printing of Practical Vitrification Devices for Germplasm Repository Development in Aquatic Species

Vitrification – encapsulating a substance in a glass or tube made of another material – is one of the most efficient methods of cryopreservation. The goal of this project is to design, prototype and use 3-D printing methods to fabricate standardized receptacles that can be used for the vitrification of aquatic species' sperm.

Kelsey Van Dam, biological sciences major, Department of Biological Sciences, Loyola University

Faculty advisor: Frank Jordan, Department of Biological Sciences and Environment

Assessment of Recruitment of Blue Crab Larvae into Lake Pontchartrain Estuary

The project objective is to quantitatively sample and compare the abundance of blue crab larvae interior and exterior to the Inner Harbor Navigation Canal Surge Barrier (IHNCSB). Data collected will be used to test the hypothesis that construction of the IHNCSB has not adversely affected recruitment of blue crab larvae. Results may be used to inform the design and construction of future projects intended to minimize the effects of storm surges in coastal Louisiana.

In addition to performing their project under the guidance of a faculty member, each UROP student is required to produce a writt en final report of research accomplishments and to present their findings at LSU during an LSG-sponsored event. UROP students are expected to submit abstracts of their research results for a poster session or similar event at a statewide conference related to coastal issues. Students also are encouraged to present their findings at national and international symposia and to publish in peer-reviewed scientific journals.

UROP applications are accepted each fall (due date is typically early December) for projects starting the following March. Full-time undergraduate students at all Louisiana colleges and universities are eligible. Junior- and senior-level students may be better prepared to conduct research projects, but an application from any student who has the support of a faculty mentor will be considered.

New Coastal Science Assistantship Program Recipients Announced

The Louisiana Coastal Protection and Restoration Authority (CPRA) continues its funding for the Coastal Science Assistantship Program (CSAP). It provides up to three years of support to Master of Science students who are enrolled full-time at Louisiana colleges or universities and who are involved in science or engineering research relevant to Louisiana coastal protection and restoration efforts. This both exposes students to CPRA activities and provides a potential avenue for recruitment of new CPRA personnel.

The Louisiana Sea Grant College Program (LSG) administers these assistantships, which are available to all faculty pursuing appropriate coastal restoration-related research so they may recruit outstanding graduate students. Up to four new students will be funded each academic year, based on evaluations of applications submitted by faculty members. The annual award is \$25,000 per student.

The newest recipients are:

Jon Bridgeman



Tulane University, Department of Earth and Environmental Sciences Pursuing a Master of Science in Earth and Environmental Sciences (Coastal Geoscience) Major professor: Torbjörn Törnqvist Understanding Mississippi Delta Subsidence by Integrating Continuous Coring with Geodetic Methods

Land-surface subsidence is a major contributor to the rapid rate of land loss in the Mississippi Delta. This project will measure and determine the major

contributors of Holocene (the epoch of geological time from about 10,000 years ago to the present) subsidence in the Mississippi River Delta through the examination of a new, continuous, 40-meter long, 5-inch diameter core taken from a drill site near the proposed mid-Barataria Sediment Diversion. The core will capture the entire Holocene succession and will include geotechnical measurements as well. The new core will enable researchers to develop a direct connection between geodetic measurements of present-day subsidence rates and the nature of underlying strata. After graduation, Bridgeman plans to work in coastal and wetland restoration.

Brian Harris

Louisiana State University, Department of Civil Engineering Pursuing a Master's degree in Civil Engineering Major professor: Navid H. Jafari

Predicting Subsurface Settlement of Marsh Creation Projects and Flood



Protection Infrastructure in Coastal Louisiana

Marsh creation projects build land, but the marsh fill will erode and settle over time. A major contributor of this settlement is the consolidation of foundation soils caused by loading exerted by dredged material or levee embankments. Because a limited number of laboratory tests are performed to evaluate the compressibility and permeability characteristics of foundation layers, significant uncertainties exist in the parameters over a large spatial expanse. As the next-generation marsh creation projects are expected to increase in size

from hundreds of acres to thousands of acres, this uncertainty will challenge CPRA's ability to construct successful restoration projects. To address this problem, Harris seeks to predict the subsurface settlement of marsh creation projects and flood protection infrastructure in coastal Louisiana. Following this, he plans to become a researcher in wetland restoration.

