

## About the Gulf of Mexico Research Initiative

The Gulf of Mexico Research Initiative is a 10-year, \$500 million independent research program established by an agreement between BP and the Gulf of Mexico Alliance to study the effects of the Deepwater Horizon incident and the potential associated impact of this and similar incidents on the environment and public health.

Would you like to know more about the GoMRI-funded research?

Check out our Research page on the website:

<http://research.gulfresearchinitiative.org/research-awards/>

## Upcoming Events:

### Save the Date: 2020 Gulf of Mexico Oil Spill and Ecosystem Science (GoMOSES) Conference

February 3-6, 2020  
Tampa, Florida

### Synthesis and Legacy Workshops

Core Area 6 - Defining the Gulf of Mexico Microbiome

April 9-10, 2019

Washington, District of Columbia

Core Area 2 - Fate of Oil and Weathering: Biological and Physical-Chemical Degradation

June 12-14, 2019

Washington, District of Columbia

Core Area 5 - Living on the Edge: Enhancing the Sustainability of Coupled Human-Environment Systems in the Gulf of Mexico Region

July 10-12, 2019

Mobile, Alabama

Core Area 7 - Operational Oil Spill Monitoring

October 15-17, 2019

Washington, District of Columbia

## GoMRI Consortia Outreach Coordinators Partner on Special Issue of *Current: The Journal of Marine Education*

The Gulf of Mexico Research Initiative (GoMRI) consortia outreach coordinators partnered to produce a special issue of *Current: The Journal of Marine Education*, published by the National Marine Educators Association (NMEA) titled *Special Issue Featuring the Gulf of Mexico Research Initiative: Research Resulting from the 2010 Deepwater Horizon Oil Spill*. The special issue, which was sponsored by GoMRI, features synthesis articles on oil spill science and educational resources educators can use to incorporate oil spill science into their curriculums. The goal of the issue is to convey the process of science utilizing the Deepwater Horizon oil spill and GoMRI as an example.

Jessie Kastler (Consortium for Oil Spill Exposure Pathways in Coastal River-Dominated Ecosystems, CONCORDE), Katie Fillingham (GoMRI Management Team), Sara Beresford (Ecosystem Impacts of Oil and Gas Inputs to the Gulf consortium, ECOGIG), and Teresa Greely (Center for the Integrated Modeling and Analysis of the Gulf Ecosystem, C-IMAGE) served as co-editors and co-authors for the special issue. Laura Bracken (Consortium for Advanced Research on Transport of Hydrocarbon in the Environment, CARTHE), Murt Conover (Coastal Waters Consortium, CWC), Emily Davenport (ECOGIG), Dan DiNicola (formerly Relationships of Effects of Cardiac Outcomes in Fish for Validation of Ecological Risk consortium, RECOVER), Sandra Ellis (formerly Gulf of Mexico Research Initiative Information and Data Cooperative, GRIIDC) and Rachel McDonald (Alabama Center for Ecological Resilience, ACER) also served as co-authors. The special issue includes a *Current Log* from GoMRI Research Board Chair Dr. Rita Colwell, an introduction highlighting the goals of the issue, descriptions of each of the GoMRI-funded consortia and links to GoMRI's Education site and external communications partners, and five main articles. The articles discuss where oil went after the Deepwater Horizon oil spill, the story of marine oil snow, the spill's impacts on organisms and habitats, technological advancements resulting from the spill and the GoMRI investment, and a feature on data sharing, data transparency, and GRIIDC.

The special issue is available on the [GoMRI Education site](#) and also through the [Current website](#) to NMEA members.



Special Issue Featuring the Gulf of Mexico Research Initiative  
Research Resulting from the 2010 Deepwater Horizon Oil Spill



Image Credit: National Marine Educators Association.

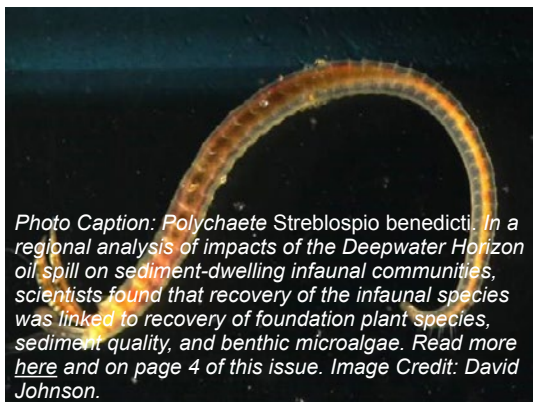


Photo Caption: *Polychaete Streblospio benedicti*. In a regional analysis of impacts of the Deepwater Horizon oil spill on sediment-dwelling infaunal communities, scientists found that recovery of the infaunal species was linked to recovery of foundation plant species, sediment quality, and benthic microalgae. Read more [here](#) and on page 4 of this issue. Image Credit: David Johnson.

The Gulf of Mexico Sea Grant Oil Spill Science Outreach team recently published a new one-pager titled *Federal Emergency Response Framework for Oil Spills: Stafford Act and Oil Pollution Act*. The publication describes the Stafford Act of 1988 and the Oil Pollution Act of 1990, laws that determine federal oil spill response efforts. In the event of a major disaster in the United States, such as a fire, flood, hurricane, or other type of event that causes significant damage, the Stafford Act authorizes the federal government to provide aid to state and local governments in the form of individual, public, or hazard mitigation assistance.



Texas • Louisiana • Florida  
Mississippi-Alabama

Alternatively, the Oil Pollution Act supports the federal government's ability to ensure that responsible parties compensate for damages that result from an oil spill, from natural resource impacts to injuries to public health or welfare. Read the one-pager [here](#).

