

## 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 Abstract Submission**

Deadline: September 18, 2015

[Click here for more information](#)

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

February 1-4, 2016

Tampa, Florida

Registration is now open.

[Click here for more information](#)

## Highlights from the 2015 Summer Field Season

Summer is a busy time for GoMRI scientists and they have been hard at work! Read on to see what some of the Consortia and RFP-II scientists have been up to this summer!

Photo Credit: C-IMAGE.

## RECOVER:

A team of scientists, professional anglers, and videographers recently embarked on a fishing trip to capture wild mahi-mahi broodstock for the University of Miami's Experimental Hatchery program. *The ongoing research is part of the RECOVER Consortium, which is focusing on the effects of crude oil on mahi-mahi and red drum in the wake of the 2010 Deepwater Horizon Oil Spill.*

RECOVER (Relationships of Effects of Cardiac Outcomes in fish for Validation of Ecological Risk) is a GoMRI consortia based at the University of Miami's Rosenstiel School of Marine and Atmospheric Science. RECOVER scientists rely on the healthy population of wild mahi-mahi off the coast of Miami to repopulate breeding stocks in captivity. These fish will produce the tens of thousands of offspring that will be used in experimental trials relating to oil exposure at various life stages. The mahi-mahi are caught with rod and reel using circle hooks to ensure the least amount of harm

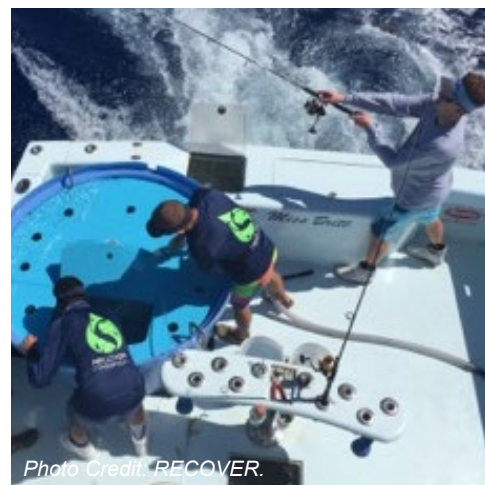


Photo Credit: RECOVER.

and stress to the fish. They are then placed into a large custom-designed holding tank on the aft of the boat. The tank is constantly supplied with oxygen and seawater to further reduce stress and keep the fish healthy as they are transported back to the hatchery facility. Individual fish are transported from the capture vessel to land-based tanks at the hatchery where they are then placed into quarantine tanks for acclimation. Following the acclimation period, newly captured broodstock are introduced into specially designed maturation tanks equipped with advanced recirculating aquaculture systems (RAS) that allow for year-round spawning of the fish in captivity. The large volume of the tanks, which range in size from 8,000 to 21,000 gallons, and advanced

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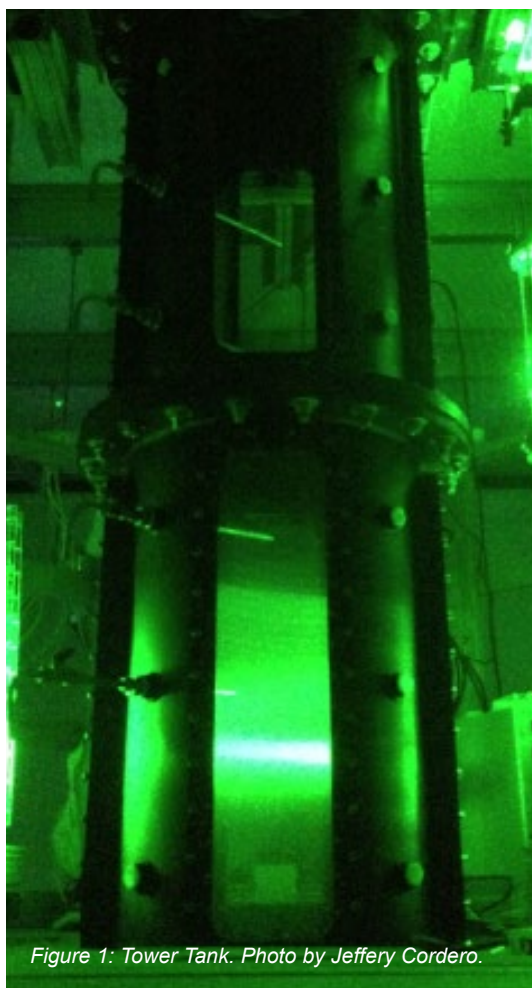


Figure 1: Tower Tank. Photo by Jeffery Cordero.

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life support systems allow the mahi-mahi to grow and reproduce naturally thereby providing a unique resource for research.

