

## 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:

**Gulf of Mexico Oil Spill and  
Ecosystem Science Conference**

February 1-4, 2016  
Tampa, Florida

Photo Credit: C-IMAGE.



## Community Reflects on Fifth Anniversary of Deepwater Horizon

It has been five years since the Deepwater Horizon explosion and oil spill, which began on April 20, 2010 and lasted for 87 days. The Gulf of Mexico Research Initiative was created in response to the disaster, to help researchers study the impacts of the oil on the ecosystem, learn new ways to mitigate oil in the environment, and understand how to be better prepared for a similar event in the future. Several media outlets highlighted the anniversary to discuss what has been learned and how the outcomes of the research can be applied.

The GoMRI website featured a three-part series, focused on how GoMRI research is contributing to oil spill response. The [first article](#) in the series discussed how research on oil transport helps to inform spill response. One of the most critical components to rapid response to oil spills is knowing where the oil is and what direction it is moving in, information that is being researched and tracked by GoMRI scientists. Communications between the scientists and emergency responders continues to improve, making response efforts quicker and more effective. The [second article](#) in the series highlighted the use of dispersant in mitigating oil impacts on the environment. The use of dispersant is still being studied to understand its impacts and when and where it can be used in oil spill response, if it should be used at all. The [third article](#) discussed oil biodegradation, monitoring, and its impacts on the ecosystem. In some cases, microbes or other organisms living in the ecosystem actively contribute to the degradation of oil particles. Other research focuses on commercial and recreational fish species that have been affected by oil and may impact human health. GoMRI research is contributing to a broader understanding of the Gulf of Mexico ecosystem as a whole and how it is responding and recovering to the Deepwater Horizon oil spill. In turn, this information is becoming vital to aiding scientists and emergency responders alike to be more prepared to respond to similar events in the future.

An anniversary article in [Smithsonian Magazine](#) more broadly emphasized important research findings about the ocean that might not have otherwise been learned without the GoMRI program. Scientists from GoMRI-funded consortium [CARTHE](#) have been instrumental in learning more about ocean currents that lie at

## Keeping up with the Consortia Blogroll!

*Some of the Consortia have  
updated their blogs. Check  
them out!*

Measure. Model. Mitigate:

[\*\*CARTHE\*\*](#)

Marsh Edge-U-Cation: [\*\*CWC\*\*](#)

*In addition, some of the new  
consortia have launched their  
websites!*

[\*\*ADDOMEX\*\*](#)

[\*\*CONCORDE\*\*](#)

[\*\*DEEPEND\*\*](#)

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depths too hard to see at the surface, but too shallow to see by satellite. Their drifters are providing unprecedented information on currents all over the world, information that is vital to oil spill response. While studying the impacts of the oil on the ecosystem in the Gulf, GoMRI researchers have also discovered many new species not previously identified (for more information on this research, check out our Seven Questions Interview with Dr. Stephen Landers on page 5, and a recent publication by Dr. Landers and Dr. Sorenson in Science Corner on page 6). In addition to discovering new species, GoMRI scientists have been able to study the unique communities and organisms that live around natural oil seeps, feeding on the microbes that digest the oil (to learn more about this research, check out Caroline Johansen's research in GoMRI Scholars on page 4). And finally, GoMRI research has provided the opportunity to learn more about the bluntnose sixgill shark and the invasion of the lionfish. Smithsonian's article provides an excellent reminder that research can often be surprising and lead to unplanned but important discoveries.

Several other news outlets also posted stories acknowledging the anniversary. Many of them can be found highlighted on the [GoMRI website](#). Several of the GoMRI consortia also posted news articles or press releases, or hosted press conferences acknowledging the fifth anniversary and highlighting GoMRI science. C-IMAGE posted an article emphasizing what we know now and where they are going next. They also held a press conference; the article and a recording of the press conference can be found on their website. The [ECOGIG](#) consortium posted a series of articles on their website, featuring interviews from ECOGIG researchers and their perspectives on what has been learned since the spill five years ago.

The GoMRI community continues to learn and investigate the effects of the Deepwater Horizon accident; now five years later there is time for reflection on what has been learned, what still needs to be better understood, and how these findings can be utilized in response to future oil spills, should they occur.