The team hosted two more seminars as a part of their collaborative workshop series in partnership with the Gulf of Mexico Research Initiative and the National Academies of Sciences, Engineering, and Medicine Gulf Research Program. *Setting Priorities for Health, Social,*

*and Economic Disruptions from Spills in Alaska: Learning from the Past, Preparing for the Future* took place from February 20-21 in Anchorage, Alaska. This workshop focused on research and lessons learned from the Exxon Valdez oil spill, Alaska's current state of oil spill preparedness, and how to prepare local communities for an upcoming spill or other type of disaster. *Mid-Atlantic Oil Spill: Are We Ready?* took place on March 29 in Virginia Beach, Virginia. This workshop brought together coastal community members, emergency responders, and health and environment experts to discuss the potential impacts of a mid-Atlantic oil spill and identify priorities to address key issues. More information on this collaborative workshop series is available [here](#).

Image Credit: Gulf of Mexico Sea Grant Oil Spill Science Outreach Program.

The team hosted a Gulf of Mexico Sea Grant Oil Spill Science Outreach Program seminar on February 28 in Baton Rouge, Louisiana on *Birds and Oil Spills*. This seminar was presented in partnership with the U.S. Fish and Wildlife Service and shared information on the impacts of oil spills on birds, both marsh-dwelling and migratory species, including toxicological effects and response, rehabilitation, and monitoring efforts. The seminar featured presentations by Kendal Harr from URIKA, LLC; Sabrina Taylor from the Louisiana State University AgCenter; Jessica Henkel from the Gulf Coast Ecosystem Restoration Council; Rhonda Murgatroyd from Wildlife Response Services, LLC; Laird Henkel from the California Department of Fish and Wildlife; Michael Seymour from the Louisiana Department of Wildlife and Fisheries; Gina Muhs Saizan and Eva Diana Windhoffer from the Louisiana Oil Spill Coordinator's Office; and Jeff Gleason from the U.S. Fish and Wildlife Service's Migratory Bird Program and Gulf Restoration Office. A summary of this seminar, including recordings of the presentations, is available [here](#).

The team has announced Save the Dates for two additional upcoming seminars. *Improving Oil Spill Preparedness and Response in Santa Barbara* will take place on April 5 in Santa Barbara, California. *How Does Science Guide Oil Spill Response? Collaborating Before, During, and After a Spill*, rescheduled from January 24, will take place on April 24 in St. Petersburg, Florida. More information on all of the Gulf of Mexico Sea Grant Oil Spill Science Outreach team's seminars, including summaries, recordings, and registration details for upcoming presentations, is available [here](#).



Screenscope Film's *Dispatches from the Gulf 2* was selected as the winner of the Environment Award at the 2019 [International Ocean Film Festival](#) (IOFF), which took place from March 7-10, 2019 in San Francisco, California. The IOFF is a world-renowned ocean-themed film festival, featuring films from all over the world focused on ocean adventure, science, marine life, sports, and coastal cultures. *Dispatches from the Gulf 2* was screened at the festival on March 8, 2019. GoMRI congratulates the Screenscope team on receiving this award!



Photo Credit: CC 4.0, no changes made.

## Note from the Research Board Chair

Dr. Rita Colwell, University of Maryland and Johns Hopkins University

The Gulf of Mexico Research Initiative (GoMRI), led by the GoMRI Research Board, has emphasized the importance of communication and outreach to share GoMRI science with audiences beyond the scientific community. The initiative has accomplished this through the GoMRI website, newsletters, and social media; external partnerships with the Smithsonian Ocean Portal, Screenscope Films, and the Gulf of Mexico Sea Grant Oil Spill Science Outreach Program; and education and outreach programs and activities led by the research consortia and individual investigators funded by GoMRI.

As GoMRI will complete its mission in 2020, there are several ongoing efforts to archive GoMRI-funded education and outreach products and provide resources to keep these available beyond the end of the program. Also, work is being done to provide a synthesis of what has been learned and to disseminate the findings as outreach and education-related lessons learned and as useful resources of value to educators, the general public, outreach specialists, and others outside of the scientific community. Thus, GoMRI initiated an education and outreach archive of consortia-produced resource materials and products that will be available on the [GoMRI Education site](#) for several years after the program ends. Consortia outreach coordinators recently shared lessons learned and their recommendations for integrating outreach into research projects and programs in an article published in the August 2018 issue of the Association for the Sciences of Limnology and Oceanography *Limnology and Oceanography Bulletin*, called *Recommendations for Science Outreach Program Development: Perspectives from the Gulf of Mexico Research Initiative Consortia*. An announcement of this publication, a GoMRI outreach legacy product, was made in the [summer 2018 GoMRI newsletter](#).

The GoMRI Research Board is pleased to announce that the GoMRI outreach coordinators partnered to produce a special issue of the National Marine Educators Association (NMEA) journal, *Current: The Journal of Marine Education*, recently published and available on the [GoMRI website](#) and the [Current website](#) to NMEA members. *Current* is a peer-reviewed journal that features “in-depth articles and activities relating to all aspects of the world of water.” The GoMRI-sponsored special issue, *Special Issue Featuring the Gulf of Mexico Research Initiative: Research Resulting from the 2010 Deepwater Horizon Oil Spill*, provides an excellent synthesis and legacy product showcasing scientific highlights of GoMRI-funded research and a collection of activities that educators can use in their classrooms to incorporate oil spill science. More information about the content and goals of the issue is available on page 1 of this newsletter. The GoMRI Research Board is very proud of the accomplishments of its outreach efforts, and I encourage you to read and share this special issue.



The [Center for the Integrated Modeling and Analysis of the Gulf Ecosystem \(C-IMAGE\)](#) recently released a video summarizing their OneGulf Expeditions. C-IMAGE is working to understand the impacts of the Deepwater Horizon oil spill by studying fish and seafloor sediments, and by learning from the IXTOC 1 oil spill which occurred in the Gulf of Mexico off the coast of Campeche, Mexico in 1979. The OneGulf Expeditions are a collaborative effort between the United States (through C-IMAGE), Mexico, and Cuba. The video, which was written, created, and narrated by C-IMAGE program assistant Ben Prueitt, is available on the C-IMAGE YouTube channel [here](#).

