LUMCON 2018 ANNUAL REPORT

RUN





LUMCON 2018 ANNUAL REPORT

EXECUTIVE DIRECTOR'S MESSAGE

Here in the last few days of 2018, mere hours ago, what will be the eighth faculty member accepted an offer to join LUMCON's dynamic science group. In the new year, I anticipate I will hear acceptance of LUMCON's second offer. These two scientists will bring innovative, productive, and energetic research programs to LUMCON. In the last three years, I have been privileged to hire five new faculty, significantly increasing the scientific capacity of LUMCON and Louisiana. Both the two new faculty and our current scientific group embody the three parts of our mission that make LUMCON unique, to connect through collaboration to achieve something greater, to enrich the students and our communities at large through education, and transform the world by conducting innovative research and serving as a leader in science and education. The growth of the science program through these new faculty reflects the broader growth and excitement of LUMCON in 2018.

LUMCON had a fantastic year, and in the following pages, you will read about our science, education and outreach, library, facilities, vessels, development, administration, and our consortium. LUMCON's continued transformation and growth reflect countless hours invested by the faculty and staff. I am continually impressed with their dedication, passion, and selflessness. It is also important to acknowledge that we had a good year because of the community that supports us and the people who come down the bayou. In the end, LUMCON is a partnership between those of us at the center; the scientists, students, educators, and administrators across the state; and Consortium partners. It is this family that builds us and makes us something great. This family in total makes us the **heart of Louisiana marine science.**

The accomplishments and successes permeate across LUMCON.

• Marine operations with a scientific advisory committee oversaw the first set of designs for the R/V *Pelican* replacement. Glosten Naval Architecture & Marine Engineering Services delivered plans for a state-of-the-art vessel. While we work actively to raise funds for this replacement vessel, we are excited to be able to bring, with all the capabilities of the *Pelican*, an even greater capacity to conduct science on the high seas of the Gulf of Mexico.

• Contractors finished waterproofing and refinishing of the exterior DeFelice Marine Facility earlier this year. Besides the aesthetic brilliance of the refinished facility, the increased investment into the facility's infrastructure will allow LUMCON to be able to weather storms and flooding alike.

• LUMCON's growth is also reflected in several new hires, 14 in total, this year that increased our capacity and skill set allowing for greater efficiency as an institution and better service to our users.

• While I mentioned we made two offers to faculty to join the LUMCON ranks, I have not noted that this pool of faculty applicants represents one of LUMCON's most extensive and strongest ever.

• In 2018, LUMCON also finds itself in a place of better serving our Consortium partners. Our Changing Coastal Oceans course was the largest at 43 students enrolled from 5 consortium member universities.



• OCEANDOTCOMM, the first science communication event of its kind, occurred in the spring. This event placed LUMCON on the map as an innovator in both science communication but also in program and meeting creation. While speaking of outreach, our social media program became fully realized this year with the establishment of a mission and core values, increased partnerships, and dissemination of our expertise.

• This spring also saw our first Open House under my leadership. The event drew 1,200-1,400 members of the public — the largest attendances ever of an Open House. Moreover, people stayed at the Marine Center much longer than for previous events.

• The completion of our indoor wet lab facilities and marsh mesocosms, and the refurbishing of our racetrack flume, greatly expanded LUMCON and the state's capacity for experimental coastal and marine science. These systems will allow scientists to address the most pressing scientific and conservation questions in a way never realized before.

• This year LUMCON's Research Experience for Undergraduates (REU) program regained its National Science Foundation status and funding. The applicant pool and the selected REU students who joined our faculty this summer to conduct research comprised a set of high caliber junior scientists.

• The environmental monitoring program has worked tirelessly in this year overseeing the curation and quality control of decades worth of environmental data; taken every 15 minutes. While taking on this herculean effort, the team also constructed a new monitoring station in Port Fourchon, with the generous donation of the Winsner Foundation. This is the first new station to come online in over a decade.

• Late in the year, LUMCON hired a new Dive Safety Officer, who comes with a tremendous amount of experience in program building. Considerable progress has already been made on resurrecting the program, rearticulating our policies and procedures, and developing coursework.

• This year LUMCON also submitted multiple grants, including several for several million dollars. While we were not successful with all, LUMCON's ability to apply for these more substantial opportunities reflects our increased capacity, expertise, and reputation.

• Behind the scenes of all these were continued refinement and efficiency of our administration including invoicing, collections, contracts, travel, budgets, and human resources. Our new reservation system has made it easier for external users to acquire the assets they need from us for research and education and for us internally to provide them. Many may not see these changes directly, but they will notice the speed and efficiency by which we conduct business now.

• Last is perhaps our greatest achievement this year; LUMCON's first major facility expansion in our history. This year the state approved \$13.2 million of funding for LUMCON's new tentatively named Louisiana Center for Marine Science Innovation (LCMSI). This new facility on the Houma Marine Education Campus, a partnership with Fletcher Community College, will serve at LUMCON's new technology campus. While our DeFelice Marine Center serves as our field and main campus, LCMSI will allow LUMCON to expand research and education in technological and engineering spaces as related to coastal and ocean sciences. This provides a tremendous opportunity for the Consortium at large and regionally by providing maker and tech labs as well as meeting spaces. LCMSI will also provide a sheltered retreat for LUMCON when our central facility experiences flooding. LUMCON is excited to be working with the award-winning Eskew+Dumez+Ripple, a New Orleans-based, multidisciplinary design studio, to realize LCMSI.

If one word described 2017, that word was growth. In 2018 the word is innovation. Events like OCEANDOTCOMM, a group of researchers working at the cutting edge of science, a team of educators leading experiential learning, new forward-thinking policies on a variety topics ranging from sexual harassment to open access and journal subscriptions, to name just a few are helping to build a reputation of LUMCON as a different kind of place with a different kind of thinking. This innovation has stemmed from one simple idea — **no barriers**. We don't limit our thinking; we start with moonshots and work backwards. As always our doors are open to all. You just need to come to Cocodrie and experience a different kind of place with a different kind of thinking for yourself.

Craig R. McClain December 2018



TABLE OF CONTENTS

| The Consortium in 2019 | |
|--|--|
| ENRICH | |
| University Education | |
| Research Experience for Undergraduates (REU) Program | |
| University Education Goals for 2019 | |
| K-12 Education | |
| K-12 Education Goals for 2019 | |
| Public and Events | |
| Public and Event Goals for 2019 | |
| Social Media | |
| TRANSFORM | |
| LUMCON Marine Center Faculty | |
| LUMCON Grants - 2018 | |
| Mentorship of Graduate Students and Postdocs | |
| Scientific Infrastructure | |
| INFRASTRUCTURE | |
| Facilities | |
| Vessels | |
| Environmental Monitoring | |
| Dive Operations | |
| Information Technology | |
| Library | |
| Infrastructure in 2019 | |
| FINANCES AND DEVELOPMENT | |
| Administration, Finance, and Budget | |
| Development | |
| Finances and Development in 2019 | |
| List of Scientific Publications for 2018 | |
| 2018 Media and Press | |
| VESSEL OPERATION SCHEDULE | |
| | |
| 2018 LUMCON DONORS | |

CONNECT





CONSORTIUM HIGHLIGHTS:

Although it is difficult to cover the full scope of LUMCON's consortium activities in last year, they include:

- campus visits by LUMCON leadership;
- students and researchers utilizing LUMCON for educational programs, facilities, location, and vessels;
- multitudes of collaborative proposals between LUMCON and Consortium faculty;
- shared research programs between LUMCON and Consortium faculty;
- shared mentoring of undergraduate and graduate students between LUMCON and Consortium faculty;
- taught courses and invited lectures on Consortium campuses.

There are also several notable highlights. With **Fletcher Community College**, LUMCON continues to realize the joint Houma Marine Campus. Programs would include potential educational partnerships that will provide workforce education in marine technology and operations as well as coastal restoration. With LSU, several ongoing research collaborations continue to occur between the two institutions' faculty including: LSU faculty (DOCS: Drs. Gene Turner, Dubravko Justic, Mike Polito, Haoshen Huang, and Giulio Mariotti; ENVS: Drs. Ed Overton, Linda Hooper-Bui; SRNR: Drs. Phil Stauffer, Sabrina Taylor) on GoMRI-funded Coastal Waters Consortium-II (CWC-II) project with LUMCON/LSU PI Dr. Nancy Rabalais and LUMCON co-PI Dr. Roberts; LSU faculty and staff (Dr. MikePolito (lead PI), Dr. Linda Hooper-Bui, Erick Swenson) with LSU/LUMCON faculty member Dr. Rabalais and LUMCON lead PI Dr. Roberts on NOAA RESTORE-funded project; Dr. Kanchan Maiti (DOCS) and Dr. Roberts on ongoing ocean acidification project and NSF RAPID grant examining impact of 2017 hurricanes including completion of 10 day research cruise on the R/V Pelican in January. Dr. Bockus submitted a proposal with co-PIs Chris Green and Greg Lutz and has done contract work with Kampachi Farms, LLC. Dr. McClain continues to collaborate with Dr. Mark Benfield on deep-sea impacts of the DWH oil spill. With Louisiana Tech University, current efforts are in place to develop a joint program for undergraduate research internships at LUMCON as a mechanism for student training and to partner the two faculty groups in several new research collaborations. With Nicholls State University, LUMCON made efforts this year on several fronts including adjunct status of LUMCON faculty, a coastal science communication program at Nicholls, joint work study students, Port Fourchon field laboratory, and the Houma Marine Education Campus. LUMCON partnered with University of Louisiana at Lafayette on a National Science Foundation MRI proposal to acquire gliders. The proposal was successful and will add open-water technological capacity previously absent in the state. Drs. Robinson, Stauffer, and Nelson (Biology) are active in research projects and grant proposals with Drs. McClain and Roberts. ULL faculty also continues to support LUMCON's summer education programs by overseeing academic administration and providing credit. ULL, along with LSU, also partnered with LUMCON on a proposal to host the UNOLS office. Although unsuccessful, the proposal was well received and highlighted the strength and expertise of the consortium. Several projects and proposals with faculty at **University of New Orleans** were initiated including Dr. Roberts collaborating with Drs. Phoebe Zito and David Podgorski (Chemistry) on a DOM characterization project associated with a larger Ocean Acidification project, Drs. Bowles, Roberts, and Schutte submitting a proposal with Dr. Podgorski (Chemistry), and Dr. Bowles also submitting a proposal with Drs. Podgorski and Zito (Chemistry) and Dr. Juliana D'Andrilli (Montana State).



LUMCON also hosted the **Bayou Micreaubio Catalysis Meeting**. LUMCON's Dr. Marshall Bowles led a group in May of 2018 that brought together Gulf Coast microbial ecologists to discuss major research themes of their respective groups and their visions for the future. The goals of the workshop were to: 1) become more aware of the related research going on in Louisiana or other parts of the Gulf coast, 2) identify collaborations that can aid in generating breakthrough research, 3) identify research themes that could likely be funded and , 4) identify equipment needs at LUMCON (or home institutions) that would aid in this research. Participants included Consortium faculty from LSU, McNeese, Northwestern, Nicholls, and UNO.