## GoMRI Newsmakers

### Congratulations to the following members of the GoMRI community!

CARTHE's [Drones at the Beach video](#) was featured in the last newsletter as the Clip of the Quarter; since then that video went on to win the [Ocean 180 Video Challenge](#)! The Ocean 180 Video Challenge was created to encourage ocean scientists to share their research with the general public. Nearly 38,000 middle school students from all over the world participated in judging the videos, and [CARTHE's video](#) Drones at the Beach won first place in category one! GoMRI would like to congratulate CARTHE and everyone involved in the making of the video!



The Screenscope Films is developing "Dispatches from the Gulf" to help tell the story about the scientists involved in oil spill research and their studies to improve society's ability to understand, respond to, and mitigate the impacts of petroleum pollution and related stressors to the marine and coastal ecosystems. The film will air later this year as a new episode of the Journey to Planet Earth Series. The "Dispatches from the Gulf" trailer can be found [here](#).

In April 2015, the E/V Nautilus was diving on methane seeps in the Gulf of Mexico, an [expedition](#) for the GoMRI-funded Gulf Integrated Spill Response Consortium (GISR), when the ROV received a visit from a very inquisitive sperm whale! [Check out the incredible video here!](#)



Photo Credit: CARTHE.

## We are now on the BRIDGE!

GoMRI has partnered with the BRIDGE to help highlight education and outreach materials that can be of use to educators and the general public. The education resources are located on the [BRIDGE website](#).

### Note from the Research Board Chair

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

A founding principle for GoMRI was to make data produced from the program discoverable and available to other scientists and the general public as soon as possible. Thus, the initiative has worked to capture and archive GoMRI data through the [Gulf of Mexico Research Initiative Information and Data Cooperative \(GRIIDC\)](#), whose mission is to “ensure a data and information legacy that promotes continual scientific discovery and public awareness of the Gulf of Mexico ecosystem.”

The massive amount of data being generated is unprecedented for the Gulf of Mexico and will serve as a critical resource for scientists, decisions makers, and the public even after the program has ended.

There is also a growing national push for data archiving and availability, especially given the development of new technology to support this new open data environment. Constrained science budgets, increasingly complex problems to solve, and the growing costs of research are also helping to drive a cultural change among scientists. Interdisciplinary collaboration and shared resources are increasingly common. Data is potentially the most valuable resource increasingly being shared. Scientists from several disciplines can work from a single data set, increasing the amount of research that can be done at a reduced cost. However, an ongoing challenge exists for data consistency and continuity. Programs like GoMRI, where researchers are from diverse fields, exemplifies this challenge - if the data can be accessed, but is not in a usable format, what is the value of the data?

The science community is beginning to recognize and address this need for large, accessible, integrated data sets. Recently, [NOAA announced](#) it will be partnering with five web organizations, Amazon Web Services, Microsoft Azure, IBM, Google, and the Open Cloud Consortium through a Cooperative Research and Development Agreement (CRADA) to organize and make NOAA's data more easily accessible and usable by anyone who wants to use it.

In May 2015, the [National Academies released an RFP](#) focused on “the use of existing data collected in the Gulf of Mexico and associated coastal communities to advance the understanding of environmental conditions, ecosystem services, and community health and well-being, including community vulnerability, recovery, and resilience.” The letter of intent submission period is currently open and will close on June 15, 2015.

The American Institute for Biological Sciences (AIBS), funded by the National Science Foundation, recently convened a series of workshops focused on data, urging scientists to include their data in publications, and also working with the community to identify ways to foster the integration of complex data, ranging from genomics and phenomics all the way to ecosystem and continental scale data. The summary from the first workshop is available [here](#). The report from the second workshop expected this summer.

In May, the American Association for the Advancement of Science (AAAS) and the American Geophysical Union (AGU) held a workshop on “Reproducibility in the Field Sciences” focused on preservation and access to data used to support research publication. A primary goal of this discussion was to seek continuity across publishers in the expectation and enforcement of data support policies.

Data are critical to helping answer important research questions and make informed management and policy decisions. Access to data generated by GoMRI can make a huge difference when it comes to understanding, responding to, and mitigating future oil spills. GoMRI recognized this early on in the program's development and GRIIDC serves as an excellent example of how data integration and consistency can provide exponential added value to the research community as a whole.