The [Relationships of Effects of Cardiac Outcomes in Fish for Validation of Ecological Risk \(RECOVER\)](#) consortium recently shared a description of “density gradient columns” on their Facebook page, a technology they use to study both mahi-mahi and red drum embryos. The technology is used to measure the density of organisms that are too small to measure with standard scales. In a follow-up post, RECOVER shared a video of what it looks like when RECOVER researcher Dr. Christina Pasparakis introduces mahi-mahi embryos into the density gradient column. Check out what happens on the RECOVER Facebook page [here](#)!

Don't forget to check out GoMRI's YouTube Channel [here](#).



## Science Corner

Published Science Highlights from the GoMRI Program

### [Study Reveals Corals' Cellular Response to Oil and Dispersant Exposure](#)

D.M. DeLeo, S. Herrera, S.D. Lengyel, A.M. Quattrini, R.J. Kulathinal, E.E. Cordes  
Molecular Ecology, 2018, Vol. 27(20), pgs. 4066-4077

### [Study Estimates Larger-Than-Expected Oil Footprint Near the Damaged Taylor Energy Platform](#)

S. Sun, C. Hu, O. Garcia-Pineda, V. Kourafalou, M. Le Henaff, Y. Androulidakis  
Marine Pollution Bulletin, 2018, Vol. 136, pgs. 141-151

### [Study Finds Low Salinity May Mitigate Oil and Dispersant Effects on Oysters](#)

M. Schrandt, S. Powers, F.S. Rikard, W. Thongda, E. Peatman  
PLoS ONE, 2018, Vol. 13(9), e0203485

### [Ten-Year Assessment Study Finds Increased Vulnerability of Deep Sea Fishes to Oil Exposure](#)

I.C. Romero, T. Sutton, B. Carr, E. Quintana-Rizzo, S.W. Ross, D.J. Hollander, J.J. Torres  
Environmental Science and Technology, 2018, Vol. 52(19), pgs. 10985-10996

### [Study Develops Algorithm to Detect Surface Oil and Estimate Thickness](#)

S. Sun, C. Hu  
IEEE Transactions on Geoscience and Remote Sensing, 2018, pgs. 1-16, 10.1109/TGRS.2018.2876091

### [Study Identifies Positive Influencers on Marsh Infauna Recovery After Oiling](#)

J.W. Fleeger, M.R. Riggio, I.A. Mendelsohn, Q. Lin, D.R. Deis, D.S. Johnson, K.R. Carman, S.A. Graham, S. Zengel, A. Hou  
Estuaries and Coasts, 2019, Vol. 42(1), pgs. 204-217

### [Study Simulates How Large and Small Circulations Influence Sinking Marine Particles](#)

G. Liu, A. Bracco, U. Passow  
Elementa: Science of the Anthropocene, 2018, Vol. 6(1), pg. 36

### [Study Simulates Effectiveness of Chemical Dispersant Applications](#)

B. Chen, D. Yang, C. Meneveau, M. Chamecki  
Physical Review Fluids, 2018, Vol. 3(8), 083801

### [Study Develops Oil Spill Outflow Calculator for Improved Oil Spill Forecasts](#)

A.L. Dissanayake, J. Gros, S.A. Socolofsky  
Environmental Fluid Mechanics, 2018, Vol. 18(5), pgs. 1167-1202

### [Study Detects Drifter Droque Loss and Produces More Accurate Surface Ocean Transport Data](#)

A.C. Haza, E. D'Asaro, H. Chang, S. Chen, M. Curcic, C. Guigand, H.S. Huntley, G. Jacobs, G. Novelli, T.M. Ozgokmen, A.C. Poje, E. Ryan, A. Shcherbina  
Journal of Atmospheric and Oceanic Technology, 2018, doi.org/10.1175/JTECH-D-17-0143.1

### [Study Finds Razor Clams Help Remove Oil from Surface Sediments](#)

P.L. Klerks, A. Kascak, A.M. Cazan, N. Deb Adhikary, A. Chistoserdov, A. Shaik, S. Osman, F.R. Louka  
Archives of Environmental Contamination and Toxicology, 2018, Vol. 75(2), pgs. 306-315

To see all GoMRI publications, please visit the [GoMRI Publication Database](#).



Smithsonian Ocean Portal recently released a new article in partnership with the [Consortium for Advanced Research on the Transport of Hydrocarbon in the Environment \(CARTHE\)](#) called *Five Methods for Tracking the Ocean's Motion*. After the Deepwater Horizon oil spill, responders needed to know where the oil was going in order to clean it up. Ocean currents in large part determine oil transport and fate, so understanding how those currents move can be a very helpful tool for researchers and responders in the event of an oil spill. In the article, Ocean Portal summarizes five technologies and techniques CARTHE researchers use in their experiments to learn about ocean currents in the Gulf of Mexico, including GPS drifters, acoustic doppler current profilers, planes, aerostats, and drones. Visit the article on the Ocean Portal site [here](#) to learn more.

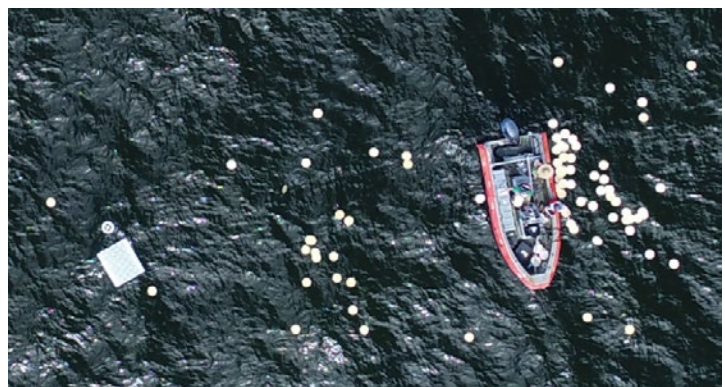


Photo Caption: CARTHE researchers release bambo plates during one of their experiments and track their movement using drones. Photo Credit: CARTHE.