Provided by Daniel DiNicola, RECOVER Outreach Coordinator

## LADC-GEMM:

LADC-GEMM consortium has just returned from a successful 10-day Gulf of Mexico expedition onboard LUMCON R/V *Pelican*. The team of 14 scientists led by the consortium director Dr. Natalia Sidorovskaia (University of Louisiana at Lafayette) deployed five deep water moorings and a Seaglider in the vicinity of the Deepwater Horizon incident site. Both platforms will collect passive acoustic data for several months. The data will be later used by the LADC-GEMM scientists to continue monitoring the long-term effects of the 2010 oil spill on deep-diving marine mammals



Photo Credit: LADC-GEMM.

(dolphins, sperm whales, and beaked whales). During the field operations LADC-GEMM was also using a real-time acoustic data analysis from arrays towed by two autonomous surface vehicles (C-Worker 6 and C-Enduro). *The team is excited to report that they had many visual and acoustic encounters with sperm whales and dolphins in the area.*

Provided by Sara Heimlich and Natalia Sidorovskaia, LADC-GEMM Consortium

## DROPPS:

In June, DROPPS participated in the University of Texas Marine Science Institute's Summer Science (UTMSI) program. On four separate occasions, Dr. Ed Buskey spoke to 3rd-8th graders about the DROPPS research and the importance of studying oil spills. CARTHE's Laura Bracken and DROPPS's Lalitha Asirvadam then gave a presentation about how scientists use "drifters" to study ocean currents. Laura presented to the students via Skype. The students then decorated their own drifters and deployed them off the pier at UTMSI.

In late June, DROPPS members from Texas Tech and John Hopkins University traveled to UTMSI and participated in a series of experiments. They used holographic technology,



Photo Credit: DROPPS.

which allows visualization of the 3D distribution of tiny dispersed oil droplets suspended in seawater to take help understand what could have happened to plumes of oil mixed with dispersant released from the Deepwater Horizon well head. DROPPS researchers first tested their methods in smaller scale experiments in the laboratory and then in the 4 meter tall tower tank that was constructed for larger scale experiments studying the interaction of dispersed oil and marine plankton. In the tower tank experiments, they set up layers of slightly different seawater density to create a discreet thin layer of dispersed oil droplets to see how the micro oil droplets would disperse naturally, with and without small planktonic organisms swimming through it or with larger organisms such as jellyfish stirring up the water. This will help estimate the importance of biogenic mixing (mixing of the ocean by animals), an idea that has recently been of great interest to biologists and oceanographers.

On July 9, 2015 local news station Channel 3 TV visited UTMSI to conduct interviews for a story on the recent BP settlement. DROPPS Director Ed Buskey explained the importance of his research and how it is helping us understand the many dynamics of oil spill research. Graduate student Meredith Evans, who is involved in DROPPS, and UTMSI director Bob Dickey were also interviewed. It was aired on the evening news that night.

Provided by Lalitha Asirvadam, Program Coordinator DROPPS Consortium

## CARTHE

CARTHE (Consortium for Advanced Research on Transport of Hydrocarbon in the Environment) has spent the summer preparing for LASER, LAgrangian Submesoscale ExpeRiment, planned for January 2016. This experiment will feature 1000 biodegradable, GPS-equipped, surface drifters and an aerostat, in addition to various other observational tools, to measure the surface currents in the northern Gulf of Mexico.

Over the past 2 years, CARTHE researchers have been designing new drifters for LASER and have spent much of July testing the latest version of these custom drifters. They have tested a full scale prototype in the field, while



Photo Credit: CARTHE.

comparing it to previous designs, and tested half scale, 3D printed versions in the University of Miami's SUSTAIN facility (a 23-m long wind wave tank). Aerial monitoring of the sea surface, drifters, and drift cards during LASER will be done from both manned and unmanned aircraft, including a Ship-Tethered Aerostat Remote Sensing System (STARRS). The CARTHE team spent a week this summer testing this custom-made platform that will acquire high-resolution images of the ocean's surface using a 50 megapixel digital camera and an infrared camera, mounted on a 3-axis gimbal.

Observational data collected during all of CARTHE's large-scale experiments are used to make more accurate computer models for predicting the fate of hydrocarbon released into the environment to help inform and guide response teams in the event of a future spill.

Provided by Laura Bracken, CARTHE Outreach Manager

## ECOGIG

From May 29th to June 21st, the ECOGIG research team, made up of scientists and students from Georgia Tech, Lamont-Doherty Earth Observatory/Columbia University, the University of Georgia, Florida State University, and Coastal Carolina University conducted research in the northern Gulf from the R/V Endeavor. Under the leadership of Chief Scientist Dr. Joe Montoya, the research party set out to collect water column and sediment samples to further their understanding of the impacts of natural oil and gas seeps and anthropogenic oil and gas inputs on the water column and sea floor. The researchers carried out an intensive sampling and experimental program at natural oil and gas seeps in the Northern Gulf as well as at sites affected by the Macondo blowout. They collected water samples spanning the water column as well as sediment cores from the sea floor, allowing the researchers to explore the impact and fate of oil and gas in offshore environments. The shipboard work included water column and sediment processing. They deployed APEX floats (Autonomous Profiling Explorer) to profile the surrounding water column independent of the ship. Midway through the cruise, the ship made a port call in Gulfport, MS and participated in a media and education day,

in celebration of World Oceans Day. ECOGIG researchers conducted dockside interviews and hosted an educational event including mini-Remotely Operated Vehicle building and ship tours with 210 kids from the local Boys and Girls Clubs.