To be named

University of New Orleans, Department of Earth and Environmental Science and the Pontchartrain Institute for Environmental Sciences Pursuing a Master of Science in Coastal Geology Major professor: Ioannis Y. Georgiou *Coupled Barrier Island and Shoreface Dynamics: A Comprehensive Understanding of Coast-wide Response to Transgression* Barrier islands and tidal inlet systems along the Mississippi River Delta Plain are undergoing rapid morphological change due to shoreface retreat and increasing bay tidal prism, driven by high rates of relative sea-level rise and interior wetland loss. Protection and restoration of barrier habitats, sea grass beds and marshes are common. The student selected for this project will analyze shoreline, seafloor, wave and sediment data and corroborate the role of the shoreface in driving barrier island trajectory at both the regional and local scales. This analysis will provide additional information on barrier dynamics that will aid in making decisions for restoration, help identify regional trends in coastal dynamics, and prioritize future locations for restoration.

To be named

University of New Orleans, Department of Civil & Environmental Engineering

Pursuing a Master of Science in Civil and Environmental Engineering with a concentration in Geotechnical Engineering and Coastal Sciences

Major professor: Malay Ghose-Hajra

Development of a Comprehensive Engineering Design Tool to Predict and Evaluate Long-term Performance of Louisiana Coastal Restoration and Protection Projects

The goals of this research are to achieve improved outcomes, reduced time and lower costs for marsh creation fill projects. The student selected for this assistantship will help develop a comprehensive engineering design tool to predict and evaluate long-term performance of Louisiana coastal restoration and protection projects. This will be achieved in five steps: 1. Compile historical geotechnical data and perform Data Gap Analyses of the different soil parameters commonly utilized in the design of coastal restoration and protection projects, 2. Develop a GIS-based database of foundation soil and dredged sediments for use by coastal and geotechnical engineers, 3. Perform laboratory testing on new coastal sediments, 4. Develop a geotechnical design tool, and 5. Develop a geotechnical instrumentation plan for current and future marsh creation projects.

Sea Grant-Sponsored Students Graduate

Ten graduate students supported by Louisiana Sea Grant completed their degrees in 2015. The list includes:

Jill Christoferson, master of science, Louisiana State University. Thesis: *Direct Marketing of Louisiana Shrimp: A Cost-Earnings Analysis.* Major professor: Rex Caffey.

Valerie A. Derouen, master of science, Louisiana State University. Thesis: *Bridging Research and Education: A Look into the Evolutionary History of Batfishes and How Museum Exhibits Can Be Used to Engage the Public*. Major professor: Prosanta Chakrabarty

Zelam M. Kaluskar, doctor of philosophy, Louisiana State University. Dissertation: *Cation Regulation and Proteomic Analysis of Phase Variation and Biofilm Formation in the Human Pathogen* Vibrio Vulnificus. Major Professor: Gregg Pettis.

Christine Mebust, master of science, University of New Orleans. Thesis: *Analysis of Sedimentation Characteristics of Dredge Sediment Used in Coastal Restoration and Marsh Creation Projects*. Major professor: Malay Ghose-Hajra.

Stacy Nicole Peterson, master of Science, Louisiana State University. Thesis: *Failed Agriculture Impoundments: An* *Interdisciplinary Assessment of Community Structure and Social Resilience.* Major professors: Joseph Powers and R. Eugene Turner.

Steven Potts, master of science, Louisiana State University, nonthesis. Major professor: James Cowan

Emily Joy Powell, doctor of philosophy, Louisiana State University. Dissertation: *Climate Extremes in the Southeast United States: Observed Variability, Spatial Classification and Related Planning*. Major professor: Barry Keim.

Katherine Anne Renken, doctor of philosophy, Louisiana State University. Dissertation: *Investigations into Ecogeomorphodynamics of Coastal Embryo Dunes at Padre Island National Seashore, Texas.* Major professor: Steven Namikas.