## Guest Frequently Asked Questions

*Dr. Lisa DiPinto, senior scientist with the Office of Response and Restoration (OR&R) at the National Oceanic and Atmospheric Administration (NOAA), answered a few questions about her position and her thoughts on the Gulf of Mexico Research Initiative's (GoMRI) legacy.*

**Question:** Please tell us about your role as senior scientist with OR&R at NOAA. (To learn more about NOAA OR&R, please visit the Guest FAQs with director Dave Westerholm in the summer 2016 issue of the GoMRI Quarterly Newsletter [here](#)).

**Answer:** I think I have one of the best jobs at NOAA! In a nutshell, my role is to improve NOAA's Office of Response and Restoration's pollution response and assessment methods and tools through advancing science. My job involves understanding, coordinating, and communicating advances in science and methodologies within OR&R's divisions and programs. The divisions include Emergency Response, Assessment and Restoration, Marine Debris, and Disaster Response. Each is specialized to address specific aspects of marine pollution. We also coordinate with external partners; other federal agencies, nongovernmental organizations, academia, and industry partners. Specifically, I develop and implement multi-partner research projects. For example, I'm currently focusing on advancing what we learned from the six years of scientific studies conducted as part of the Deepwater Horizon response and associated Natural Resource Damage Assessment. See for example: <https://response.restoration.noaa.gov/deepwater-horizon-oil-spill/noaa-studies-documenting-impacts-deepwater-horizon-oil-spill.html>. Many of these projects advance our ability to characterize oil in the environment. By using remote sensing tools such as satellites, drones, Autonomous Underwater Vehicles (AUVs), and Remotely Operated Vehicles (ROVs), we can collect data faster and more cost-effectively. It also grants us access to areas of the ocean and sensitive habitats that would otherwise be much more difficult to reach or could cause additional environmental harm to evaluate (e.g., fragile marsh habitat). Other projects ask important questions and advance our understanding of how oil affects natural resources. How does oil impact sensitive early life stages of fish and invertebrates in the shallow surface mixing layer? How are surface breathing animals, like marine mammals, exposed to oil through inhalation and aspiration in surface oil slicks? These are the kinds of questions we try to answer through our research. We are also working to advance our ability to predict and track the transport of oil in the environment. This helps us understand how best to clean it up, including in sensitive habitats. All of this work is done through partnerships, by working with internal and external experts to leverage funding and resources for research projects, publications, and outreach opportunities. Ultimately, we strive to transition the research into practice in the constantly evolving world of science.

**Question:** From your perspective as a scientist with OR&R, what do you think, or what would you like, the legacy of GoMRI to be?

**Answer:** I think that there are several important legacies from GoMRI. First is the science: GoMRI-funded research has significantly advanced our understanding of ecology and of oil spill effects on the ecologically and economically valuable resources of the Gulf of Mexico and beyond. This infusion of data, advanced technology, enhanced modeling, and new ways of studying and understanding the environment will serve as a fundamental new scientific foundation that informs future responses and assessments. This information allows us to get to the oil faster, clean up the oil more efficiently, and as such, the environmental harm following oil pollution events will be reduced as our methods for finding and responding to oil spills improve. This science also improves our ability to enhance recovery for affected resources. This is made possible through GoMRI research. Beyond the science, I see a legacy of the new cadre of trained oil spill researchers that would not have otherwise gotten engaged in this important area of research. There are now hundreds of scientists and associated laboratories that are able to continue this important work, and many who will continue to advance oil spill science beyond the lifespan of GoMRI. There is new awareness and appreciation of oil spill-related science due to the extensive efforts of GoMRI's outreach work, and through the myriad partnerships among researchers and between researchers and their communities. These partnerships will result in better informed and more efficient response, assessment, and restoration for future events.

# 2019 Gulf of Mexico Oil Spill and Ecosystem Science Conference:

## Oil Spill Science, Response, and Restoration Communities Convene in New Orleans, Louisiana

Members of the oil spill science, response, and restoration communities gathered in New Orleans, Louisiana from February 4-7 for the [2019 Gulf of Mexico Oil Spill and Ecosystem Science \(GoMOSES\) conference](#). Reflecting the GoMOSES conference's evolution to connect science to application, response, and restoration, this year's theme was: *Minding the Gaps – Research Priorities for Response, Restoration, and Resilience*. More than 800 attendees from 11 countries participated in 23 scientific and two poster sessions, including 245 oral presentations (49 from students) and 235 posters (over 100 from students). This year's conference was sponsored and supported by 18 partners, including major support from the Gulf of Mexico Research Initiative (GoMRI), the National Academies of Sciences, Engineering, and Medicine Gulf Research Program, the National Oceanic and Atmospheric Administration, the Bureau of Ocean Energy Management, the Harte Research Institute for Gulf of Mexico Studies, the Gulf of Mexico University Research Collaborative, and the Gulf Sea Grant Programs. Throughout the week, GoMOSES also paid tribute to Chris Elfring, executive director of the Gulf Research Program, who passed away in 2018. Dr. Elfring served on the GoMOSES Executive Committee, where she was instrumental in advocating for an interdisciplinary and holistic focus for the conference.

This thematic evolution of the GoMOSES conference was also reflected in the topic of the opening plenary, *Changing Focus: From Oil Spill Response to Restoration*. Rita Colwell, chair of the GoMRI Research Board, opened the conference, followed by keynote presentations by Robert Spies, chief scientist of the Exxon Valdez Oil Spill Trustee Council (*A Legacy of Knowledge*) and Buck Sutter, deputy executive director of the Gulf Coast Ecosystem Restoration Council (*Bridging the Gap of Gulf Science and Decision-Makers*). A panel moderated by Chuck Wilson, GoMRI's Chief Scientific Officer, featuring Alyssa Dausman, vice president for Science at the Water Institute of the Gulf; Pamela Plotkin, director of the Texas Sea Grant College

Program; and Evonne Tang, associate executive director of the Gulf Research Program, shared their perspectives on *The Next Phase in Gulf Research*. More information on the opening plenary, including speaker biographies, is available [here](#).