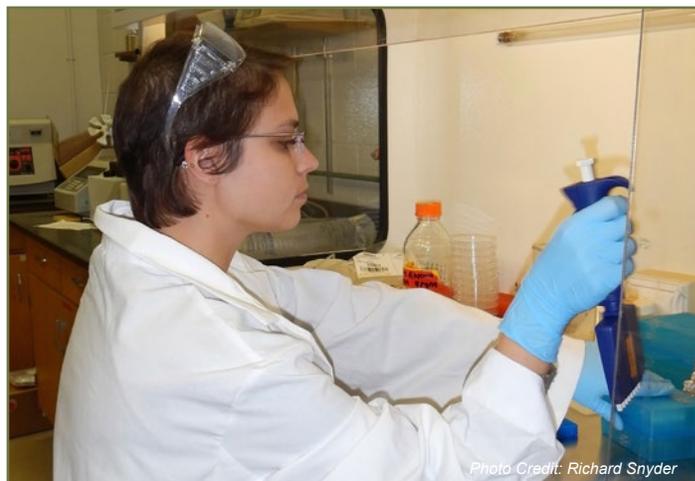
Photo Credit: [GRIIDC](#) - no changes made.

## GoMRI Scholars in Action

The Gulf of Mexico Research Initiative (GoMRI) is recognizing the graduate students whose vital research contribute to improving understanding about the damage, response, and recovery of the Deepwater Horizon oil spill. Candidates for this program must be graduate students who have participated in a GoMRI-funded project for at least one year, whose work is primarily funded by GoMRI, and who are working on a dissertation or thesis based on GoMRI-funded science.



**Caroline Johansen (ECOGIG)**  
Counts Bubbles to Understand Natural Oil Seeps



**Sarah Tominack (Deep-C)**  
Answers "What is Normal?" for the Gulf's Smallest Organisms



**Conor Smith (CARTHE)**  
Keeps Surface Currents and Disaster Response on his Radar



**Alexis Temkin (RFP-II, PI Spyropoulos)**  
Links Dispersant Component with Fat Cell Differentiation



### Women's History Month

To honor Women's History Month in March 2015, Smithsonian's Ocean Portal featured three interviews with GoMRI scientists, Lexi Temkin, Nancy Rabalais, and Uta Passow. [Click here](#) to read their stories, learn more about how they got interested in science, and what they are working on now!

# GoMRI Researcher Interview With Dr. Stephen Landers

Dr. Stephen Landers from Troy University answered a few questions about his RFP-II project, *[Analysis of Continental Shelf Meiofauna in the Northern Gulf of Mexico: Effects of the Deepwater Horizon Oil Spill Investigated During a Long-Term Community Study \(2007-Present\)](#)*.



## 1. Thank you so much for taking the time to answer our questions! Tell us a bit about your research. What are the goals of your project?

My research involves the study of meiofauna, those microscopic animals such as nematodes that crawl around between the sand grains in the ocean floor. They provide food for larger animals and are an important component of the food chain. Since they can't move very far, they are stuck in their local environment and can't crawl or swim away from pollution or any change in habitat, and thus may be good indicators of the quality of the sediment in which they live.

Our project goals were to sample sediment from multiple locations on the edge of the continental shelf, from central Louisiana to Apalachicola. From that sediment, we would look at population densities of the various meiofauna groups, we would focus on specific animals for taxonomic analysis, and we would analyze the sediment for pollutants and sediment grain characteristics, all to see if the meiofauna could tell us about the effect of the DHOS on the continental shelf habitat.

## 2. How do you collect your samples?

We are currently using a multicorer, which collects the sediment in tubes and keeps the sediment surface/seawater interface undisturbed. Most of the meiofauna are found in the top few centimeters of the sediment so this device is very helpful for our research. My lab collaborates with the NOAA/NMFS Pascagoula lab, and we cruise with them every fall to deploy the multicorer while they are doing a fishing survey.

## 3. What are you looking for in the animals to indicate they might have been impacted by the oil spill?

We are looking for changes in population densities over time as the spill gets further into the past, as well as changes in species composition in the meiofauna communities.