THE CONSORTIUM IN 2019:

In 2019, LUMCON plans to:



Hire a consortium coordinator position to serve as a project manager of Consortium relationships, develop new partnerships, attract students and faculty to LUMCON, and identify consortium needs.



Add one out of state Consortium partner.



Establish one internship program (e.g. LA Tech, Northwestern, and Grambling).

10%

Increase consortium researcher usage of LUMCON by 10%.



Develop and implement a Marine Science Club and add two community colleges, one public 4-year college, and one private school to Marine Science Club.



Engage with a new social science or humanities department.



Formalize one tangible partnership with an HMSI.



Begin planning and securing funding for teaching/research postdoc with a Consortium member (e.g. Xavier).



Students measure elevation during LUMCON's Field Marine Science summer camp.

In 2018, LUMCON Education and Outreach (E&O) made significant advancements. The program was able, for the first time, to invest funds raised from its programs back into the department. Additionally, physical improvements were made to educational spaces at the Marine Center, new and lasting relationships with Consortium members were made, unproven science communication models were tested, and funding was garnered to make marine science accessible to all learners. In an effort to complete its mission, LUMCON E&O believes that meaningful educational opportunities are built on strong collaborative relationships between scientists, educators, students, and the community.

UNIVERSITY EDUCATION:

Successes:

In 2018, the university programs saw continued growth and ongoing success. On the heels of the highest enrollment yet of the semester course "Changing Coastal Oceans" (CCO), LUMCON drafted a Memorandum of Understanding to be signed by member institutions. With this agreement, all current and future semester courses offered by LUMCON will be made sustainable by becoming cost neutral. The agreement will broaden LUMCON's impact by allowing for the enrollment of students from all Consortium members and out-of-state schools. LUMCON offered new courses during its 2018 summer program. The new course offerings allowed for new collaborations between LUMCON faculty and Consortium member faculty.

Semester Field Trips:

In 2018, LUMCON was utilized by 21 Consortium and 4 non-Consortium instructors for field trips. A total of 533 university students from Louisiana, New York, Connecticut, and Canada utilized LUMCON facilities, vessels, and education staff support. LUMCON had higher rates of usage from Louisiana Tech and the University of Louisiana at Lafayette in 2018 than in 2017. All other Consortium members utilized LUMCON at about average rates in 2018 when compared to past years.

Semester Courses:

The number of students participating in the CCO course reached an all-time high with 38 students. The number of Consortium member involvement included five out of the original eight member universities that have traditionally enrolled students in the course. The figure (next page) shows the enrollment by year. These types of courses are beneficial because they allow for the broadening of student knowledge, experience, and interest. LUMCON is able to provide and deliver content topics which may not be of interest to many students within one university but may be of interest to many students across multiple institutions.

Summer Courses:

The LUMCON summer courses had an enrollment of 19 students. The new LUMCON course proposal system yielded courses that were better structured and focused on topics not traditionally taught at marine labs. The courses allowed for more significant and deeper collaborations between LUMCON faculty, Consortium member faculty, and partner organization faculty. The recent agreement with the University of Louisiana at Lafayette has continued to allow the summer courses to be sustainable while ensuring that the cost of the courses is not prohibitive to students who seek a field marine science education.





CHANGING COASTAL OCEANS:

Student Enrollment and School Numbers by Years



RESEARCH EXPERIENCE FOR UNDERGRADUATES (REU) PROGRAM:

2018 Cohort:

2018 saw the completion of the 8th year of LUMCON's REU Program on Interdisciplinary Research Experiences in Changing Coastal Environments. The main REU site program was supported by a new grant awarded to Drs. Roberts and McClain (NSF OCE-1757887). This year's REUs were directly supported by the NSF grant as well as a research grant to Drs. Rabalais and Roberts from the Coastal Waters Consortium via the Gulf of Mexico Research Initiative. The 2018 cohort consisted of 9 students from across the country that completed a 10-week internship from June through mid-August during which they worked with a mentor and/or mentor team to identify a research question, develop and orally present a research proposal, conduct their research project, and participate in a series of career and skill-building workshops and activities. The program is directed by Dr. Brian Roberts, and this year's mentors included Drs. Craig McClain, Clif Nunnally, Marshall Bowles, Abigail Bockus, Guillaume Rieucau, Scott Jones, Ryann Rossi, Charles Schutte, and Brian Roberts. The program concluded on August 10th with the annual LUMCON Summer Student Research Symposium. All 9 REUs gave presentations in the research conference style symposium.

- Karyolyn Agosto Shaw (Universidad Metropolitana), REU intern in Roberts lab, "Characterizing the Fungal Communities of Four Salt Marsh Plants in Louisiana"
- Ben Crooke (Skidmore College), REU intern in Kolker lab, "Determining Uncharted Subsidence Rates in Coastal Louisiana"
- Carli Fawcett (Willamette University), REU Intern in Rieucau lab, "Social Foraging in a Dynamic System: Testing Ideal Free Distribution"
- Adrianna Grow (Smith College), REU intern in Roberts lab, "Interaction of Fiddler Crab (*Uca longisignalis*) Bioturbation and Oiling on Salt Marsh Soil Greenhouse Gas Fluxes"
- Max Jahns (Vasser College), REU intern in Bowles lab, "Neighbor-Induced Germination of Endospore Communities in the Marine Subsurface"
- Herbert Leavitt (Eckerd College), REU intern in Roberts lab, "Salt Marsh Plants InfluenceSoil Conditions Through Photosynthesis and Production"
- Cynthia Lupton (University of South Florida), REU intern in Rieucau lab, "Comparison of Refuge Habitats in Louisiana Salt Marshes Using an In Situ Field Experiment: Does Predation Risk Influence Species Assemblage?"
- Kaytlin Pepper (Dalton State College), REU intern in Bockus lab, "Investigating the Physiological Effects of Varying Salinities on Adult Grass Shrimp, *Palaemonetes pugio*"

• Catalina Rubiano (University of New Orleans), REU intern in McClain lab, "High Macroinvertebrate Diversity at Different Scales in Deep-Sea and Shallow Water Environments"



UNIVERSITY EDUCATION GOALS FOR 2019:

LUMCON is currently exploring a new model for the summer courses offered at the Marine Center. LUMCON is committed to offering students an experience that is based on skill-building and hands-on application of science. The goal for the summer programs is not to be competitive with the courses offered on campuses but an outlet for the application and enhancement of student knowledge. The goal is to launch this new model of summer courses in 2019 and have an enrollment of 20 students by the year 2020. LUMCON E&O will also start to build a stronger relationship with the member schools by launching a Marine Science Club with the goal of eventually having a Marine Science Club on every campus. These clubs with help make marine science obtainable, collaborative, and accessible to undergraduate students who have a passion about coastal and ocean environments.

K-12 EDUCATION:

Successes:

Two new hires were made and filled gaps in expertise enabling staff to expand on the diversity of experiences and content. Improvement and upgrades to the marine education classroom have expanded the capabilities of that space. To help advertise program offerings, E&O also completed Field Trip Guides and Handbooks for both K-12 and university groups. These will be great resources for educators to find more extensive information about LUMCON E&O offerings. The K-12 programs received funds for the Bayou Community Foundation to help support Terrebonne Parish school teachers who traditionally do not have the funds to bring their students to LUMCON. This has allowed LUMCON to better serve students of Terrebonne Parish that are underserved and underrepresented in marine science and STEM careers. E&O also made a considerable investment in safety this year. All E&O staff were given increased First Aid/ CPR/AED training from the American Red Cross and have been identified as people who can respond to emergencies at the Marine Lab. E&O also purchased their own Automatic Electronic Defibrillator (AED) to carry into the field during remote program activities. The LUMCON E&O Active Shooter Policy was updated. The Terrebonne Parish Sheriff's Department visited the Marine Center and provided guidance and training for E&O staff. After the visit, procedures and safety protocols for the E&O staff were instituted.

K-12 Field Trips:

93 student groups utilized the education program for field trip experiences in 2018. A total of 2,542 students visited the Marine Center in 2018 to participate in the place-based, skill-based programming offered by LUMCON E&O. The education staff completed 695 hours of active teaching which generated 14,879 contact hours for the year. The map to the right breaks Louisiana down by region. The accompanying table shows the number of trips and schools from each region that participated in LUMCON field trip programs.

Summer Camps:

In 2018, LUMCON hosted three summer camps for students in grades 7-12. Camps were partially funded by the Coastal Waters Consortium with additional funding from the Gulf of Mexico Initiative. A total of 30 students from Louisiana, Tennessee, Texas, Minnesota, and Virginia attended one-week residential camps offered at the Marine Center. Camps are designed to help promote stewardship, strengthen scientific knowledge, introduce STEM careers within marine science, and teach communication skills. These highly successful and in-demand programs have been the premiere summer marine science education experience in Louisiana for over a decade.



| Region | Number of Trips | Number of Schools |
|---------------------|--------------------|----------------------|
| Greater New Orleans | 8 | 6 |
| Southeast LA | 65 | 25 |
| Acadiana | 4 | 3 |
| Southwest LA | 1 | 1 |
| Florida Parishes | 3 | 1 |
| Greater Baton Rouge | 1 | 1 |
| Central Louisiana | 5 | 3 |
| Northeast Louisiana | 0 | 0 |
| Northwest Louisiana | 6 | 2 |
| Total | 93 | 42 |

K-12 EDUCATION GOALS FOR 2019:

The year 2019 will bring with it many new opportunities and challenges. LUMCON Education & Outreach will continue to:

- invest in its own programs to offer even better programming.
- strive to reach new audiences and geographical regions.
- build programs with the philosophy of embracing the challenges that are presented by our changing landscape.

These will all be achieved by:

- seeking funding to invest in educator training, new equipment, and sustaining current programming.
- better promotion of our programs within regions that may not know about LUMCON.
- reevaluating what program activities need to be added or modified to accommodate the times when there is flooding, specifically the programs for pre-K-3rd grades.





PUBLIC AND EVENTS:

Festivals & Events:

LUMCON education staff attended seven community and partner events in 2018. LUMCON education staff impacted 2,142 people by attending public education events in 2018.

Open House:

The LUMCON Open House was hosted on April 21, 2018. Roughly 1,400 visitors came to the Marine Center to participate in educational activities, meet the science staff, and tour the vessels. The event was a big success due to the activities and special events offered by the science and education staff.

OCEANDOTCOMM:

In March of 2018, LUMCON hosted the OCEANDOTCOMM event. This was the launch of a new science communication conference model. This new model is a product-driven meeting for doing science communication, like a storytelling sprint. OCEANDOTCOMM hosted 37 online science communication experts over four days with the goal of producing narratives about coastal optimism. In all, 27 projects were completed and can be viewed on the LUMCON website at https://lumcon.edu/oceandotcomm/. Based on the success of OCEANDOTCOMM 2018, LUMCON has submitted a proposal for funding to NSF for OCEANDOTCOMM 2020.