The conference concluded with the closing plenary, during which the winners of the 2019 James D. Watkins Student Award for Excellence in Research were announced. The Watkins Award is co-sponsored by the Consortium for Ocean Leadership and the National Academies of Sciences, Engineering, and Medicine Gulf Research Program, and the goal of the award is to recognize outstanding student oral presentations in order to cultivate the next generation of scientists and encourage excitement in the students for presenting their work. This year's recipients are Alexander Freddo (Texas A&M University), Lindsay Jasperse (University of Connecticut), Alexis Khursigara (University of Texas at Austin), Kelli Mullane (Scripps Institution of Oceanography), and Kendall Valentine (Louisiana State University). The closing plenary also featured the *Gulf of Mexico University Research Collaborative's Presentation of the Wes Tunnell Lifetime Recognition for Gulf Science and Conservation*, awarded to Chris D'Elia from Louisiana State University. The award was created in honor of Wes Tunnell, who passed away in 2018. Paul Montagna from Texas A&M University, Steve Murawski from the University of South Florida, and Larry McKinney from the Harte Research Institute shared tributes to Dr. Tunnell and highlighted some of his many scientific achievements and contributions to Gulf science. Kelly Lucas from the Thad Cochran Marine Aquaculture Center presented the award to Dr. D'Elia. More information on the closing plenary is available [here](#).

More information on this year's conference can be found [here](#). An official report will be posted to the GoMOSES website soon. Save the date for next year's GoMOSES conference, which will take place from February 3-6, 2020 in Tampa, Florida!



## Opportunity - Call for Abstracts: 2020 International Oil Spill Conference

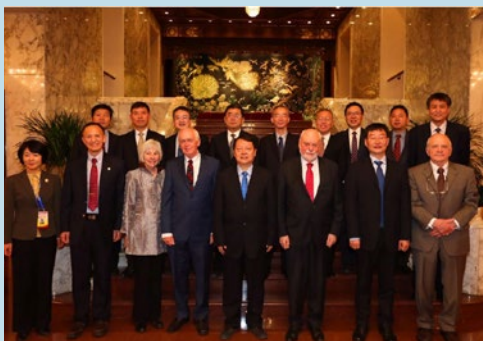
The 2020 [International Oil Spill Conference](#) (IOSC) will take place from May 11-14, 2020, in New Orleans, Louisiana, and the call for papers and posters is now open. [Submissions](#) will be accepted until May 15, 2019, and the Gulf of Mexico Research Initiative (GoMRI) Research Board encourages the community to submit abstracts and participate. Discounted registration rates will be available for academic, student, and government participants, and there may be opportunities for needs-based scholarships. The IOSC provides a vital forum for professionals from the international oil spill response community, private sector, government, and non-governmental organizations to address challenges with sound science, practical innovation, social engineering, global research, and imagination. Different than traditional scientific conferences, IOSC is specifically interested in presentations that are relevant to the oil spill preparedness, response, and restoration communities. Additionally, GoMRI will host a special session at the conference featuring GoMRI's Synthesis and Legacy efforts. For more information, please visit the GoMRI website [here](#).

## GoMRI Newsmakers

Dr. Antonietta Quigg, principal investigator of the [Aggregation and Degradation of Dispersants and Oil by Microbial Exopolymers](#) (ADDOMEx) consortium, and Associate Vice President for Research and Graduate Studies and professor of biological oceanography in the Department of Oceanography at Texas A&M University at Galveston, has been honored with the Regents Professor Award of Marine Biology and Oceanography by Texas A&M University. The Regents Professor Award is given to "individuals who have provided exemplary service to their university, agency, health science center, the community, or the state of Texas," both nationally and internationally. [GoMRI congratulates](#) Dr. Quigg for receiving this honor.

Dr. Peter Brewer, Gulf of Mexico Research Initiative (GoMRI) Research Board member and senior scientist at the Monterey Bay Aquarium Research Institute, was awarded the China International Science and Technology Cooperation Award during a ceremony in Beijing, China on January 8, 2019. The award represents the highest honor China bestows on foreign scientists for their contributions to China's science and technology development. Dr. Brewer has invited Chinese scientists on American deep-sea exploration cruises and has also trained several Chinese Ph.D. students over many years. For these efforts, Dr. Brewer [also received](#) the Award for International Scientific Cooperation of the Chinese Academy of Sciences in 2018, which was featured in the winter 2018 GoMRI Quarterly Newsletter [here](#). GoMRI [congratulates](#) Dr. Brewer on these honors and recognitions of his many contributions to the scientific community.

Dr. Joseph Katz, a William F. Ward Distinguished Professor at Johns Hopkins University, director of the University's Center for Environmental and Applied Fluid Mechanics, and co-principal investigator of the [Dispersion Research on Oil: Physics and Plankton Studies](#) (DROPPS) consortium, was recently elected into the [National Academy of Engineering](#), among the highest professional distinctions awarded to an engineer. Election into the Academy honors those who have made contributions to engineering research, practice, or education, and to the pioneering of new and developing fields of technology. Dr. Katz is recognized for his contributions to the development of optical methods in experimental fluid mechanics for turbomachinery, cavitation, turbulence, and environmental flows. He will be inducted during a formal ceremony in Washington, D.C. in October 2019. The GoMRI community [congratulates](#) Dr. Katz on this recognition.