## 4. What are some of the most significant or exciting findings so far in your work?

Our most interesting data relate to the discovery of new species of animals and new genus records of animals for the Gulf of Mexico. This documentation will establish a record of what animals are out there, to aid in future analysis when there is another man-made or natural disaster. To date, we have discovered over 15 new species of kinorhynchs (mud dragons) and have formally described two of them, which are deposited in the Smithsonian Institution (visit Science Corner on page 6 for the link to this publication). More species descriptions are in the works. Also, we have recorded 38 new genus records for nematodes (roundworms) that have not been reported before in the Gulf of Mexico (12 of those are now reported: <http://www.pbsw.org/doi/abs/10.2988/0006-324X-127.1.47>. The other 26 are in a new article being prepared for publication).

## 5. That is really interesting and having this expanded biodiversity record for the Gulf is really important! Your study began in 2007, prior to Deepwater Horizon. Have you been able to detect any changes to the populations that had been identified prior to the spill, after the spill occurred?

The area of the Gulf where my lab collects samples, on the edge of the continental shelf, has not revealed a detectable impact when comparing data from before the spill to data from Fall 2010. We are currently examining changes in species communities over time to see if the diversity in this area of the Gulf is shifting. Other studies certainly have shown meiofauna impacts either on the shoreline or close to the DWH site, so it will be interesting to compare our data with other reports.

## 6. What is your background and how did you get involved in this kind of work?

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I am an invertebrate zoologist and protozoologist by training (Ph.D. NCSU 1990). I've published on a variety of protozoan species, mostly marine, and became involved in meiofauna work through a friend of mine, Dr. Frank Romano (Jacksonville State University). He was working on meiofauna, and we thought it would be fun to collaborate. Meiofauna are larger than protozoans (though very small to most scientists) so I was already comfortable with working with the really small stuff. We started our collaboration in 2007. Frank has since passed away, but I owe him credit for my involvement and interest in meiofauna research.

**7. If funding were not an issue, what would you add to your project?**

I would extend our biodiversity studies to include metagenomic analysis of the sediment, and DNA barcoding of specific larger meiofauna animals.

## GoMRI Presents Special Award at 2015 Intel International Science and Engineering Fair

GoMRI once again presented a Special Award at the Intel International Science and Engineering Fair (ISEF), which was held in Pittsburgh, PA from May 10-15, 2015. Approximately 1500 projects were entered into the fair, 12 of which had an oil spill focus. The special award judges, who were from the Consortium for Ocean Leadership and GoMRI, interviewed 9 of the 12 students whose projects had an oil spill focus in person. Sahil Veeramoney's project, *The Development of an Oleophilic and Hydrophobic Polystyrene Synthetic Polymer Coated Cotton for High Efficiency Marine Oil Spill Absorption*, was selected as the winner of the \$2000 award. Veeramoney is an incoming junior at the Oregon Episcopal School in Portland, Oregon. His innovative project uses cotton, coated with polystyrene, as an oil absorbent which he hopes can one day be used commercially in large scale oil spill remediation.

The judges also identified three honorable mentions. Those students were Keiana Ashli Cave from Lusher Cater High School in New Orleans, LA for her project *A Method for Identifying the Photoproducts, Mechanisms, and Toxicity of Petroleum from the Deepwater Horizon by High-Performance Liquid Chromatography and DNPHi Derivation*, Karan Jerath from Friendswood High School in Friendswood, TX for his project titled *International Oil Spill Remediation: The Numerical Simulation of an in-situ Subsea Separator, Part II*, and Dominique Marie Marchini from Sleepy Hollow High School in Sleepy Hollow, NY for her project titled *Recycling Hair: Investigating Flocculation as an Alternate Method of Assembling Hair Fibers for Oil Recovery*. Karan Jerath's project went on to win the \$50,000 Intel Foundation Young Scientist award! GoMRI would like to congratulate all the participants on their excellent projects!



Sahil Veeramoney (Middle) receives the GoMRI Special Award  
Photo Credit: Consortium for Ocean Leadership.