On July 22nd, ECOGIG PhD student Ryan Sibert joined an on-going R/V Pelican cruise employing the ROV Global Explorer for a one-day sampling bonanza at the GC600 natural seep site. Ryan was able to photograph and video a seafloor monitoring system deployed by the ECOGIG "Lander" team, recover a time-lapse video camera that had been stranded at GC600 for more than a year, and collect *Bathymodiolus brooksi* mussels for experiments in the University of Georgia laboratory.

From July 27th to August 4th, ECOGIG PhD student Mary-Kate Rogener will participate in a Coastal Waters Consortium research cruise to the Mississippi River hypoxic zone. The general goals of this cruise are to document the temporal and spatial extent of the hypoxic zone that forms in the Northern Gulf of Mexico during the summer, and identify the



Photo Credit: ECOGIG.

hydrographic, chemical, and biological data related to the development and maintenance of the Gulf hypoxic zone. As part of Mary-Kate's PhD research, she will determine rates of microbially-mediated N loss through the processes of denitrification and anammox and will also be determine rates of methane oxidation at multiple stations within the hypoxic waters.

Provided by Emily Davenport, ECOGIG Education and Outreach Assistant

## C-IMAGE:

This summer C-IMAGE looks to both continue established field operations and pioneer studies for continued research across the Gulf of Mexico. *The main focus of C-IMAGE's summer field operations are the annual Mud & Blood Expeditions studying ocean sediments ("Mud") and fish toxicology ("Blood") for two oil spills, IXTOC-I (1979) and Deepwater Horizon (2010).* The Expedition incorporates three cruises, two to the southern Gulf, and one to the northern Gulf, totaling 51 days at sea. The first cruise aboard

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the *R/V Justo Sierra* studied the three-decade impacts from the IXTOC-I (1979) oil spill, which spilled a comparable oil volume as the Deepwater Horizon, by sampling deep-ocean sediment cores in the Bay of Campeche. Known as 'Return



Photo Credit: C-IMAGE.

to Ixtoc,' this 14-day cruise was the first research expedition to the region since the 1979 well disaster. Future C-IMAGE summer cruises include continuing long-term, Deepwater Horizon impact studies on sediments and fishes of the northern Gulf, and beginning study of fishery connectivity and toxicology, post-IXTOC in the southern Gulf of Mexico.

Aside from the three summer cruises C-IMAGE summer field operations includes continued monitoring of artificial and natural habitat off the Texas coast with Texas A&M-Corpus Christi, inaugural oil exposure studies in fishes through MOTE Marine Aquarium, and utilizing Remotely Operated Vehicles (ROVs) to study fish abundance with Dauphin Island Sea Lab. Texas A&M-Corpus Christi and the Harte Research Institute has sampled and surveyed fish population using vertical longlines and fish traps, and SCUBA surveys and ROVs, respectively. Their goal is to determine how habitat type might influence growth and reproduction in areas unaffected by Deepwater Horizon and compare their findings with regions impacted by oils. MOTE Marine Laboratory began oil exposure studies to observe the changes in fish through ingestion, contact with oil in water, and contact with oil in sediments. Later this fall, Dauphin Island Sea Lab will survey and sample fish abundance and diversity in Gulf waters south of Alabama.

Provided by Ben Prueitt, C-IMAGE

## RFP-II Investigators

**Demetri Spyropoulos, RFP-II:** *We are in the midst of our summer undergraduate research program, in which two students attend lectures and perform field/lab research for 10 weeks.* This summer we have Caitlin Sojka from California State University, Long Beach, CA and Amelia Burmbaugh from Maryville College in Maryville, TN. Caitlin is involved in identifying endocrine active compounds in COREXIT Water Accommodated Crude Oil and Amelia is involved in studying the impacts of DOSS (a likely obesogen) on alligator egg development. Both Caitlin and Amelia have gone out into the

field to collect alligator eggs. Our recent DOSS 'obesogen' paper was published online, highlighting the work of GoMRI-supported Ph.D. student Lexi Temkin. She is lead author on the paper and Maggie, our summer student from last year is a co-author, as well as other NOAA/NIST collaborators. Some press coverage on this article, with two world-class leaders in obesogen researchers (and my graduate student/first author Lexi) chiming in, can be found [here](#) and [here](#).