*Photo Caption: Dr. Peter Brewer and his wife Hilary (front row, third and fourth from the left) attend a banquet for awardees of the China International Science and Technology Cooperation Award in Beijing, China. Photo Credit: Peter Brewer.*

# GULF<sup>OF</sup> MEXICO



## RESEARCH INITIATIVE SYNTHESIS & LEGACY

Contributing Author: Callan Yanoff

As we approach 2020 and the conclusion of GoMRI's investment in research, the final Synthesis and Legacy workshops are being planned and executed. The contributions of the Synthesis Core Areas - big and small - help cement GoMRI's legacy.

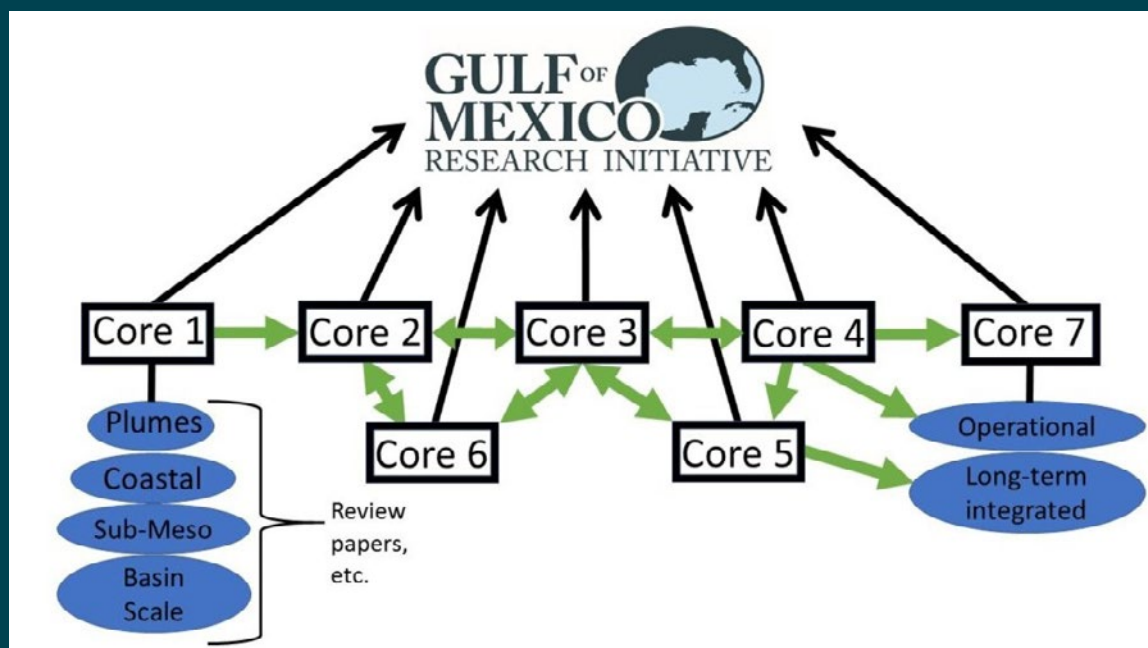
The below diagram illustrates the interrelated nature of the GoMRI Synthesis Core Areas. The green arrows indicate critical lines of communication. Each Core Area has multiple subtopics, as shown here in the Core Area 1 example. The Core Area 8 advisory group will play a unique and crucial role

throughout all the Core Areas promoting the effective application and communication of GoMRI-funded science between the research and user communities. Products from the subtopics, designed for a scientific audience within that specific field, will help inform a product for each Core Area that is written for scientific audiences in all fields. Eventually, all Core Area products will inform Synthesis products for the general public.

To continue capturing GoMRI's scientific discoveries and results through new products, cross-consortia workshops will go through 2019. In the coming summer months, Synthesis workshops will be held on the following topics:

- **Defining the Gulf of Mexico Microbiome (Core Area 6)** will be held in Washington, D.C. from April 9-10, 2019. In partnership with the American Academy of Microbiology and the American Geophysical Union, this joint colloquium will explore and synthesize research results from GoMRI and other relevant post-Deepwater Horizon funded microbiology and meta-omics efforts to advance the fields of environmental microbiology and ocean science. Discussion will also include how novel findings can be used to improve planning, preparedness, response, and recovery in future oil spills.
- **Fate of Oil and Weathering: Biological and Physical-chemical Degradation (Core Area 2)** is being held from June 12-14, 2019 in Washington, D.C. This multi-day workshop will look to synthesize findings and identify a unifying message across many Core Area 2 subtopics, specifically: analytical chemistry; use of genomics and proteomics; use of molecular biology tools to ascertain and measure response of marine organisms other than microbes; physical fate and natural processes; standardization of WAFs and CEWAFs methods; photochemical reactions at sea and on shoreline; microbial degradation in all sectors of the ecosystem; and marine oil snow sedimentation and flocculent accumulation (MOSSFA).

For more information about how GoMRI's Synthesis and Legacy effort is being put into motion, visit [here](#).





# GoMRI Scholars in Action

GoMRI recognizes the graduate students whose vital research contributes to improving understanding about the damage, response, and recovery from the Deepwater Horizon oil spill. Candidates for the GoMRI Scholars program must be graduate students who have participated in a GoMRI-funded project for at least one year, whose research is primarily funded by GoMRI, and who are working on a dissertation or thesis based on GoMRI-funded science.