White Boot School:

LUMCON is uniquely situated to a place where scientists, community members, policy makers, students, and artists can come together to establish and strengthen relationships built on a shared vision and passion. The White Boot School provides this collaborative space for everyone that visits or takes up residence at the Marine Center in the summer. Becoming part of the community instead of outside of it was the goal in 2018. Each summer a series of events including a seminar series, educational workshops, scientific field trips, recreational outings, and family events are planned to build a culture where people feel welcome to bring their knowledge, skills, and perspectives to the issues that face coastal Louisiana.

PUBLIC AND EVENTS GOAL FOR 2019:

In 2019, LUMCON will continue to build the relationships within the local and state communities. Investment in events that tie together community members interested in marine science and the environmental issues that face Louisiana is a core value of our education and outreach programs. LUMCON will be looking for deeper relationships with new community events and organizations. Education & Outreach is already looking ahead to Meet the Fleet 2020 with location selection and preliminary planning. The White Boot School will continue to grow and expand to reach people that seek an opportunity to learn, be creative, and innovate.





SOCIAL MEDIA:



Growth & Direction:

LUMCON'S Social Media Program experienced significant growth and maturation during 2018. For example, LUMCON's total follower counts across all three platforms grew by 156% this year. The program has been building a reputation of being innovative and creative. LUMCON is changing the online science communication landscape through trying new models and, academically, trying to answer the questions about how best to progress with digital science communication. The program strives to be diverse and engage people on a personal level that is currently lacking in institutional science communication. With continued investment in a formal social media program, LUMCON stands to be a leader and creator of the future of online science communication. Achievements of the Social Media Program in 2018 are included below.



Formal Program Definition & Experimentation:

Program activities settled into a routine, especially once the Program mission and core values were articulated. Crafting a firm foundation for the Program allowed for innovation and experimentation to begin in earnest. For example, the same tweets were released at the same time from LUMCON's account and from Solomon David (a local but independent science communicator), and more people engaged with Solomon's tweets than with LUMCON'S, leading to further tests.



Increased Partnerships with Consortium Members:

The Science Media Officer began seeking out opportunities to promote work done by scientists based outside of the DeFelice Marine Center. For example, she accompanied a lab from the University of Louisiana at Lafayette into the field and covered UL Lafayette's Graduate Student Symposium in person.



Dissemination of Program Activities & Science Communication Expertise:

The Science Media Officer began sharing Program activities and lessons learned in addition to promoting Program training. For example, she presented results at two scientific society meetings from activities carried out on the Reddit platform while at sea during a scientific cruise. She also delivered a training workshop at one of those society meetings and acted as a science communication expert at several Sea Grant-hosted events.



Program Deliverables:

Deliverables that were particularly successful include Open House and faculty position advertising, posting about land loss in a way that resonated with locals, and the #FridayFieldFashion campaign. The Program reached outside of its social media followers with a press release about Nancy Rabalais's work and with a long-form blog post published with the Ocean Conservancy on the anniversary of the Deepwater Horizon incident.

Researcher samples the salt marsh to log sediments, nutrients, and plant water supply.

Sec.

LUMCON MARINE CENTER FACULTY:

LUMCON faculty had a very productive 2018. This included the continued development of the research programs of our three junior faculty members Drs. Bockus, Bowles, and Rieucau, who joined our ranks in summer of 2017, and the continued development and growth of the research programs of senior research faculty Drs. Kolker, McClain, Rabalais and Roberts. This year included continued productivity in terms of research grant funding and scientific publications (which are highlighted in other sections of this report). Here we touch on some of the major research highlights and accomplishments of the research faculty and their lab groups in 2018.



Dr. Abigail Bockus

completed her year-long fellowship with Louisiana Sea Grant as part of the LaDIA (Discovery-Integration-Application) Program for early-career scientists and was appointed as Adjunct Faculty at Louisiana State University's School of Renewable Natural Resources and Department of Biological Sciences and Affiliate Faculty with LSU's Graduate School. The Bockus lab completed a project examining new ways of using soybean meal as an alternative protein source in aquaculture feeds that was funded by the United Soybean Board and was conducted in collaboration with scientists at the university of Idaho and the U.S. Fish and Wildlife Service (Bozeman, MT). Dr. Bockus continued to expand her research program through publication of her completed research, submission of six grant proposals this year, and presenting research results at three national scientific conferences and five invited University guest lectures. Additionally, Dr. Bockus mentored a student from Dalton State College (GA) in LUMCON's NSF-funded Research Experience for Undergraduates (REU) program this summer and hired one part time undergraduate research technician from Nicholls State University starting in September. The Bockus lab also participated in multiple regional outreach and extension events including Ocean Commotion and the Louisiana Fisheries Forward Summit, events hosted by Louisiana Sea Grant, Louisiana Department of Wildlife and Fisheries and the LSU AgCenter. Additionally, Dr. Bockus has led LUMCON's effort to redesign and renovate our experimental wet lab facilities (see experimental facilities section of report), including extensive re-engineering and redesign of LUMCON's bytoplankton culture, larviculture, spawning, rearing, and experimental Recirculating Aquaculture Systems.

Dr. Marshall Bowles

pursued many different activities to excel in education, outreach, and research during 2018. Dr. Bowles's educational activities included organizing a course in Marine Microbial Ecology and teaching in LUMCON's Changing Coastal Oceans course. Drs. Bowles, Landry, Shields, and Hollander also proposed a course under the Seaphages program at Nicholls State University to teach biology students about marine viruses. His outreach activities included participation in the Terrebonne County Science Fair as a judge and in the LUMCON Open House. Dr. Bowles attended and presented at a number of meetings and workshops in diverse locations (Arizona, Washington, D.C., Shanghai, China, and Cambridge, United Kingdom) that were focused on carbon in the deep subsurface. Dr. Bowles led the submission of proposals to NSF Biological and Chemical Oceanography and to the Louisiana Board of Regents (both the Targeted Enhancement and Research Competitiveness Subprograms). Dr. Bowles was lead author on two papers that collectively revolutionized our understanding of microbial biomass through time and microbial limits in marine sediments. He also has several other first author and co-authored papers in press that will be published in 2019. Dr. Bowles mentored a REU intern from Vassar College (NY) in summer 2018. Future planned research activities in the Bowles lab will focus on developing our understanding of microorganisms and their fine scale interactions with marsh plants. These research activities will incorporate various consortium members and expand the lab's focus into Louisiana salt marshes.





Dr. Guillaume Rieucau

pursued his research on coastal behavioral ecology and continued to develop his research laboratory. He conducted research projects on fish ecology in different Louisiana coastal environments. He was actively developing in-state (e.g., University of Louisiana at Lafayette, Nicholls State University, Louisiana State University), out-of-state (e.g., Texas A&M, Mississippi State University, Dauphin Island Sea Lab, Smithsonian Marine Station Fort Pierce, Florida International University), and international (University des Antilles, Guadeloupe) collaborations through the submission of several grant proposals in 2018. Dr. Rieucau was recently funded by the Louisiana Sea Grant - Project Development Seed program to use unmanned aerial vehicle surveys for the study Gulf Menhaden (*Brevoortia patronus*) in Louisiana's coastal zone. Dr. Rieucau lectured the Changing Coastal Ocean course offered at LUMCON and gave guest lectures in 2 courses at Nicholls State University. He mentored REU interns from Willamette University (OR) and the University of South Florida in the summer of 2018. Dr. Rieucau presented his research at seminars in several academic institutions (ULL, LSU, NSU, Texas A&M, St Francis College, NY, Université des Antilles) during 2018. Dr. Rieucau was appointed as Adjunct Faculty at ULL and NSU. He submitted several manuscripts for publication in 2018, was appointed as an Academic Editor at *PeerJ*, and acted as a reviewer for several journals and funding agencies. Dr. Rieucau was also actively involved in the redesign of LUMCON's experimental wet lab facilities throughout 2018.

Dr. Alexander Kolker

was lead PI on a NOAA RESTORE project examining the central role of the Mississippi River and its delta on the oceanography, ecology, and economy of the Gulf of Mexico that concluded in 2018. The project convened a large, multidisciplinary working group to contribute to several research products, including two peer-reviewed publications, two white papers, a series of conceptual models, and several web-based tools. Additionally, this project supported a Tulane University graduate student to complete a study of Mississippi River plume dynamics using the US Navy's Coupled Ocean Data Assimilation geophysical tool. Dr. Kolker also participated in a National Academy of Sciences panel that examined the long-term evolution of the Gulf of Mexico and released its final report in 2018. He also published several other papers during 2018. Dr. Kolker initiated several new projects in 2018. One involved conducting fieldwork throughout the city of New Orleans in the fall of 2018 to evaluate the geology and hydrology of the city. Dr. Kolker also collaborated with the Salk Institute and several Louisiana institutions to convene a working group that met at the Marine Center in the fall to discuss research priorities to better understand biopolymers in wetland plants and the potential applicability of such polymers in the context of wetland restoration and carbon sequestration. Dr. Kolker also submitted several research proposals to expand his research program. He also mentored a REU intern from Skidmore College (NY) in summer 2018.





Dr. Craig McClain

served as PI for five submitted NSF grants this year focused on LUMCON hosting the UNOLS offices, LUMCON serving as operator of Regional Class Research Vessel, mechanisms driving deep-sea biodiversity under climate change, alterations to energetics and metabolism of marine invertebrates due to climate change, and continued funding for OCEANDOTCOMM. In addition, Dr. McClain also submitted a NOAA proposal in collaboration with MIT and others to host a cooperative institute. Dr. McClain's research team focused mainly on analyzing biological and environmental samples taken from the Gulf of Mexico deep-sea and Deep-Water Horizon sites on the expedition in 2017. A long-term field sampling program began of the Terrebonne Bay benthos starting in 2019. In 2019, monthly sampling will begin of 12 sites throughout the bay. The research group had five scientific publications this year including one in the prestigious *Proceedings of the National Academy of Science* and one each in the prominent journals of *Ecology* and *Biology Letters*. River Dixon (ULL) joined the lab as Ph.D. student. Dr. McClain also served as a mentor to three undergraduate researchers from UNO, McGill, and Nicholls. Dr. McClain gave four invited lectures (Southeastern, ULL, UNO, U. of Georgia, U. of South Carolina) as well as attended Ocean Sciences, Ecological Society of America, World Conference on Marine Biodiversity, and the Deep-Sea Biology Symposium meetings. Dr. McClain also attended Google's SciFoo event, an invite-only conference to bring together the world's scientific and technological leaders.