**Charles Meneveau, RFP-II:** The RFP-II project team working on Large Eddy Simulations of turbulent dispersion of oil in the ocean's surface layer is having a productive summer. The team includes Charles Meneveau of Johns Hopkins University, Marcelo Chamecki and Bicheng Chen of Penn State and Di Yang of the University of Houston. This summer the team has completed the study of effects of oil droplet size on dispersion plumes, with the publication of a 31-page article in the *Journal of Geophysical Research: Oceans*. *The results reported include an important finding: the dilution rate and overall direction of transport of oil plumes in the ocean mixed layer are determined by competition between droplet rise velocity and vertical turbulent diffusion due to Langmuir turbulence.* The simulations show how the minute, small-scale details can affect the large-scale properties of physical dispersion. Understanding how to relate small-scale physics to large-scale physics is crucial for predictive computer models of geophysical phenomena in general, and of the fate of oil spills in the ocean in particular. Also, the computer model has been successfully tested for predictions of oil plumes emanating from a source (like an underwater blowout) into water, including stratification and formation of horizontal intrusion layers where a lot of oil can remain trapped for extended periods of time (see figure). The team is collaborating with Scott Socolofsky of Texas A&M on further comparisons with laboratory data and engineering models.

**Mindy Levine, RFP-II:** *The Levine group at the University of Rhode Island is hard at work this summer studying complex oils that have been collected directly from oil spill sites, and figuring out ways to use a large, cage-like ring molecule to remove toxic chemicals from those oils.* We are looking at weathered oil, crude tar balls, and all kinds of purified and commercial oils as well, to test how general our method is. We are excited that some of these results were just published in the journal *Marine Pollution Bulletin*, and we are in the process of writing up two more papers about this work. Some other new science that we are working on is seeing how well our method works for fuel spills, and how the composition and behavior of fuel differs from crude oil. There was a fuel truck that spilled 12,000 gallons of fuel on Cape Cod recently, and we collected fuel samples from the spill site to assess the generality of our method. We are happy to report that even though the composition of fuel is very different from oil, there are enough similarities that we were able to easily adapt our environmental remediation method to remove toxic compounds from fuel as well. Finally, we are working on ways to detoxify the toxic compounds after they have been removed, and some of those results were recently published in the chemistry journal *Tetrahedron Letters*.

## Note from the Research Board Chair

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

As stated in the [Legacy Goals](#) of the GoMRI, one of our primary objectives is to build scientific and intellectual capacity for rapid and coordinated response and effective mitigation strategies for future oil spill events. GoMRI has demonstrated significant success and results as presented in the extensive publications of GoMRI scientists. Also, a manifestation of this success is the participation of graduate students in GoMRI-funded research, in effect, the next generation of oil spill scientists. While carrying out research and guiding graduate students, GoMRI scientists have joined oil spill emergency response teams as the need arises.

More than 600 scientific publications have been published that derive from GoMRI-funded science and these have appeared at a rate of approximately 50 manuscripts published in peer reviewed journals each quarter, with more in the pipeline. These publications comprise a lasting contribution to the scientific literature, providing researchers for generations to come information that they can rely on and build upon. GoMRI publications are archived and can be accessed from the GoMRI website [here](#). Recent publications have frequently been highlighted in our newsletter (visit Science Corner on page 9) and in the Featured News section of our website. [GRIIDC](#) serves as the GoMRI data archive and the GRIIDC team is in the process of enhancing their software to be able to link data sets to publications.

GoMRI builds intellectual and scientific capacity by integrating graduate students into the ongoing research. Including students directly in the research helps to train and develop the next generation of oil spill scientists. These students are the front line of those who will continue this important work into the future, representing an important component of the GoMRI legacy, long after GoMRI itself has completed its work (visit the FAQs section of this newsletter on page 12 for more information about graduate students involved in the program).

Perhaps most important is that GoMRI scientists and the research they do are actually being called upon when oil spill events have occurred. They have assisted in emergency response efforts. It is a measure of the respect they have earned that emergency responders look to our GoMRI scientists for assistance during oil spills. The benefit to our GoMRI scientists is that not only are called upon as experts, but they gain unprecedented access to spill sites for study. There is a relationship and strong trust being built between emergency responders, the Coast Guard and other Federal agencies, and GoMRI scientists that allows for better coordination and faster response to oil spills. Examples of these coordinated efforts include the [Hercules gas blowout](#) in 2013, the [Galveston Bay oil spill](#) in 2014, and, most recently, the [Santa Barbara oil spill](#) in May of this year. Admiral Thad Allen stressed the critical importance of placing “the best available information into the hands of the decision makers” when he spoke at the [plenary session](#) of the 2014 Gulf of Mexico Oil Spill and Ecosystem Science Conference. In summary, the body of scientific literature that has been produced, the cadre of young oil spill scientists that is being trained, and the strong relationships that now exist between responders and scientists attest to the success of GoMRI in building the capacity for meeting the challenges of future oil spill events.

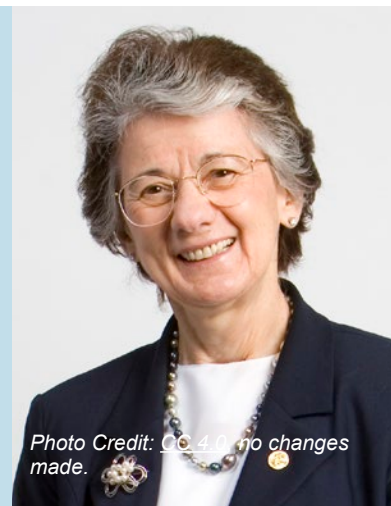


Photo Credit: CC 4.0, no changes made.