**[Learn more about the Scholars' research and career paths on the GoMRI website!](#)**



Photo Credit: Alexis Khursigara

[Grad Student Khursigara Examines How Oil Exposure Alters Fish Behavior](#)



Photo Credit: Diana Udel

[Grad Student Lodise Deconstructs Drifter Velocities to Understand How Wind Influences Currents](#)

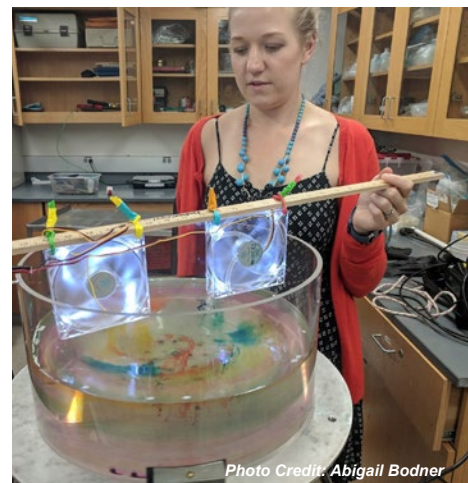


Photo Credit: Abigail Bodner

[Grad Student Pearson Resolves Statistical Conflict in Submesoscale Ocean Processes](#)

## Keep up with the GoMRI-Funded Consortia on Social Media

**[ACER](#)**: [Facebook](#), [Instagram](#)

**[ADDOMEx](#)**: [Facebook](#), [Twitter](#), [Instagram](#)

**[CARMMHA](#)**: [Facebook](#)

**[CARTHE](#)**: [Facebook](#), [Twitter](#)

**[C-IMAGE](#)**: [Facebook](#), [Twitter](#)

**[CONCORDE](#)**: [Facebook](#), [Twitter](#), [Instagram](#)

**[CRGC](#)**: [Facebook](#)

**[CSOMIO](#)**: [Facebook](#), [Twitter](#)

**[CWC](#)**: [Facebook](#), [Instagram](#)

**[DEEPEND](#)**: [Facebook](#), [Twitter](#), [Instagram](#)

**[DROPPS](#)**: [Facebook](#), [Twitter](#)

**[ECOGIG](#)**: [Facebook](#), [Twitter](#), [Instagram](#)

**[LADC-GEMM](#)**: [Facebook](#)

**[RECOVER](#)**: [Facebook](#), [Twitter](#)

The Center for the Integrated Modeling and Analysis of the Gulf Ecosystem (C-IMAGE) has posted several new episodes of their podcast *The Loop*. Check out the new episodes [here!](#)

The RFP-V project [Deep-Sea Risk Assessment and Species Sensitivity to WAF, CEWAF, and Dispersant \(D-TOX\)](#), led by Anthony Knap from Texas A&M University, has a Facebook page. The project team includes co-principal investigators Tamara Frank, Abigail Renegar, and Bernhard Riegl from Nova Southeastern University, post-doctoral researcher Gopal Bera from Texas A&M University, and graduate research assistant and project manager Nick Turner from Nova Southeastern University. The goal of the D-TOX project is to understand how oil impacts deep-sea organisms; learn more about the project [here](#), and visit their Facebook page [here](#).

Check out the [Gulf of Mexico Research Initiative Information and Data Cooperative's \(GRIIDC\)](#) recent stories:

[GRIIDC Teams Up with GoMRI and Sea Grant at Clean Gulf Conference](#)

[GRIIDC Welcomes Dr. Udonna Ndu to the Team!](#)

# GoMRI Researcher Interview with Dr. Srinivasa Raghavan

Dr. Srinivasa Raghavan from the University of Maryland's Department of Chemical and Biomolecular Engineering answered a few questions about his work as a co-principal investigator with the [Consortium for the Molecular Engineering of Dispersant Systems \(C-MEDS\)](#) and his RFP-V project, *Molecular Engineering of Food-Grade Dispersants as Highly Efficient and Safe Materials for the Treatment of Oil Spills*.

## 1) What is your background and how did you get involved with this kind of work?

My background is in the field of colloid science, which nowadays is synonymous with “nanoscience.” This field deals with materials such as emulsions. When an oil spill is cleared, oil droplets get suspended in the seawater, thereby creating an oil-in-water emulsion. To stabilize this emulsion, it is necessary to have certain molecules, called surfactants, on the surfaces of the droplets.

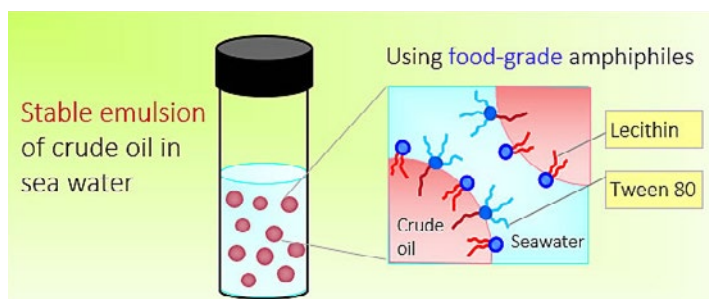
I got into the area of oil spills when Professor Vijay John from Tulane University first created the C-MEDS consortium to address the oil spill that arose in the Gulf of Mexico in 2010. Professor John was a true visionary in establishing C-MEDS, which was a consortium of 40 key researchers in the field. He knew of my expertise in colloid science, which is why I was included in C-MEDS.

## 2) Can you tell us a bit more about your involvement with C-MEDS?

In working with C-MEDS, we all learned about the current materials used to stabilize oil spills, called dispersants. We learned that current dispersants were deemed to be somewhat toxic, both to aquatic life as well as to humans who came in contact with the materials. This motivated my group to develop an alternative dispersant that was based entirely on food-grade molecules, which would then be non-toxic. We collaborated with Professor John and succeeded in creating a food-grade dispersant that was able to stabilize emulsions of crude oil in seawater. This was our principal finding, and it was published in an [article in 2014](#) in the journal *Langmuir* (read more on the GoMRI website [here](#)). To our knowledge, this was the first ever example of a food-grade dispersant.

## 3) What is the food-grade dispersant made out of?

The key components are two molecules. One is lecithin, which is a natural component (‘lipid’) extracted from soybeans. Soy lecithin is widely used in many food products. One of these is chocolate: if you look at the list of ingredients on chocolate products, you will likely find soy lecithin listed. The second molecule is called Tween 80, and it is also used in many food products, notably ice cream. According to one study, which we cited in our paper, the average person in the U.S. consumes between 12 and 111 milligrams (mg) of this material every day.