Brittany D. Schwartzkopf, master of science, Louisiana State University. Thesis: *Assessment of Habitat Quality for Red Snapper*, Lutjanus campechanus, *in the Northeastern Gulf of Mexico: Natural vs. Artificial Reefs*. Major professor: James H. Cowan.

Havalend Ellen Steinmuller, master of science, Louisiana State University. Thesis: Anthropogenic Impacts on Soil Microbial Processes in Coastal Westlands: Nutrient Loading and Rising CO₂ Levels. Major professor: John White.

Message from the Executive Director

Our oceans serve as a source of food for billions of people. They are the principal means of transport for international trade; supply oil, gas and other energy sources; and are an immense reservoir of other natural resources. Our oceans also produce violent storms, hurricanes and tsunamis that threaten our coastal communities.

While meeting with the American Fisheries Society in 1963, visionary Athelstan Spilhaus first proposed the creation of Sea Grant Colleges to foster research, education and community outreach so our nation could better utilize the bounty of the oceans and develop better tactics of protecting our shores from its dangers. Two years later, Sen. Claiborne Pell of Rhode Island introduced legislation to establish Sea Grant colleges, and the University of Rhode Island's Dean of Oceanography – John Knauss – convened a national conference on the concept.

In 1966, these ideas became reality when President Lyndon Johnson signed the Sea Grant Colleges and Program Act.

In the half-century since its founding, Sea Grant programs now cover every coastal and Great Lakes state, as well as Puerto Rico, Guam and Lake Champlain. Louisiana Sea Grant was the thirteenth college program to join, with a grant to LSU that was funded in 1968. Today, this national network connects more than 300 universities and more than 3,000 scientists, engineers, educators, students and outreach experts – not to mention private and public sector partners.

The achievements of Sea Grant are many and varied. And I'm proud of Louisiana Sea Grant's contributions to the national network and to solving problems here in coastal Louisiana.

Join us in celebrating 50 years of Sea Grant in 2016.



Robert Twilley, Ph.D. *Executive Director Louisiana Sea Grant College Program*





LOUISIANA STATE UNIVERSITY

Louisiana Sea Grant College Program Sea Grant Building • Baton Rouge, LA 70803-7507 Non-Profit Org. U.S. Postage P A I D Permit No. 733 Baton Rouge, LA



Louisiana Sea Grant College Program Louisiana State University Sea Grant Building Baton Rouge, LA 70803-7507

> Robert Twilley, Executive Director

Editors: Roy Kron, Paula Ouder Art: Robert Ray

The Louisiana Sea Grant College Program is part of the National Sea Grant College Program maintained by the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce. Sea Grant, a unique partnership with public and private sectors, combining research, education and technology transfer for public service, is the national network of universities meeting changing environmental and economic needs of people in our coastal, ocean and Great Lakes regions.

© Louisiana Sea Grant College Program. Articles within this publication or quotations from them may be used or reproduced for educational purposes with a formal credit to the Louisiana Sea Grant College Program. This publication or portions of it may not be used, printed or electronically transmitted for other purposes without authorization from the Office of Communications, Louisiana Sea Grant. Please send a copy of all materials in which this publication or any portion of it is reproduced to the Office of Communications, Louisiana Sea Grant.

Please send change of address, subscription requests, and correspondence to *Coastal Clips*, Louisiana Sea Grant Communications Office, Louisiana State University, Baton Rouge, LA 70803. (225) 578-6564. *Coastal Clips* is published four times a year. Subscriptions are free upon request. Visit us online at *www.laseagrant.org*. al Clips

NUMBER 39 SPRING 2016



June 1-3, 2016 Ernest N. Morial Convention Center, New Orleans

Early-bird registration continues through April 3. Regular registration continues through May 16.

For more information, visit *www.stateofthecoast.org*

The State of the Coast Conference is the largest event of its kind providing interdisciplinary presentations on the dynamic state of Louisiana's coastal communities, environment, and economy. The Coalition to Restore Coastal Louisiana (CRCL), the Water Institute of the Gulf and the Coastal Protection and Restoration Authority (CPRA) have partnered to produce this forum, the need for which grows with every acre of land lost to the Gulf.