### Anatomy of an Oil Spill

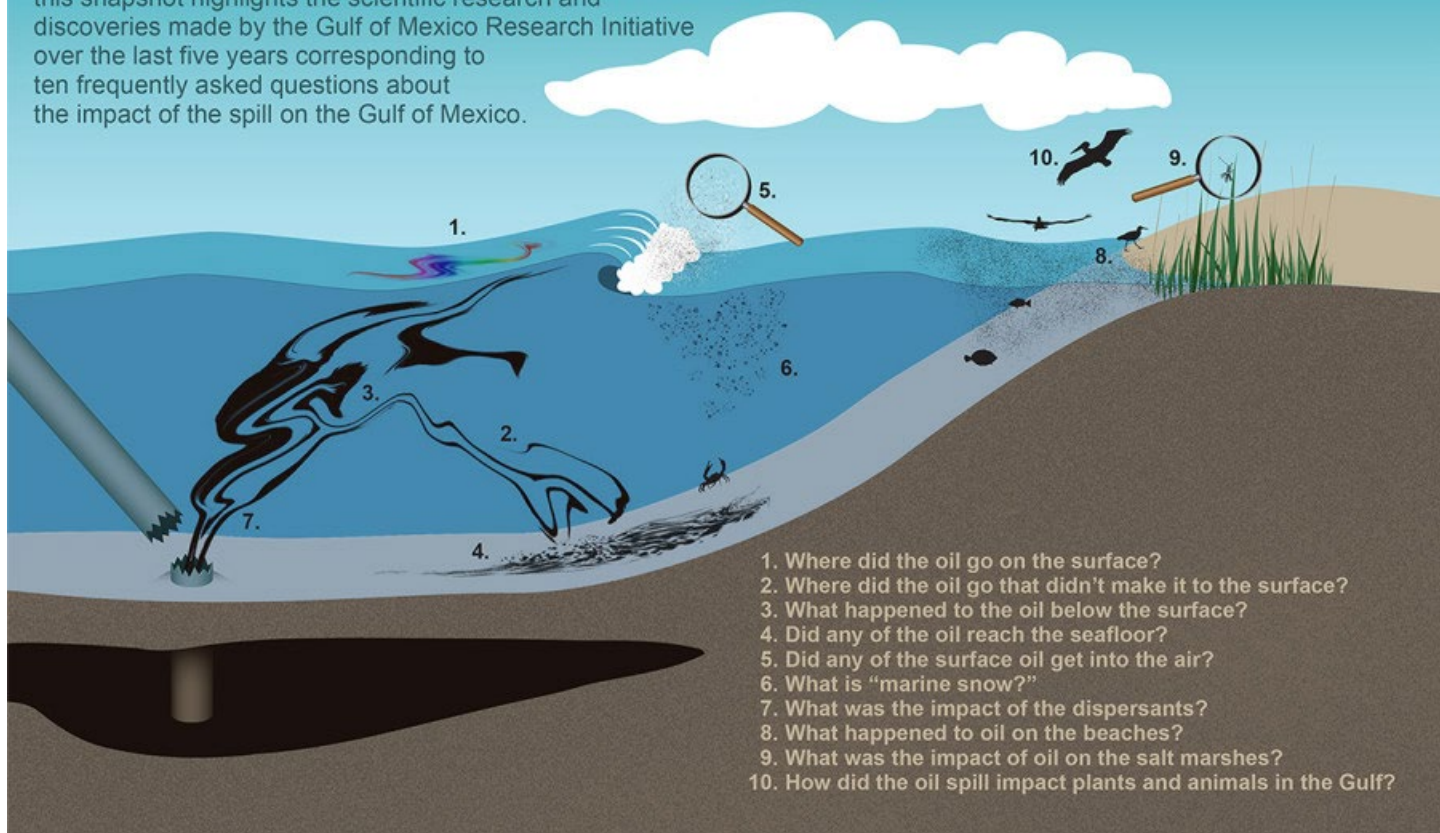
Smithsonian Ocean Portal recently launched an *Anatomy of an Oil Spill* interactive info graphic. Created using GoMRI science, the graphic takes the viewer from the day the Deepwater Horizon oil rig exploded through today, with information and pictures detailing

how the recovery in the Gulf is progressing. [Check it out here!](#)

To recognize the fifth anniversary of the capping of the well from the Deepwater Horizon oil spill, GoMRI compiled an article highlighting the program and answering ten questions about the spill that are being investigated through GoMRI science. The article is an excellent synthesis of the work that has been accomplished through the program in its first five years.

Five years ago today, July 15, 2010, the wellhead at Deepwater Horizon was capped, slowing an oil spill that lasted for 87 days.