*Photo Caption: Dr. Raghavan and his team created a food-grade dispersant out of lecithin and Tween 80 which successfully stabilizes emulsions of crude oil in seawater. Soy lecithin is commonly found in chocolate, and Tween 80 is commonly used in ice cream. Figure Credit: Srinivasa Raghavan.*

## 4) Please tell us about your RFP-V research project, *Molecular Engineering of Food-Grade Dispersants as Highly Efficient and Safe Materials for the Treatment of Oil Spills*. What are the goals of your project?

Our initial exciting results from C-MEDS provided the backbone for our RFP-V project. In this project, we have attempted “molecular engineering” of the food-grade dispersant that we had previously created. For this project, we formed a team of four researchers: myself, Professor John, Professor Alon McCormick (University of Minnesota), and Professor Geoff Bothun (University of Rhode Island).

The idea of “molecular engineering” is to use scientific principles to select the right molecules (in the right proportions) that will give us the best dispersant. Note that the dispersant disperses the oil



A good dispersant converts the oil slick into many small oil droplets that are suspended in the water.

A poor dispersant has no effect on the oil slick, which remains as a thick film on the water surface.

*Photo Credit: Srinivasa Raghavan.*

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slick into small droplets, which then get carried below the ocean surface, where they get biodegraded by bacteria in the ocean. The more efficient the dispersant, less of it will be needed to disperse a large oil slick. This is one metric we care about. By creating efficient, food-grade dispersants, we hope to provide a viable alternative to the current dispersants used by industry.

## 5) What are some of the most significant or exciting findings so far in your GoMRI-funded research?

The most exciting findings from our RFP-V project fall into two categories. First, we have discovered that dispersion and emulsification are related, but *not* the same process. There are subtle, but important differences. We are trying to outline these differences and describe them to the scientific community. Our results will probably come as a surprise to many scientists. If we can explain these differences, it could be a big scientific achievement. Second, we have been studying the process by which bacteria biodegrade crude oil that is dispersed by our food-grade dispersant. In this regard, we have made many surprising discoveries, one of which is that the bacteria can coat oil droplets and form a biofilm. We are looking forward to publishing our work on the above topics this year.

More information on Dr. Raghavan's GoMRI-funded research is available on the GoMRI website [here](#), [here](#), and [here](#). Please also visit Dr. Raghavan's laboratory website [here](#).

## Education Spotlight



**The Consortium for Resilient Gulf Communities (CRGC)** formed after the 2010 Deepwater Horizon oil spill, is a research, outreach, and training program aimed at assessing the social, economic, and public health impacts on communities in the Gulf of Mexico.

Over the past three years, more than 40 students have earned undergraduate, master's, and doctoral degrees while conducting hands-on research alongside CRGC's diverse professional staff. Students analyze and manage data, review existing research, help develop new tools, present at conferences, and author peer-reviewed papers. They also train community health workers, conduct surveys, and otherwise engage with local communities that were affected by the oil spill. The ultimate goal is to generate actionable information to help communities become more resilient, so they are better prepared for and can recover quickly from a future oil spill, hurricane, or other disaster.

Funded by the Gulf of Mexico Research Initiative (GoMRI), CRGC offers a unique training environment that emphasizes transdisciplinary research methods and best practices. Because the impacts of the disaster are overlapping and interdependent, no single discipline has all the necessary expertise to conduct this type of research. CRGC also uses an adaptive systems approach to understanding community resilience that is difficult to replicate in a traditional discipline-focused academic environment. In short, CRGC is training the next generation of leaders and experts in how to build community resilience.

What type of work do students contribute?	Who participated?
<ul style="list-style-type: none"> <li>Reviewing scientific literature</li> <li>Analyzing and managing data</li> <li>Training community health workers</li> <li>Presenting at conferences and authoring peer-reviewed papers</li> <li>Developing new tools</li> </ul>	<ul style="list-style-type: none"> <li>Louisiana State University</li> <li>Pardee RAND Graduate School</li> <li>Tulane University</li> <li>University of South Alabama</li> </ul>

44 students

The [Consortium for Resilient Gulf Communities](#) (CRGC), one of the consortia funded by the Gulf of Mexico Research Initiative, aims to “assess and address the social, economic, and public health impacts of the 2010 Deepwater Horizon oil spill.” One of CRGC’s broader goals is to prepare graduate students to be the next leaders in community resilience. Graduate students with CRGC are trained utilizing adaptive systems and transdisciplinary approaches. Over 40 students have worked with CRGC, from Louisiana State University, Pardee RAND Graduate School, Tulane University, and the University of South Alabama. Recently, CRGC published a two-page flier summarizing the goals of their student education initiatives and highlighting some of the recent efforts by CRGC graduate students. Be sure to check out the flier on the CRGC website [here](#). For more information on CRGC, including additional two-page fliers on their program and their adaptive systems approach, please visit the CRGC Resources page [here](#).

The Experiential Education and Learning (ExEL) Program at Nova Southeastern University (NSU) provides undergraduate students opportunities to explore careers and activities outside of the classroom to help them reach their academic and professional goals. Through ExEL, students can participate in faculty-mentored research, experiential coursework beyond the classroom, internships, community engagement and volunteering, and study abroad. The program includes an Early Immersion Program through which students can learn about professions by participating in hands-on activities and experiences and interacting with professionals in their career of interest. In October 2018, Dr. Abigail Renegar and her lab participated in the Early Immersion Program, hosting undergraduate biology students and talking to them about her GoMRI-funded RFP-VI project [Coral-Tox: A Species-Sensitivity Assessment of Petroleum Hydrocarbon Toxicity to Scleractinian Corals](#). More information about NSU’s ExEL and Early Immersion Programs can be found [here](#).

(Top) Image Credit: Consortium for Resilient Gulf Communities. (Right): Nova Southeastern University (NSU) undergraduate students participate in the Early Immersion Program, a part of the Experiential Education and Learning Program at NSU, visiting Dr. Abigail Renegar’s lab and learning about the Coral-Tox project. Photo Credits: Melissa Dore, NSU.