Dr. Nancy Rabalais

continued her long-term studies of hypoxia on the Louisiana shelf, with completion of 2018 shelf-wide hypoxia cruise and documentation of fourth-smallest bottomwater area since 1985. While the May nitrate load predicted the hypoxia size to be 17,250 km2, the measured size was 7,040 km2. The smaller bottom-area was attributed to high seas at the initiation of the cruise and persistent winds from the west that moved the hypoxic water mass to the eastern end of the study area. Dr. Rabalais also continued research on ocean acidification through continued collaborations with Drs. Wei-Jun Cai (University of Delaware), Samantha Joye (University of Georgia), and students on the relationships of low dissolved oxygen levels with decreasing pH levels. Student research included Michael Scaboo (UD) completing another year of surface flow through pCO2 and bottom pH; Andy Montgomery (UG) conducting research on nitrification/denitrification and methanogenesis; and Mary-Kate Rogener (UG) completing her PhD. She also continued as the lead PI on the GoMRI-funded Coastal Waters Consortium project, completed the benthic infauna and microphytobenthos components of her research, and began the syntheses of multiple studies. The Rabalais lab also took initial meiofauna samples from the LUMCON marsh mesocosms. Her graduate student Elizabeth Robinson (LSU) completed her Ph.D. on CWC research in 2018. The Rabalais lab also collected the initial benthic infaunal samples in spring 2018 as part of a multi-year NOAA RESTORE project which Dr. Rabalais also led the development of the data management plan for in 2018.





Dr. Brian Roberts

continued to serve on the executive committee of and lead the biogeochemistry, microbial ecology, and plant ecology components of the GoMRI-funded Coastal Waters Consortium project. Additionally, his lab oversaw the completion of LUMCON's marsh mesocosm facility and the initiation of the baseline sampling of the marshes ahead of oiling in 2019. The Roberts lab participated in three research cruises on the R/V *Pelican* as part of NSF-funded projects examining the coastal carbon cycle, metabolic balance, ocean acidification, and the impacts of Hurricane Harvey in the northern Gulf of Mexico. Dr. Roberts was also part of the NOAA RESTORE project examining the central role of the Mississippi River and its delta on the oceanography, ecology, and economy of the Gulf of Mexico which concluded in 2018. The Roberts lab participated in the initial sampling campaign of a multi-year NOAA RESTORE project focused on the impacts of salinity alterations and marsh creation projects and began an LA Sea Grant project focused on evaluating how gulf ribbed mussels (*Geukensia granosissima*) may enhance living shoreline restoration projects and began a project studying an assimilation wetland project with colleagues from ULL. Dr. Roberts participated in workshops on modeling marsh food webs, designing a national coastal observatory network, and operating REU sites. Dr. Roberts is the program director for LUMCON's NSF-funded Research Experiences for Undergraduates (REU) program and co-mentored interns from Smith College (MA), Eckerd College (FL), and Universidad Metropolitana (PR) in his lab this summer.



Aerial view of a South Louisiana marsh, captured during a flyover for LaDIA fellows to showcase coastal land loss and restoration process.

LUMCON GRANTS - 2018:

Continuing

Bockus AB; "Exploring the Use of Trimethylamine Oxide as a Feed Additive to Combat Soy-Induced Enteritis in Farmed Rainbow Trout", Soy Aquaculture Alliance, 2017-2018; \$75,000

Klevjer TA, **Rieucau G**, et al (5 total PIs); "SWARM: From Swarming Behaviour to Trophic Interactions: Forecasting Krill Dynamics in Ecosystem Hotspots Using Behaviour-based Models", Norwegian Research Council--Norwegian Antarctic Research, 2017-2020; \$950,000

Kolker AS, **Roberts BJ**, et al; "The Central Role of the Mississippi River and its Delta in the Oceanography, Ecology and Economy of the Gulf of Mexico Large Marine Ecosystem", NOAA RESTORE, 2015-2018; \$268,756

McClain C, et al; "The Energetic Assembly of Invertebrate Communities: A Test with Experimental Wood Fall", NSF Biological Oceanography, 2017-2020; \$833,270

Polito M, **Roberts BJ**, **Rabalais NN**, et al (9 total PIs); "Linking Community and Food Web Approaches to Restoration: An Ecological Assessment of Created and Natural Marshes Influenced by River Diversions", NOAA RESTORE, 2017-2021; \$2,040,845

Rabalais NN; "2017 and 2018 Shelfwide Hypoxia Cruise Support", NOAA, Gulf of Mexico Research Initiative, Mississippi State University; \$255,000

Rabalais NN; "Collaborative Research: pH Dynamics and Interactive Effects of Multiple Processes in a River-Dominated Eutrophic Coastal Ocean", NSF Chemical Oceanography, 2016-2019; \$177,417

Rabalais NN, **Roberts BJ**, et al (26 total PIs); "Coastal Waters Consortium II: A Collaborative Approach to Evaluate the Effects of the Macondo Oil Spill on Coastal Ecosystems", Gulf of Mexico Research Initiative, 2015-2018; \$16,100,000

Roberts BJ, et al. (5 total PIs); "Collaborative Research: A RAPID Response to Hurricane Harvey's Impacts on Coastal Carbon Cycle, Metabolic Balance and Ocean Acidification", NSF Chemical Oceanography, 2017-2019; \$42,686



New

Kolker AS, et al. (4 total PIs); "A Changing Landscape in a Future Without Action: The Geological Evolution of the Southeast Mississippi River Delta", Louisiana Sea Grant/LA Coastal Protection and Restoration Authority, 2018-2021; \$75,000

Rabalais NN, **Roberts BJ**, et al (22 total PIs); "Coastal Waters Consortium III: Oil spills as Stressors in Coastal Marshes: The legacy and the Future", Gulf of Mexico Research Initiative, 2018-2019; \$4,800,000

Rieucau G; "Implementing Video Analysis and Automated Tracking to Unmanned Aerial Vehicle (UAV) Surveys for the Study of Distribution, Movement and Behavior of Gulf Menhaden (*Brevoortia patronus*) in Louisiana' Coastal Zone", LA Sea Grant - Project Development Seed program, 2018-2020; \$9,896.

Roberts BJ, McClain CM; "REU Site: Interdisciplinary Research Experiences in Changing Coastal Environments", NSF OCE, 2018-2021; \$158,147

Roberts BJ, **Rietl A**, **Chelsky A**; "Core: Incorporating Life into Living Shorelines: Can Gulf Ribbed Mussels Reduce Shoreline Erosion and Enhance Restoration Practices?", Louisiana Sea Grant, 2018-2020; \$144,000

MENTORSHIP OF GRADUATE STUDENTS AND POSTDOCS:

Graduate Students:

PhD Students:

Elizabeth Robinson, Louisiana State University DOCS (Rabalais), graduated August 2018; Daniel Alt, Louisiana State University CEE (co-advised by Roberts); Molly Keogh, Tulane University Earth and Environmental Sciences (Kolker); Skyler Flaska, University of Louisiana-Lafayette Biology (co-advised by Roberts); River Dixon, University of Louisiana-Lafayette Biology (McClain)

MS Students:

Ronald Scheuermann, Louisiana State University DOCS (Roberts); Celeste Woock, University of New Orleans Earth and Environmental Sciences (Kolker); Catherine Fitzpatrick, Tulane University Earth and Environmental Sciences (Kolker)

Postdoctoral Research Associates:

Shivakumar Shivarudrappa (Rabalais); Ariella Chelsky (Roberts), departed July 2018; Ryann Rossi (Roberts), March 2018 - present; Scott Jones (Roberts), May - August 2018

OCEANDOTCOMM participants examine a soil core extracted from a local salt marsh during a salt marsh ecology lecture.

PER B



SCIENTIFIC INFRASTRUCTURE:

2018 saw significant advances in our scientific research and experimental infrastructure at the Marine Center. These improvements took place in several locations throughout the Marine Center facility and grounds and provide benefits to scientists in residence as well as throughout the consortium.

Shared Equipment Room:

In 2018, we were able to make additional improvements to this shared space with the addition of a new autoclave and improvements to the supply and drainage of water from the area. Additionally, we were able to complete the transition of the old autoclave room into a dedicated balance room.

Experimental Wet Lab Facilities:

2018 saw significant progress in the redesign and expansion of our experimental wet lab and aquaculture facilities in the large lab at the end of the wet wing of the Marine Center that originally began in the fall of 2017. The specially-designed racetrack flume has been returned to operation this year through the efforts of the facility staff. Our experimental tank systems in have been greatly expanded and consolidated in this new facility through the relocation of several systems previously located on the ground level of the facility and the acquisition of several new tank systems of differing sizes that will accommodate a range of experimental designs. Additionally, the redesign of the culture room has seen great progress throughout 2018. It is anticipated that all of the experimental systems in the redesigned wet lab will be fully operational in spring 2019. This effort has been led by Dr. Abigail Bockus and Dr. Guillaume Rieucau with input from Dr. Brian Roberts and Dr. Craig McClain.

Marsh Mesocosm Facility:

Construction of LUMCON's marsh mesocosm facility continued throughout 2018 on the Marine Center grounds with funding to the Coastal Waters Consortium research team from the Gulf of Mexico Research Initiative. The facility consists of 12 experimental tanks (10' diameter, 5' tall) and paired tidal surge tanks (6' diameter, 5' tall) enclosed in aviary-proof netting. Briefly, water is pumped from the bayou adjacent to the Marine Center through two settling tanks, then to the tidal surge tanks. Water is moved between each tidal surge tank and its paired mesocosm via air blowers on each tidal cycle. The computer-controlled flushing rate is currently designed to be 10% per day (water residence time of Terrebonne Bay). The facility is initially being designed to conduct a long term study of impacts of oil exposure on *Spartina alterniflora* (smooth cordgrass) salt marsh ecosystems. The transplanting of intact sections of marsh containing *S. alterniflora* and soil was completed in January 2018, instrumentation and sampling of baseline conditions began in spring 2018, and this will continue until oiling takes place in June 2019. By including control tanks in the design, the facility will continue to allow scientists to address non-oil related questions while the oiling experiment takes place.





INFRASTRUCTURE





FACILITIES:

The facility, maintenance, safety, and property management team take pride in the services that they provide on a daily basis to help assure the success of LUMCON. The facility team is tasked with and performs, at a very high level, all maintenance of the Marine Center including all of the equipment, utilities, and infrastructure required to keep it going, the Fourchon Laboratory, all vehicles that are vitally important to operations, and so much more. The safety and security teams work to assure that everyone here goes home each day having sustained no accidents or injuries. The custodial team provides a clean, pleasant facility daily. In addition to all of the daily preventive maintenance tasks, special work order requests, and general assistance provided to all who ask, the following major projects were completed during this year:

Renovations:

There was a complete upgrade to the wet lab, giving researchers much more flexibility in room setup and use for experimentation. This work included stripping and repainting of flooring, removal of piping and tanks, and installation of new seawater piping and electrical services. The facility team gutted and renovated the student lounge, which included upgrades to lighting, ceiling, cabinetry, and fixtures. A badly deteriorated steel entrance/exit stairway was partly demolished and reconstructed; all of the safety flooring in this stairwell was also replaced. The cafeteria underwent minor renovations with the wallpaper removed, walls patched and painted, and new cabinets installed.