On the fifth anniversary of the capping of the wellhead, this snapshot highlights the scientific research and discoveries made by the Gulf of Mexico Research Initiative over the last five years corresponding to ten frequently asked questions about the impact of the spill on the Gulf of Mexico.



1. Where did the oil go on the surface?
2. Where did the oil go that didn't make it to the surface?
3. What happened to the oil below the surface?
4. Did any of the oil reach the seafloor?
5. Did any of the surface oil get into the air?
6. What is "marine snow"?
7. What was the impact of the dispersants?
8. What happened to oil on the beaches?
9. What was the impact of oil on the salt marshes?
10. How did the oil spill impact plants and animals in the Gulf?

Illustration by Jason Mallett (Consortium for Ocean Leadership).

# AUV Jubilee

## CONCORDE coordinates Gulf-wide data collection event and teacher education program

Provided by Jessica Kastler (Outreach Coordinator, GoMRI CONCORDE) and Ryan Vandermeulen (University of Southern Mississippi)



The AUV Jubilee was a premier event to coordinate autonomous underwater vehicles, known as AUVs or gliders, and other in situ operations in the Gulf of Mexico during July 2015. Called a “big science party,” the name used the term Jubilee to refer to the Gulf Coast phenomenon during which naturally occurring hypoxia pushes fish close to shore, prompting locals to collect seafood with little effort and then celebrate with friends and family.

One goal of the AUV Jubilee was to establish collaboration among scientists across the Gulf to acquire simultaneous ocean observations and leverage separate efforts into creating an integrated data set. A second goal was to provide a technology-rich educational experience for a competitively selected group of teachers who participated in oceanographic sampling and real-time glider operations, followed by curriculum development. The data collection component of the AUV Jubilee was led by the University of Southern Mississippi’s Ocean Weather Laboratory (OWX; [www.usm.edu/marine/research-owx](http://www.usm.edu/marine/research-owx)), while the teacher program was organized through the USM Marine Education Center (MEC; <http://www.usm.edu/gcrl/mec>). These organizations worked together as part of the GoMRI-funded Consortium for Oil Exposure Pathways in Coastal River-Dominated Ecosystems (CONCORDE).

The OWX hosted a series of daily webinars from July 13-17 to display real-time ocean color and model (HYCOM/NCOM) products, as well as spatial uncertainty estimates. With this system, it is possible to examine the origin and date of river plumes, quantify biomass and physical volume transport, track the movement of bio-optical features, characterize water masses, resolve spatial and temporal variance, and link the bio-physical coupling that ultimately drives ecosystem variability on global scales. During the AUV Jubilee, OWX provided collaborators with this data to expand the collective capacity. Up-to-date locations of various glider and ship/aerial operations facilitated adaptive sampling. During the calls, glider pilots and other participants discussed regional oceanography (i.e., location of river filaments, eddies, high/low chlorophyll regions, surface currents), mission challenges/successes, future waypoints, data collected (via GCOOS-generated KMZs\* with profile data visualized in real time), and comparisons of in situ subsurface features with the surface expression as

shown by VIIRS ocean color or model output. In addition to real-time operations, all participants were encouraged to submit data to the National Glider Data Assembly Center (NGDAC), so that the data could be available for assimilation into operational physical circulation models.

### The following ten institutions participated:

**USM (CONCORDE); Rutgers University (CONCORDE); University of South Florida, Mote Marine Lab; Texas A&M; Oregon State University (LADC-GEMM); Skidaway Institute of Oceanography, University of Georgia (ECOGIG); Gulf Coast Ocean Observing System (GCOOS); National Oceanic and Atmospheric Administration (NOAA); Roffer’s Ocean Fishing Forecasting Service, Inc.; Florida Fish and Wildlife Research Institute.**

The teacher experience centered on AUV technology and Gulf operations during the week of July 13-17. In addition to interactions with glider pilots during the daily briefings, teachers worked with 28 CONCORDE scientists including senior investigators, post-docs, grad students, and techs. Presentations and land-based demonstrations gave teachers background for a twelve-hour research cruise aboard the *R/V Point Sur* in the Gulf of Mexico to deploy a glider and use a depth-specific sampler to collect ichthyoplankton. During the cruise teachers processed plankton samples and launch the CTD. Glider deployment was postponed because of a steep vertical salinity gradient. This resonated with teachers in how adaptive sampling might avoid loss of expensive instruments. Taken with the differences in plankton samples collected at different depths, the teachers also integrated a strong understanding of the vertical structure of the water column. These personal lessons were reflected in the educational materials that the teachers began to develop: 1. Gulf of Mexico processes, 2. buoyancy, and 3. ichthyoplankton behaviors and interactions with oil. After piloting and revising the lessons, they will be posted to the CONCORDE website ([www.concorde.org](http://www.concorde.org)).