### Science Corner

Published science highlights from the GoMRI program

**Studies Describe Lingering Presence of Hydrocarbons along the Alabama Shoreline**

Joel S. Hayworth, T. Prabhakar Clement, Gerald F. John, and Fang Yin  
*Marine Pollution Bulletin*, 2015, (90), 95 – 105  
Fang Yin, Gerald F. John, Joel S. Hayworth, and T. Prabhakar Clement  
*Science of the Total Environment*, 2015, (508), 46 – 56

**Study Describes Two New “Mud-Dragon” Species Discovered in the Gulf of Mexico**

Martin V. Sorensen and Stephen C. Landers  
*Frontiers in Marine Science*, 2014, 1:8

**Study Finds High Pressure Inhibits Growth and Function of Oil-Degrading Microbes**

Martina Schedler, Robert Hiessl, Ana Gabriela Valladares Juárez, Giselher Gust, and Rudolf Müller  
*AMB Express*, 2014, 4:77

**Study Finds Sunlight Enhances Water Solubility of Oil**

Phoebe Z. Ray, Huan Chen, David C. Podgorski, Amy M. McKenna, and Matthew A. Tarr  
*Journal of Hazardous Materials*, 2014 (280), 636-643

**Study Finds Ecofriendly Clay Delivers and Improves Oil Spill Treating Agents**

Olasehinde Owoseni, Emmanuel Nyankson, Yueheng Zhang, Samantha J. Adams, Jibao He, Gary L. McPherson, Arijit Bose, Ram B. Gupta, and Vijay T. John  
*Langmuir*, 2014, 30 (45), 13533 – 13541

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

## Frequently Asked Questions by Dr. Chuck Wilson

*Dr. Chuck Wilson, Chief Scientific Officer for the Gulf of Mexico Research Initiative (GoMRI) answers a few of the most frequently asked questions about the program.*

**GoMRI is now five years in to what is ultimately a 10-year program. At the halfway point, the program is reflecting on what has been learned and thinking about what happens next.**

**Question:** What have we learned in these first five years?

**Answer:** The most remarkable accomplishment is that offering funding to large teams of scientists does create a community of like-minded scientists who can work together on a common goal where the whole is greater than the sum of its parts. We are closing in on the end of the first round of Consortia funding (RFP-I) and small investigator awards (RFP-II) and already we have captured over 550 peer reviewed publications and thousands of science presentations. The GoMRI science community has, to date, clearly documented post oil spill impacts and recovery in the water column, in the deep ocean, on/in the beaches, and in the marsh. We have seen the development of new techniques in data collection, analysis, and modeling that have advanced our understanding of oil spills and the Gulf of Mexico ecosystem. A recurring theme across chemistry, physics, and biology is the roll of and importance of microbes in marine environments.

**Question:** What is happening currently with the program? What are we doing now?

**Answer:** In the fall of 2014, the Research Board announced funding for 12 consortia who will work on a new wave of research projects through 2018 ([see RFP-IV awards here](#)). This group of researchers will continue the very productive legacy begun by the RFP-I consortia. Research will now expand to cover a larger footprint of the Gulf of Mexico and we have added new programs in the area of marine mammals, more focused fisheries projects, and an expanded effort on the formation of marine snow related to hydrocarbon release. We have teams looking at biodiversity as it relates to insult resistance and recovery and another examining pathways for the movement of toxins through the GOM's coastal/shelf ecosystem. RFP-IV consortia involve 637 people at 102 institutions in 23 states and 11 countries.

GoMRI's 19 RFP-II projects will be coming to a close at the end of 2015 and the Research Board will soon select a new suite of single and small investigator group projects. RFP-V awards will be announced in the Fall 2015 and will begin in January 2016.

**Question:** What happens next?

**Answer:** As the second wave of consortia ramp up and begin to contribute to this fascinating and rich array of discoveries, it is not too early to focus on the end of GoMRI. There are several components to the conclusion of GoMRI. The Research Board has already begun discussions about the final round(s) of GoMRI funding. The Research Board has also initiated near-term concerted efforts to synthesize what we have and will learn, and translate that information for scientists, practitioners, and the public. The Research Board and GoMRI community will also develop a strategy to preserve, mine, and keep accessible the program's data.



*Photo Credit: LSU Media Relations.*

## Education Spotlight:

**DEEP-C** – Deep-C's education and outreach team worked with GoMRI scientists to publish several ocean science fact sheets, which are now available on [Deep-C's website](#). The colorful sheets highlight information on deepwater corals and sharks, oil-eating microbes, and more!

**CWC** – In January 2015, CWC hosted a Dads and Daughters outreach event which gave girls and their dads an opportunity to tour the CWC labs and participate in outdoor activities, including exploring the salt marsh, setting out minnow traps, and learning to identify different types of plants. Photos from the event can be found [here](#).