Repairs:

Repairs to the exterior of the DeFelice Marine Center, including washing, repairing damaged surfaces, repainting, and waterproofing of all exterior surfaces of the facility, were completed. The racetrack flume, which had not been operational in many years, was fixed with gears and a motor overhauled and now has full functional ability. The back dock area where the kayaks are launched, the dock and boardwalk area at the back pumphouse, and environmental monitoring equipment were all repaired due to environmental deterioration.

Upgrades to Facility and Grounds:

Parking signage was added throughout the property to provide clear information and direction for visitors. Interior lighting upgrades were made throughout all of the second floor lobby as well as all of the visitor areas of the facility. The main facility entrance doors were removed, sandblasted and repainted, and mechanical hardware replaced resulting in virtually new entrance doors. Upgrades were made to the security camera system in conjunction with the IT department to provide better coverage and safety.

Assorted and Special Projects:

Anticipation of many high water events forced the facility team to move equipment throughout the facility to higher ground and perform several clean up events once the water receded. Facility and safety teams devoted time towards preparing for the annual safety audit. Replacement of the main electrical feed for the entire facility was begun and still remains in progress. A new work order system was instituted, in conjunction with the IT department, to provide a better source of organization for the process of daily and preventive maintenance tasks being performed and for the tracking of these items. Finally, the facility team worked side by side with other staff members to create the LUMCON Community Garden on the grounds of the facility.



VESSELS:

R/V Pelican

2018 proved to be a fully subscribed year for the R/V *Pelican*. Our flagship UNOLS vessel, the R/V *Pelican*, spent 177 days offshore in support of marine science and education, down from 201 in 2017. The vessel's seven year average is 185. The R/V *Pelican* supported various data collection cruises of both the physical and chemical environments in the Gulf. In addition, the R/V *Pelican* completed two annual inspections: an annual American Bureau of Shipping (ABS) load-line survey and an annual OVID (Offshore Vessel Inspection Database). The R/V *Pelican* was fully subscribed with follow up NSF RAPID research work from the 2017 hurricane season, hypoxia, and ocean acidification research along the Louisiana and Texas coast. Multiple mooring cruises utilized the vessel systems which includes a combination of the vessel's folding knuckle boom crane, multipurpose winch, and stern A-frame to systematically deploy and recover multiple offshore buoy scientific mooring and weather stations.

R/V Acadiana

The R/V Acadiana completed 177 sea days in support of busy educational and research seasons. The vessel conducted 33 days total of education cruises, up from 32 days in 2017. The R/V Acadiana additionally completed two extended research cruises which included a 26-day 2,000 mile acoustic survey of Ship Shoals for Ocean Surveys and a 56-day NOAA funded 8,600 mile acoustic survey of the area just south of Port St. Joe, Florida.

R/V Point Sur

The R/V *Point Sur* conducted 136 days of support of oceanography and marine education this year, down from 202 days at sea in 2017. The R/V *Point Sur's* presence in the Gulf was critical in aiding the scientific community's needs. As with the R/V *Pelican*, the crew of the R/V *Point Sur* provided excellent service.

Small Vessels

In 2018 LUMCON's small boat fleet aided researchers for a total of 284 days, a 12% increase from the previous year. Vessel Operations and LUMCON have been diligent in their efforts to accommodate Scientists' boating needs. Drawing from years of scientific boating experience, our fleet of small vessels have been thoughtfully combined and have spanned the coast of Louisiana from Venice to West of Marsh Island. Small boats were used extensively by the education department for a total of 77 days.

ENVIRONMENTAL MONITORING:

Program Modifications:

The DeFelice Marine Center monitoring station received an upgrade in the form of a new tower. The new tower design is modeled off the R/V *Pelican*'s mast. This design gave monitoring the ability to service instruments by simply lowering the tower and eliminated the need to climb above ground level, cut down servicing time of instruments, and created safer working conditions. All monitoring stations received a completely new lightning protection system. All of the stations' weather sensors were upgraded from the Vaisala WXT520 to the WXT530 (the latest model).

Program Achievements:

The Quality Assurance Project Plan (QAPP) was completed in 2018. This document gives detailed information into many aspects of the monitoring program, including insight into past and present station locations, data collection, sensor calibration, and maintenance. Monitoring has reestablished connections with the Gulf of Mexico Coastal Ocean Observing System (GCOOS). Environmental monitoring sends GCOOS each station's current data in real time, where it is displayed on their website. GCOOS also runs data from each station through a program that flags any suspicious data. The data is then returned to the monitoring staff to review, ensuring consistency throughout the quality assurance and quality control processes. Monitoring Technician Amanda Fontenot has been working closely with Your Ocean Consulting's owner Leslie Smith in making progress on data curation. They have established the framework to quality assure and control all historical and future data after it is processed through GCOOS's quality control software. Amanda Fontenot also completed a course on geographic information system (GIS), with the objective of expanding the scope of the LUMCON Environmental Monitoring Program. Finally, environmental monitoring completed the construction of the Wisner station at Port Fourchon. This station was possible thanks to a generous donation in 2017 by the Wisner Foundation. The Wisner station began displaying real-time data in March 2018.

Diversifying Data Types:

Environmental monitoring began taking benchmark measurements around the property in addition to capturing images of extreme flooding events on LUMCON's property. Notable environmental events including hypoxia in a local upper estuary, an algae bloom in a nearby pond, and a small fish kill resulting from freezing conditions were recorded this year. Marsh erosion measurements on LUMCON's property continue to be documented.





DIVE OPERATIONS:

New Hire:

David Muncher was hired as LUMCON's Dive Safety Officer (DSO). Previously the DSO at Florida Atlantic University, David has been an American Academy of Underwater Sciences (AAUS) diver since 1986, an AAUS Science Dive Instructor since 2004 and a licensed United States Coast Guard Captain for 20 years. David is a Technical Diver Instructor with a rating to 330 feet and has AAUS DSO qualifications with a depth rating of 190 feet. Mr. Muncher edited LUMCON's current Dive Manual to reflect recent changes in the AAUS Manual, organized all LUMCON current divers, is currently assembling a new LUMCON Diving Control Board, and is planning and coordinating future AAUS dive courses.

2018 Dive Cruises:

Three dive cruises were completed in 2018 which included trips to the Flower Garden Banks National Marine Sanctuary (FGBNMS) for the R/V *Pelican* in August, the R/V *Point Sur* in October, and a short R/V *Acadiana* cruise lander recovery for the University of Delaware. In August of 2017, Hurricane Harvey caused widespread flooding in southeast Texas when it released more than 50 trillion liters of rain, which then accumulated along the Texas Shelf. This runoff was expected to impact nearby coral reefs in the Flower Garden Banks National Marine Sanctuary via eddies and jets that transport coastal waters offshore. Findings from this project will allow managers to quickly predict whether extreme storm events are likely to induce reef mortality and ecosystem decline due to freshwater accumulation, by tracking of low salinity water masses coupled with microbial community characterization and metrics of coral health. These data are critical to managing coastal ecosystems, including the high coral cover reefs in the FGBNMS, and will help stakeholders (e.g., diving and fishing communities) plan for and minimize disruption to their livelihoods following these storms.

INFORMATION TECHNOLOGY:

Strengthening LUMCON Architecture and Security:

Stronger network password requirements were initiated throughout LUMCON in accordance with state policies. Backups for emails, contacts, and calendars were created which allows for restoring deleted items by users of LUMCON computer systems. A text alert system was initiated, allowing for better notifications to employees of ongoing events at the LUMCON facility. IT continued migrating servers to cloud instances for better disaster preparations. A joint ticketing system was created, in conjunction with the facility department. Finally, IT personnel initiated a subscription for online training to further knowledge and enhance capabilities.

Assisting Research and LUMCON Departments:

IT helped to coordinate several server and camera systems purchases by the vessels department. Security cameras were purchased, installed, and incorporated into one system to help facility personnel. Electrical wiring to the server room was installed for an uninterrupted power supply to computers with the help of the facility staff. Eduroam, a secure, worldwide roaming wireless network designed for academia, was fully configured, tested, and made available to LUMCON and visiting researchers.

A diver consults a fish identification guide during a descent to conduct scientific research.





LIBRARY:

Visitors:

The library has recorded unprecedented growth in patron visits since the department was redesigned beginning in the fall of 2016 (the figures below since 2010). 2018 saw a 40% increase from the previous year (916 versus 655) and a seven-fold increase compared to 2010 numbers. Visitors using the LUMCON library were affiliated with LSU, Louisiana Tech, Nicholls State University, Southeastern, Tulane, UL Lafayette, and the University of New Orleans. Other 2018 library visitors were affiliated with Penn State, the University of Maryland, M.I.T., the University of Wisconsin, the University of Missouri, the Monterey Bay Aquarium Research Institute, Mote Marine Lab, the University of West Virginia, the Scripps Institution of Oceanography, the Ocean Conservancy, and the Smithsonian Institution (among others).





Institutional Repository:

The LUMCON Institutional Repository (IR) continues to grow as more historical material is identified, digitized, cataloged, and uploaded. In 2018, the 400th item was added to the LUMCON IR. There are now approximately 500 unique items from digital initiatives accessible via the library's electronic catalog.

Presentations and Papers:



LUMCON Librarian John Conover participated in five conference presentations and panel discussions in 2008. Two of these presentations, as well as a panel discussion, took place at the 28th Annual Southeastern Affiliate of IAMSLIC Libraries (SAIL) conference held in Edgewater, MD. Another presentation was given at the 2018 Science Boot Camp for Librarians Southeast in Ocean Springs, MS, entitled "The Changing Environment of the Solo Librarian." Mr. Conover led an impromptu panel discussion on Institutional Repositories at the fall LOUIS User's Conference in Baton Rouge, after the invited presenter was unable to attend at the last minute. Finally, Mr. Conover assisted in the writing of two white papers and one peer-reviewed publication as part of the NOAA RESTORE project examining the central role of the Mississippi River and its delta on the oceanography, ecology, and economy of the Gulf of Mexico, which concluded in 2018.

Donations:

LUMCON received a generous donation of books and reports from LUMCON's former Executive Director Dr. Donald Boesch. Material from this donation was incorporated into the collection.

Open Access Fund:

Working with the Executive Director and faculty, Librarian John Conover created an institutional policy encouraging faculty to publish in Open Access (OA) journals with financial help from a pool of funds. We believe this was the 1st official OA Support Funds policy enacted in a Louisiana academic institution.

INFRASTRUCTURE IN 2019:

Facilities:

The facility team will continue to repair, update, and maintain all aspects of the building, grounds, equipment, and infrastructure in 2019. Facility members will continue to work in harmony with the entire LUMCON staff to make daily improvements throughout the center. Specifically, the facility team has plans for the following major projects in 2019: completion of "community garden area" to include improving ground structure to allow for improved foot traffic and building of benches for an outdoor collaborative area; refurbishing of dive operations area; moving forward with roof and storm shutter replacements; building of nature boardwalk and viewing platforms at rear of property; completion of main electrical feed project; moving forward with the planning of the new Houma facility campus; and replacement of badly deteriorated driveway entrance.