*Above: AUV Jubilee teachers aboard the R/V Point Sur. From left: John Dupuis, David Wehunt, Noel Lamey, Jessie Kastler, Kristen Smith, Sandy Salvage, Lisa Wu, Darlene Rutledge, Lesley Magee, Carolanne Grogan, Aaron Lamey. Provided by Jessie Kastler/CONCORDE.*

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The group included diverse science teachers from Alabama, Louisiana, Mississippi, Tennessee, and Virginia. They came from coastal and landlocked communities, and represented a mix of schools and student populations—public and private, wealthy and poor. One teacher, flown down for the week at the expense of her public school district, described the state-of-the-art laboratory facilities at her disposal. Another from a poor public district did not even have a sink in her classroom to conduct labs.

Research and education groups came together during the daily briefings. During the AUV Jubilee researchers addressed basic teacher questions about nearshore processes and current conditions in the Gulf as well as details of specific technologies and research projects. Uncertain looks teachers gave to the projected map of Gulf current conditions and glider locations at the beginning of the week were replaced just a few days later by awareness, comprehension and reasonable predictions of next moves for the gliders.

*CONCORDE, the Consortium for Oil Spill Exposure Pathways in Coastal River-Dominated Ecosystems, is a multi-university research team addressing how complex fine-scale structure and processes in coastal waters dominated by pulsed-river plumes control the exposure, impacts, and ecosystem recovery from offshore spills like the Deepwater Horizon release of 2010. CONCORDE is fully funded by a grant from the Gulf of Mexico Research Initiative (GoMRI) RFP-IV.*

\*KMZ is a file extension for a placemark file used by Google Earth. KMZ stands for Keyhole Markup language Zipped.



Scientists from C-IMAGE were asked what advice they would give to students interested in pursuing a career chemical oceanography, ecosystem modeling, and population genomics. Their thoughtful responses were collated into a video, which can be viewed [here](#).

Videos from the 2015 Gulf of Mexico Oil Spill and Ecosystem Science Conference are [now available online](#), including the plenaries and keynote speakers, as well as snapshots from the poster sessions.



Texas • Louisiana • Florida  
Mississippi-Alabama

The Gulf Sea Grant program has been offering a selection of oil spill science seminars, focused on providing information to the general public on the impacts of oil spills. Topics include the effects of oil on coastal habitats and wetlands, the use of dispersants, and more. A summary of past presentations and links to watch the recordings are available on the [Gulf Sea Grant website here](#).

## 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](#)

DEEPEND Research Blog: [DEEPEND](#)

*New Consortia websites:*

[DROPPS](#)

[LADC-GEMM](#)

[C-IMAGE](#) recently re-launched their website!

*GoMRI scientist Chris Reddy is writing a blog for Huffington Post on being a scientist and a father. Check out his first two blog posts [here](#) and [here](#)!*



# GoMRI Newsmakers

The GoMRI community would like to congratulate Dr. John Farrington of Woods Hole Oceanographic Institution on being elected as a [2015 Fellow](#) of the American Geophysical Union! Congratulations Dr. Farrington on this very distinguished recognition of your contributions to the science community!

**ECOGIG:** ECOGIG helped celebrate World Oceans Day on June 8, 2015 by hosting and participating in two events: a Media and Education day in Gulf Port, MS, and a Reddit event titled “Challenges Faced by the Ocean and In Ocean Exploration.” Drs. Joye, Montoya, and Subramaniam from ECOGIG participated on the six-person panel. More information on the two events, including photos and a transcript of the Reddit event, can be found on [ECOGIG’s website here](#).



ECOGIG’s Mandy Joye talks about World Oceans Day. Photo Credit: ECOGIG.

## Science Corner

Published science highlights from the GoMRI program

### **Study Reveals Oil Spill Changed Oxygen Conditions in Gulf Sediment**

*D.W. Hastings, P.T. Schwing, G.R. Brooks, R.A. Larson, J.L. Moford, T. Roeder, K.A. Quinn, T. Bartlett, I.C. Romero, D.J. Hollander*  
*Deep Sea Research Part II: Topical Studies in Oceanography, 2014*

### **Study Describes Functional Diversity of Oil-Degrading Microbes in Coral and Sediment**

*R.L. Simister, E.W. Antzlis, H.K. White*  
*Deep Sea Research Part II: Topical Studies in Oceanography, 2015*

### **Study Identifies Short-Term Changes in Plankton Communities after Oil Spill**

*L. Carassou, F.J. Hernandez, W.M. Graham*  
*Environmental Research Letters, 2014, Vol. 9 No. 12*

### **Study Estimates Subsea Dispersant Marginally Reduced Surface Oil**

*Zachary M. Aman, Claire B. Paris, Eric F. May, Michael L. Johns, David Lindo-Atichati*  
*Chemical Engineering Science, 2015 (127), 392-400*

### **Study Informs Oil Spill Forensics with Petroleum Biomarkers Degradation Data**

*Christoph Aeppli, Robert K. Nelson, Jagoš R. Radović, Catherine A. Carmichael, David L. Valentine, and Christopher M. Reddy*  
*Environ. Sci. Technol., 2014, 48 (12), 6726–6734*