Vessels:

Currently there are 172 scheduled sea days on the 2019 calendar for the R/V *Pelican* and 115 at sea days for the R/V *Point Sur*. Shipyard maintenance periods will be performed for R/Vs *Pelican, Point Sur* and *Acadiana*. The R/V *Acadiana* and small vessels are anticipating normal education usage of the fleet with a few short research and dive trips for 2019.

Environmental Monitoring:

Monitoring will be completing the curation of the Marine Center station's historical data set. The monitoring staff will maintain and build a positive relationship with GCOOS. A UV light system will be tested and integrated to prevent biofouling and increase quality of hydrographic data. Staff will begin classes to earn a Bachelor of Science Degree in Geospatial Information System (GIS). After completion, the staff plans to explore ways to integrate GIS into LUMCON's Environmental Monitoring Program. Monitoring is committed to continually exploring new funding options to help expand LUMCON's footprint of weather stations along the Louisiana coast.

Dive Operations:

The 2019 goals of LUMCON's Dive Program are as follows: make all member institutions aware of LUMCON's Dive Program and the services which are accessible to them, establish a diving supervisor/lead diver liaison at each LUMCON member institute with active diving operations, teach four scientific diver courses with collectively at least 20 participants, and establish a working dive locker at the LUMCON campus.

Information Technology:

Moving forward, improvement of network infrastructure, including hardware, will be an ongoing task. There will also be a continuation of migrating digital assets to cloud services and improvements in backup and disaster recovery.

Library:

The recent acquisition of scanning hardware makes it possible to embark on digitizing photographs and slides from LUMCON's past for use in any number of ways. A book-end scanner also enables higher quality scanning of print material for continuation of the LUMCON IR and other digital initiatives.

FINANCES & DEVELOPMENT



003

The DeFelice Marine Center on a foggy day.

1

FILLING

ADMINISTRATION, FINANCE, & BUDGET:

Continued Growth in Human Resource Department - Realignment with LOSFA and Board of Regents:

LUMCON Administration internally reorganized its Human Resource Department in 2018. After an intensive search for a Human Resource/ Payroll Specialist, Mr. Eddie Filce joined the LUMCON administrative team in October 2018. Mr. Filce joins LUMCON with over 23 years of human resource experience within the Louisiana Department of Labor. In addition, he has over 12 years experience working in the private sector as a recruiter and human resource administrator for SeaCor Marine, J. Ray McDermott, and Sontheimer Offshore Catering Company (SONOCO). Along with a new Human Resource/Payroll Specialist, LUMCON administration has been working closely with Board of Regents and LOSFA staff to begin the integration of all agency policies to streamline all departments within the Board of Regents. This realignment of policies, including agency on-boarding, hiring, and human resource processes, will lead to a smoother and more employee-friendly department for the dissemination of information to all staff and across departments.

Changes in Budget:

Over recent years, LUMCON has continued to diversify its Means of Financing Portfolio through continued research awards, vessel funding, and developmental funding growth. With the addition of this continued increase of self-generated funding, LUMCON's overall budget has increased from \$9M to \$12M in 2018. State Financing has remained the same within the last few years. This continues to be a 6:1 return on investment by the state.

Continued Investment in Research/Education/Public Outreach:

LUMCON Administration continues to invest its funding in the mission of LUMCON. While our Means of Financing has increased, LUMCON continues to keep cost of administration and operations low. Of the LUMCON \$12M total budget, only 14% covers administrative and operational support. LUMCON continues to invest its funding into research, education, and public outreach.





LUMCON BUDGET BY FUNCTION: (TOTAL BUDGET EXPENDITURE - \$12.3 M)



LUMCON BUDGET BY MEANS OF FINANCE:





DEVELOPMENT:

2018 was LUMCON's first year with a full-time development director, as Matt Isch, who joined the staff at the end of 2017, commenced efforts to establish a development program to seek support from individuals, corporations, foundations, and other institutions. Activities to establish a program included:

• Developing a database of potential supporters of 2,361 companies, foundations, South Louisiana neighbors, and former LUMCON students.

• Working with faculty, staff, and volunteers to identify potential sources of support.

• Using a monthly email newsletter to provide information about LUMCON to potential supporters and others in the South Louisiana community.

• Working with the Executive Director and staff on an ambitious schedule of meetings to expand LUMCON's presence in the Terrebonne Parish and South Louisiana communities. Also, Matt took an active role in the Houma-Terrebonne Chamber of Commerce and the South Central Industrial Association throughout the year.

• Traveling throughout South Louisiana, alone and with members of the faculty and staff, to meet and begin to cultivate potential donors.

• Soliciting and securing donations from national and local foundations.

• Conducting two mail solicitations and two online solicitations on behalf of scholarship programs. Additionally, a monthly, low-dollar scholarship appeal was included as part of our monthly email newsletters.

• Securing 63 cash donations (not counting in-kind gifts) as of November 30, prior to any results that may derive from end-of-year solicitations (19 cash donations were recorded in all of 2017).

In addition to these more traditional development activities, the Development Director assisted in advancing several of LUMCON's overarching goals for the year, including:

• Establishment of the Houma Marine Education Campus and moving forward with the Louisiana Center for Marine Science Innovation. Activities related to this project were continuous throughout the year and included:

-Completing the Capital Outlay request, moving the request through the process of the Governor's Office, securing an economic impact study, and assuring that the project was included in the final Capital Outlay budget.

-Providing information about the project to the leadership of the Terrebonne Parish and South Louisiana communities.

-Securing a line of credit for the project from the State Bond Commission.

—Securing the services of an architect from the Architect Selection Board.

—Securing support for bringing the national office of University National Oceanographic Laboratory System (UNOLS) from the Louisiana Congressional delegation, the Terrebonne legislative delegation, the Terrebonne Parish Council, the Terrebonne Port Commission, the Houma-Terrebonne Chamber of Commerce, and the Terrebonne Economic Development Authority.

-Exploring potential sources of funding for replacing the R/V Pelican.

--Working with the Board of Regents and the Office, of the Governor to secure ten days of assured funding for the projected Regional Class Research Vessel.

-Working with Board of Regents, Governor's Office and Congressional Delegation to seek support for the NOAA/Institute of Discovery.

-Exploring potential funding opportunities and filing applications to Department of Homeland Security for new roof and storm shutters for the DeFelice Marine Center.

FINANCES AND DEVELOPMENT IN 2019:

LUMCON Finance and Human Resources Department will continue to work closely with the Board of Regents and LOSFA to streamline agency policies and processes as LUMCON continues its growth in funding opportunities and its realization of LUMCON's expansion opportunities currently in process. The realignment and expansion of this department will continue to provide the necessary support and expertise required to keep LUMCON moving forward to fulfill its mission to all Consortium stakeholders.





LIST OF SCIENTIFIC PUBLICATIONS FOR 2018:

Ameen, A.D., A.S. Kolker, and C.M. Taylor. 2018. Morphological responses to competition modulated by abiotic factors in two monocultureforming wetland plants. *Aquatic Botany*, 147: 61-67. doi:10.1016/j.aquabot.2018.03.003

Baustian, M.M., S. Bargu, W. Morrison, C. Sexton, and N.N. Rabalais. 2018. The polychaete, *Paraprionospio pinnata*, is a likely vector of domoic acid to the benthic food web in the northern Gulf of Mexico. *Harmful Algae*, 79: 44-49. doi:10.1016/j.hal.2018.06.002

Bernhardt, E.S., J.B Heffernan, N.B. Grimm, E.H. Stanley, J.W. Harvey, M. Arroita, A.P. Appling, M.J. Cohen, W.H. McDowell, R.O. Hall, J.S. Read, **B.J. Roberts**, E.G. Stets, and C.B. Yackulic. 2018. The metabolic regimes of flowing waters. *Limnology and Oceanography*, 63(S1): S99-S118. doi:10.1002/lno.10726

Bernik, B., M.A. Eppinga, A.S. Kolker, and M.J. Blum. 2018. Clonal vegetation patterns mediate shoreline erosion. *Geophysical Research Letters*, 45(13): 6476-6484. doi:10.1029/2018GL077537

Bockus, A.B. and B.A. Seibel. 2018. Synthetic capacity does not predict elasmobranchs' ability to maintain trimethylamine oxide without a dietary contribution. *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology,* 217: 35-42. doi:10.1016/j.cbpa.2017.12.008

Breitburg, D., L.A. Levin, A. Oschlies, M. Grégoire, F.P. Chavez, D.J. Conley, V. Garçon, D. Gilbert, D. Gutiérrez, K. Isensee, G.S. Jacinto, K.E. Limburg, I. Montes, S.W.A. Naqvi, G.C. Pitcher, N.N. Rabalais, M.R. Roman, K.A. Rose, B.A. Seibel, M. Telszewski, M. Yasuhara, and J. Zhang. 2018. Declining oxygen in the global ocean and coastal waters. *Science*, 359(6371): eaam7240. doi:10.1126/science.aam7240

Gearty, W., C.R. McClain, and J.L. Payne. 2018. Energetic tradeoffs control the size distribution of aquatic mammals. *Proceedings of the National Academy of Sciences*, 115(16): 4194-4199. doi:10.1073/pnas.1712629115

Kolker, A.S., A.M. Dausman, M.A. Allison, G.L. Brown, K. de Mutsert, C.E. Fitzpatrick, J.R. Henkel, D. Justic, B.A. Kleiss, E. McCoy E. Meselhe, and C. Parson. 2018. Rethinking the River. *Eos*, 99. doi:10.1029/2018EO101169

Matli, V., S. Fang, J. Guinness, **N.N. Rabalais**, J. Craig, and D.R. Obenour. 2018. A space-time geostatistical assessment of hypoxia in the northern Gulf of Mexico. *Environmental Science & Technology*, 52(21): 12484-12493. doi:10.1021/acs.est.8b03474

McClain, C.R., J.P Barry, T.J. and Webb. 2018. Increased energy differentially increases richness and abundance of optimal body sizes in deep-sea wood falls. *Ecology*, 99(1): 184-195. doi:10.1002/ecy.2055

McClain, C.R., J. Conover, J. Conover, B.J. Roberts, and V. Schutte. 2018. Louisiana Universities Marine Consortium (LUMCON). *Limnology and Oceanography Bulletin*, 27(1): 11–13. doi:10.1002/lob.10220

McClain, C.R., N. Heim, M. Knope, and J.L. Payne. 2018. Is biodiversity energy-limited or unbounded? A test in fossil and modern bivalves. *Paleobiology*, 44(3): 385-401. doi:10.1017/pab.2018.4



McClain, C.R., C. Nunnally, A.S. Chapman, and J.P Barry. 2018. Energetic increases lead to niche packing in deep-sea wood falls. *Biology Letters*, 14(9): 20180294. doi:10.1098/rsbl.2018.0294

Price, A.M., M.M. Baustian, R.E. Turner, N.N. Rabalais, and G.L. Chmura. 2018. Dinoflagellate cysts track eutrophication in the northern Gulf of Mexico. *Estuaries and Coasts*, 41(5): 1322-1336. doi:10.1007/s12237-017-0351-x

Rabalais, N.N. 2018. Coastal hypoxia: What, when, where, why. The Marine Biologist: Magazine of the Marine Biological Community, 2018(10): 6-8.

Rabalais, N.N., L.M. Smith, and R.E. Turner. 2018. The Deepwater Horizon oil spill and Gulf of Mexico shelf hypoxia. *Continental Shelf Research*, 152(1): 98-107. doi: 10.1016/j.csr.2017.11.007

Rieucau, G., J.J. Kiszka, J.C. Castillo, J. Mourier, K.M. Boswell, and M.R. Heithaus. 2018. Using unmanned aerial vehicle (UAV) surveys and image analysis in the study of large surface-associated marine species: a case study on reef sharks *Carcharhinus melanopterus* shoaling behaviour. *Journal of Fish Biology*, 93(1): 119-127. doi:10.1111/jfb.13645

<u>Rietl, A.J.</u>, M.G. Sorrentino, and **B.J. Roberts**. 2018. Spatial distribution and morphological responses to predation in the salt marsh periwinkle. *Ecosphere*, 9(6): e02316. doi:10.1002/ecs2.2316

Reeves, D.B., E.J. Chesney, R.T Munnelly, and D.M. Baltz. 2018. Barnacle settlement and growth at oil and gas platforms in the northern Gulf of Mexico. *Marine Ecology Progress Series*, 590: 131-143. doi:10.3354/meps12468

Reeves, D.B., **E.J. Chesney**, R.T. Munnelly, D.M. Baltz, and B.D. Marx. 2018. Abundance and distribution of reef-associated fishes around small oil and gas platforms in the northern Gulf of Mexico's hypoxic zone. *Estuaries and Coasts*, 41(7): 1835-1847. doi:10.1007/s12237-017-0349-4

Schutte C.A., A. Teske, B.J. MacGregor, V. Salman-Carvalho, G. Lavik, P. Hach, and D. de Beer. 2018. Filamentous giant *Beggiatoaceae* from Guaymas Basin are capable of both denitrification and dissimilatory nitrate reduction to ammonium (DNRA). *Applied and Environmental Microbiology*, 84(15): e02860-17. doi: 10.1128/ AEM.02860-17

Schutte, C.A., A.M. Wilson, T. Evans, W.S. Moore, and S.B. Joye. 2018. Deep oxygen penetration drives nitrification in intertidal beach sands. *Limnology and Oceanography*, 63(S1): S193-S208. doi:10.1002/lno.10731

Telfeyan, K., A. Breaux, J. Kim, A.S. Kolker, J.E. Cable, and K.H. Johannesson. 2018. Cycling of oxyanion-forming trace elements in groundwaters from a freshwater deltaic marsh. *Estuarine, Coastal and Shelf Science*, 204: 236-263. doi:10.1016/j.ecss.2018.02.024

Thrash, J.C., B.J. Baker, K.W. Seitz, B. Temperton, L.G. Campbell, **N.N. Rabalais**, B. Henrissat, and O.U. Mason. 2018. Metagenomic assembly and prokaryotic metagenome-assembled genome sequences from the northern Gulf of Mexico "Dead Zone". *Microbiology Resource Announcements*, 7(9): e01033-18. doi:10.1128/ MRA.01033-18

Wang, H., X. Hu, N.N. Rabalais, and J. Brands. 2018. Drivers of oxygen consumption in the northern Gulf of Mexico hypoxic waters – A stable carbon isotope perspective. *Geophysical Research Letters*, 45(19): 10,528–10,538. doi:10.1029/2018GL078571

2018 MEDIA AND PRESS:

LUMCON researchers and staff authored pieces, or were featured, in the following print/radio/web-based media outlets in 2018:

Farm Journal's Ag Professional Weekly All Things Considered (National Public Radio) American Libraries ARTE TV (France) Baton Rouge Advocate Deep Sea News Delta Dispatches Greater Baton Rouge Business Report Hakai Magazine: Coastal Science and Societies HowStuffWorks Houma (La.) Today Iowa State Daily Le Monde Leesburg (Fl.) Daily Commercial Live Science Marine Technology News Minnesota Public Radio National Geographic New Orleans Advocate

New York Times NOI A.com Ocean Conservancy Plaquemines (La.) Gazette **Popular Science** PRX San Francisco Chronicle Science Science X News Seeker Media Southern Fried Science TFD Thibodaux (La.) Daily Comet Thomson Reuters Foundation News Yale Climate Connections WAFB Baton Rouge The Well (Marine Biological Laboratory) WBRZ Baton Rouge WWNO Public Radio





VESSEL OPERATIONS SCHEDULES:

R/V PELICAN CALENDAR YEAR 2018 SHIP SCHEDULE (175 Research Days, 1 Education Day)

| Cruise Dates | Map Index/ Area/ Purpose | P.I./ Institution/ Proposal NO. | Ports | Days/ Agency/ Status/ Clearance |
|------------------|---------------------------------|---------------------------------|----------------------|---------------------------------|
| 06 JAN 13 JAN | NA9/ GOM/ RAPID/ Flood Plankton | Robinson, k/ ULL/ 1760704 | Cocodrie Cocodrie | 8/ NSF/ OCE/ BIO/ F/ No |
| 17 JAN 26 JAN | NA9/ GOM/ Coastal OA | Cai, W/ UDEL/ 1559279 | Cocodrie Cocodrie | 10/ NSF/ OCE/ CO/ F/ No |
| 02 FEB 06 FEB | NA9/ GOM/ Mooring maintenance | Ogle, M/ FGEOS/ N/A | Cocodrie Cocodrie | 5/ OTHER/ F/ No |
| 18 MAR 23 MAR | NA9/ GOM/ RAPID/ Flood Plankton | Robinson, k/ ULL/ 1760704 | Cocodrie Cocodrie | 8/ NSF/ OCE/ BIO/ F/ No |
| 25 MAR 28 MAR | NA9/ GOM/ Harvey freshwater | Thyng, K/ TAMY_CS/ 1762157 | Cocodrie Cocodrie | 4/ NSF/ OCE/ PO/ F/ No |
| 30 MAR 30 MAR | NA9/ GOM/ Meteotsunami | Li, C/ LSU/ 1736713 | Cocodrie Cocodrie | 1/ NSF/ OCE/ PO/ F/ No |
| 06 APR 12 APR | NA9/ GOM/ Mooring Rotation | Ogle, M/ FGEOS/ N/A | Cocodrie Cocodrie | 7/ OTHER/ F/ No |
| 13 APR 21 APR | NA9/ GOM/ Mooring deployment | Fuller, C/ CU/ N/A | Cocodrie Cocodrie | 9/ OTHER/ F/ No |
| 24 APR 26 APR | NA9/ GOM/ Coastal OA | Cai, W/ UDEL/ 1559279 | Cocodrie Cocodrie | 3/ NSF/ OCE/ CO/ F/ No |
| 03 MAY 11 MAY | NA9/ GOM/ Rhodoliths in NWGMx | Frederiq, S/ ULL/ 1754504 | Cocodrie Cocodrie | 9/ NSF/ BIO/ DEB/ F/ No |
| 12 MAY 16 MAY | NA9/ GOM/ Mooring deployment | Aronchick, E/ WHGRP/ N/A | Cocodrie Cocodrie | 5/ OTHER/ F/ No |
| 17 MAY 24 MAY | NA9/ GOM/ Glider testing | Sidorovskaia, N/ ULL/ N/A | Cocodrie Cocodrie | 8/ GOMRI/ F/ No |
| 25 MAY 29 MAY | NA9/ GOM/ Mooring maintenance | Aronchick, E/ WHGRP/ N/A | Cocodrie Cocodrie | 5/ OTHER/ F/ No |
| 31 MAY 02 JUN | NA9/ GOM/ Mooring deployment | Fuller, C/ CU/ N/A | Cocodrie Cocodrie | 3/ OTHER/ F/ No |
| 13 JUN 17 JUN | NA9/ GOM/ Mooring Rotation | Ogle, M/ FGEOS/ N/A | Cocodrie Cocodrie | 5/ OTHER/ F/ No |
| 19 JUN 21 JUN | NA9/ GOM/ Groundfish | Dean, C/ LDWF/ N/A | Cocodrie Cocodrie | 3/ NOAA/ NMFS/ F/ No |

VESSEL OPERATIONS SCHEDULE CONTINUED:

| Cruise Dates | Map Index/ Area/ Purpose | P.I./ Institution/ Proposal NO. | Ports | Days/ Agency/ Status/ Clearance |
|------------------|--------------------------------|---------------------------------|----------------------|---------------------------------|
| 22 JUN 24 JUN | NA9/ GOM/ REU: Ocean Observing | Campbell, L/ TAMU/ 1455851 | Cocodrie Cocodrie | 3/ NSF/ OCE/ F/ No |
| 26 JUN 28 JUN | NA9/ GOM/ Coastal OA | Cai, W/ UDEL/ 1559279 | Cocodrie Cocodrie | 3/ NSF/ OCE/ CO/ F/ No |
| 03 JUL 03 JUL | NA9/ GOM/ Meteotsunami | Li, C/ LSU/ 1736713 | Cocodrie Cocodrie | 1/ NSF/ OCE/ CO/ F/ No |
| 09 JUL 10 JUL | NA9/ GOM/ RAPID/ Sediment Trap | Reynolds, C/ USGS N/A | Cocodrie Cocodrie | 2/ USGS/ F/ No |
| 11 JUL 12 JUL | NA9/ GOM/ Chemical | Lee, R., J/ TAMUG/ RS2018 | Cocodrie Cocodrie | 11/ OTHER/ FF/ No |
| 23 JUL 30 JUL | NA9/ GOM/ Gulf Hypoxia | Rabalais, N/ LUMCON/ N/A | Cocodrie Cocodrie | 8/ NOAA/ F/ No |
| 01 AUG 08 AUG | NA9/ GOM/ FGB_Harvey_Rapid | Sylvan, J/ TAMU_CS/ 1800904 | Cocodrie Cocodrie | 8/ NSF/ OCE/ BIO/F No |
| 14 AUG 17 AUG | NA9/ GOM/ Coastal OA | Cai, W/ UDEL/ 1559279 | Cocodrie Cocodrie | 4/ NSF/ OCE/ CO/ F/ No |
| 18 AUG 22 AUG | NA9/ GOM/ Sediment geochemical | Maiti, K/ LSU/ 1756788 | Cocodrie Cocodrie | 5/ NSF/ OCE/ CO/ F/ No |
| 28 AUG 02 SEP | NA9/ GOM/ Mooring deployment | Gehring, H/ LEIDOS/ N/A | Cocodrie Cocodrie | 6/ OTHER/ F/ No |
| 26 SEP 28 SEP | NA9/ GOM/ Sediment trap/ NIOZ | Malbrough, J/ LUMCON/ N/A | Cocodrie Cocodrie | 3/ NSF/ NIO/ F/ No |
| 30 SEP 01 OCT | NA9/ GOM/ Mooring retriecal | Pozin, K/ WHOI/ N/A | Cocodrie Cocodrie | 2/ INST/ WHOI/ F/ No |
| 12 OCT 12 OCT | NA9/ GOM/ Meteotsunami | Li, C/ LSU/ 736713 | Cocodrie Cocodrie | 1/ NSF/ OCE/ PO/ F/ No |
| 14 OCT 21 OCT | NA9/ GOM/ Mooring maintenance | Ogle, M/ FGEOS/ N/A | Cocodrie Cocodrie | 8/ OTHER/ F/ No |
| 29 OCT 06 NOV | NA9/ GOM/ Mooring rotation | Sidorovskaia, N/ ULL/ N/A | Cocodrie Cocodrie | 9/ GOMRI/ F/ No |
| 03 DEC 03 DEC | NA9/ GOM/ Meteotsnumani | Li, C/ LSU/ 1736703 | Cocodrie Cocodrie | 1/ NSF/ OCE/ PO/ F/ No |
| 09 DEC 19 DEC | NA9/ GOM/ Mooring maintenance | Ogle, M/ FGEOS/ N/A | Cocodrie Cocodrie | 11/ OTHER/ F/ No |

VESSEL OPERATIONS SCHEDULES:

R/V POINT SUR CALENDAR YEAR 2018 SHIP SCHEDULE (129 Research Days, 7 Education Days)

| Cruise Dates | Map Index/ Area/ Purpose | P.I./ Institution/ Proposal NO. | Ports | Days/ Agency/ Status/ Clearance |
|------------------|------------------------------|---------------------------------|----------------------|---------------------------------|
| 14 FEB 17 FEB | NA9/ GOM/ Mooring Ops | Marcus, O/ FEOS/ N/A | Cocodrie Cocodrie | 4/ OTHER/ F/ No |
| 24 MAR 25 MAR | NA9/ GOM/ Mooring Ops | Gould/ NRL/ N/A | Gulfport Gulfport | 2/ NRL/ F/ No |
| 12 APR 13 APR | NA9/ GOM/ Education | Milroy, s/ USM/ N/A | Gulfport Gulfport | 2/ INST/ E/ No |
| 16 APR 17 APR | NA9/ GOM/ Mooring Ops | Gould/ NRL/ N/A | Gulfport Gulfport | 2/ OTHER/ F/ No |
| 20 APR 24 APR | NA9/ GOM/ Tucker trawls | Knap, T/ TAMU/ N/A | Gulfport Gulfport | 5/ OTHER/ F/ No |
| 02 MAY 03 MAY | NA9/ GOM/ Lander OPS | Asper, V/ USM/ N/A | Gulfport Gulfport | 2/ INST/ F/ No |
| 07 MAY 10 MAY | NA9/ GOM/ Mooring Deployment | Diercks, A/ USM/ N/A | Gulfport Gulfport | 4/ INST/ F/ No |
| 19 MAY 24 MAY | NA9/ GOM/ Mooring Deployment | Diercks, A/ USM/ N/A | Gulfport Gulfport | 7/ INST/ F/ No |
| 30 MAY 07 JUN | NA9/ GOM/ Sargasso Grass | Hernandez, F/ USM/ N/A | Gulfport Gulfport | 9/ INST/ F/ No |
| 10 JUN 14 JUN | NA9/ GOM/ MultiCorer | Hamdan, L/ USM/ N/A | Gulfport Gulfport | 5/ INST/ F/ No |
| 21 JUN 28 JUN | NA9/ GOM/ GOMIX HRP&VMP | Polzin, K/ WHOI/ N/A | Cocodrie Cocodrie | 8/ INST/ F/ No |
| 03 JUL 03 JUL | NA9/ GOM/ Education Trip | Andres, M/ USM/ N/A | Cocodrie Cocodrie | 1/ INST/ E/ No |

VESSEL OPERATIONS SCHEDULE CONTINUED:

| Cruise Dates | Map Index/ Area/ Purpose | P.I./ Institution/ Proposal NO. | Ports | Days/ Agency/ Status/ Clearance |
|------------------|--------------------------|---------------------------------|----------------------|---------------------------------|
| 05 JUL 06 JUL | NA9/ GOM/ Mammal Class | Lee, L/ USM/ N/A | Cocodrie Cocodrie | 2/ INST/ E/ No |
| 09 JUL 17 JUL | NA9/ GOM/ Net tows | Hernandez, F/ USM/ N/A | Gulfport Gulfport | 9/ INST/ F/ No |
| 19 JUL 02 AUG | NA9/ GOM/ Mochness | Sutton/ NSU/ N/A | Gulfport Gulfport | 15/ GOMRI/ F/ No |
| 26 AUG 26 AUG | NA9/ GOM/ ROV | Hamdan, L/ USM/ N/A | Gulfport Gulfport | 1/ NRL/ F/ No |
| 29 AUG 05 SEP | NA9/ GOM/ ROV | Peterson, R/ CCU/ N/A | Gulfport Gulfport | 8/ INST/ F/ No |
| 06 SEP 20 SEP | NA9/ GOM/ ROV | Hamdan, L/ USM/ N/A | Gulfport Gulfport | 15/ NRL/ F/ No |
| 21 SEP 30 SEP | NA9/ GOM/ MultiCorer | Rogers, J/ NRL/ N/A | Gulfport Gulfport | 10/ NAVY/ F/ No |
| 06 OCT 07 OCT | NA9/ GOM/ Education Trip | Buijsman/ USM/ N/A | Gulfport Gulfport | 2/ INST/ E/ No |
| 18 OCT 18 OCT | NA9/ GOM/Glider | Martin, K/ USM/ N/A | Cocodrie Cocodrie | 1/ INST/ F/ No |
| 22 OCT 29 OCT | NA9/ GOM/ Coral | Sylvan, J/ TAMU/ N/A | Cocodrie Cocodrie | 8/ NSF/ F/ No |
| 07 NOV 07 NOV | NA9/ GOM/ Mooring | Chance, S/ L3/ N/A | Gulfport Gulfport | 1/ Other/ F/ No |
| 26 NOV 10 DEC | NA9/ GOM/ Mooring | Chance, S/ L3/ N/A | Gulfport Gulfport | 10/ Other/ F/ No |
| 12 DEC 14 DEC | NA9/ GOM/ MultiCorer | Hamdan, L/ USM/ N/A | Gulfport Gulfport | 3/ INST/ F/ No |

APPENDIX

Sampling the salt marsh.

CONSORTIUM CONNECTIONS:

| Consortium Member | # of Leadership Visits | # of Undergraduate Visitors | # of Room Nights at LUMCON | # of Small Vessels Rented | # of Research Collaborators with LUMCON Faculty |
|---|---------------------------|--------------------------------|-------------------------------|------------------------------|--|
| University of Louisiana System | | | | | |
| Louisiana Tech University | 1 | 37 | 71 | 27 | 2 |
| McNeese State University | 1 | | | | |
| Nicholls State University | 14 | 71 | 37 | 1 | 2 |
| Southeastern Louisiana University | 2 | | | | |
| University of Louisiana-Lafayette | 11 | 99 | 64 | 80 | 10 |
| University of New Orleans | 3 | | | | 15 |
| Louisiana State University System | | | | | |
| Louisiana State University | 13 | 170 | 115 | 39 | 49 |
| Louisiana Community and Technical College System | | | | | |
| Baton Rouge Community College | | 18 | 6 | | |
| L.E. Fletcher Technical Community College | 12 | | | | |
| River Parishes Community College | 2 | | | | |
| South Louisiana Community College | 2 | | | | |
| Southern University System | | | | | |
| Southern University at New Orleans | | | | | 1 |
| Louisiana Private Institutions | | | | | |
| Dillard University | 2 | | | | |
| Loyola University | 2 | 16 | | | |
| Tulane University | 3 | 45 | | 3 | 11 |
| Xavier University | 1 | | | | |

FACULTY GRANTS:

| Faculty Grants | 2017 | 2018 |
|---------------------|------|------|
| Proposals Submitted | 36 | 39 |
| Proposals Accepted | 12 | 7 |
| Pending | 1 | 12 |

FACULTY MENTORS:

| Faculty Mentors | 2018 |
|-----------------|------|
| Bockus | 2 |
| Bowles | 3 |
| Kolker | 11 |
| McClain | 6 |
| Rabalais | 2 |
| Rieucau | 2 |
| Roberts | 7 |
| Total | 33 |

STUDENT VISITORS BY YEAR:

| Student Visitors | 2014 | 2015 | 2016 | 2017 | 2018 |
|------------------|------|------|------|------|------|
| K-12 | 2245 | 2201 | 2136 | 2700 | 2545 |
| University | N/A | 476 | 515 | 334 | 483 |

VESSEL DAYS AT SEA:

| Vessels | 2014 | 2015 | 2016 | 2017 | 2018 |
|------------------|------|------|------|------|------|
| Acadiana | 82 | 90 | 72 | 49 | 178 |
| Pelican | 200 | 210 | 192 | 196 | 160 |
| Point Sur | N/A | 141 | 140 | 198 | 142 |
| Small Vessels | N/A | 188 | 217 | 303 | 296 |

*small vessels incluse kayaks

SMALL VESSEL RENTALS:

| Small Vessels | 2018 |
|---------------|------|
| Vessels | 224 |
| Kayaks | 229 |
| Total | 453 |

2018 LUMCON DONORS:

Mr. And Mrs. Anthony J. Alford Timothy Allen Louis M. "Andy" Andolsek Rebecca Aronson Arthur M. Blank Family Foundation Bayou Community Foundation Michael David Bergeron Marie V. Berkel Dale E. Boger Olga Boquet Peter D. Boulet Francis Octave Bourg III Mr. and Mrs. Bill G. Boyd Joe W. and Dorothy Dorsett Brown Foundation Glenny Lee Castagnos Buquet Gavin P. Callais Audra Ward Cenac Leonard C. Chabert Hon. Michel H. Claudet Michael P. D'Angelo Deborah Samuels Fortier Gary Leo Ganier Mary Duplantis Goodwin Dr. Neal Joseph Hebert Craig R. Hutchison Matt Isch

Dr. Alexander S. Kolker Frank Robert Kolwe, Jr. **Gregory Lamulle** Robert A. LeBlanc Jerry P. Ledet Rebecca N. Leonard Richard A. Lipsey Ramsey Lirette **Clayton Ernest Lovell** Joe Malbrough Carroll Dewitt McKey III Oceaneering Cyrus J. Pitre Dr. Gregory Allen Pizzolatto Dr. Edwin W. "Ted" Price Richard J. Roth South Louisiana Bank Mr. and Mrs. Heinke Earl Trapp, Jr. Christina Tucker **VWR** Foundation Jody Harper Waggenspack Douglas Edward Waitz Dr. Craig Michael Walker Charles Kent Weaver, Sr. Sebastien Wegeng Keith Wyckoff