### **Study Estimates Carbon, Likely from Deepwater Horizon Spill, in Gulf Sediment**

*Jeffrey Chanton, Tingting Zhao, Brad E. Rosenheim, Samantha Joye, Samantha Bosman, Charlotte Brunner, Kevin M. Yeager, Arne R. Diercks, and David Hollander*  
*Environ. Sci. Technol., 2015, 49 (2), 847–854*

### **Study Reviews Forecast System Used During Deepwater Horizon**

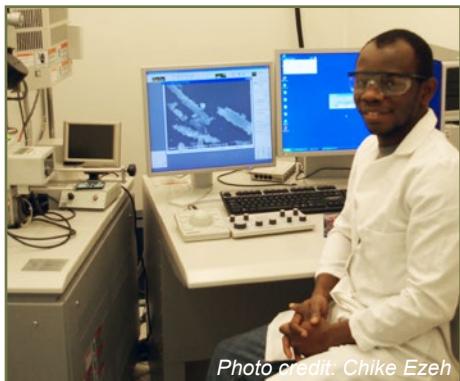
*Edward D. Zaron, Patrick J. Fitzpatrick, Scott L. Cross, John M. Harding, Frank L. Bub, Jerry D. Wiggert, Dong S. Ko, Yee Lau, Katharine Woodard, and Christopher N. K. Mooers*  
*Frontiers of Earth Science, 2015*

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

## GoMRI Scholars in Action

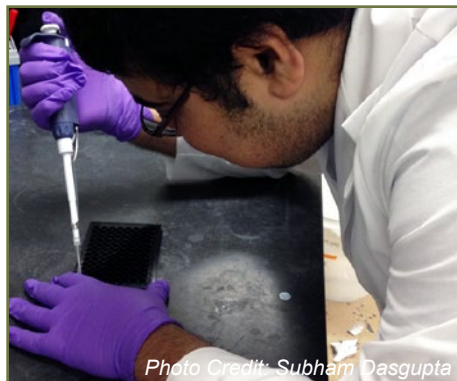
The Gulf of Mexico Research Initiative (GoMRI) is recognizing the graduate students whose vital research contribute to improving understanding about the damage, response, and recovery of the Deepwater Horizon oil spill. Candidates for this program must be graduate students who have participated in a 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.

**Learn more about the scholars' research and career paths on the GoMRI website:**

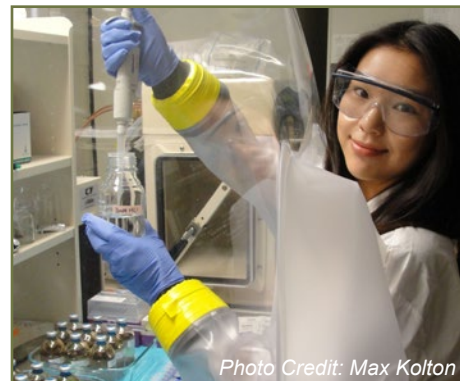


**Olasehinde Owoseni  
(C-MEDS)**

Uses Small Particles to Tackle  
Large Spills



**Subham Dasgupta (RFP-II)**  
Assessing Oil and Dispersant  
Toxicity to Fish DNA and Mortality



**Boryoung Shin (Deep-C)**  
Shines Light on Oil-Degrading  
Microbes in Sediment

## Education Spotlight:

**CARTHE**— Students from Singapore American School in Singapore have been working on building their very own Bob the Drifter. The class put together a [video](#) and reached out to CARTHE for advice on how to build their drifters. CARTHE's Outreach Manager Laura Bracken [Skyped](#) with the class, offering advice and answering their questions. The class is now working on building Proto-Bob, their prototype of Bob the Drifter. They are documenting their project on their [class blog here](#).



**Deep-C**— The Florida State University Coastal and Marine Laboratory hosted Girls Investigating Science on May 9, 2015. Members of the Deep-C consortium attended and contributed to the event. Twenty girls participated in the event, which included presentations from female scientists, sample collection from the coastal ecosystem, and analysis of their results. Pictures from the event can be found on [Deep-C's Facebook page here](#).



**CWC**— CWC is hosting a variety of camps this summer to help get kids engaged in science. The camps focus on science and art, field marine science, and more. [Visit CWC's Facebook page for more information and pictures!](#)

# GoMRI Researcher Interview with Dr. Darrell Sparks

Dr. Darrell Sparks from Mississippi State University answered a few questions about his RFP-II project, *Characterizing the Composition and Biogeochemical Behavior of Dispersants and Their Transformation Products in Gulf of Mexico Coastal Ecosystems.*



*Dr. Darrell Sparks. Photo provided by Dr. Sparks.*

## 1. Thank you so much for talking with us! Tell us a bit about your research. What are the goals of your project?

My project focuses on the fate of the dispersant (Corexit) used in the cleanup efforts of the Deepwater Horizon oil spill. I am working in collaboration with Duke University and Stony Brook University. We are investigating the toxicity, sorption behavior, and metabolism chemistry of the dispersant.

## 2. What are you learning about the fate of the dispersant? What methods are you using to carry out this research?

One of the studies we have completed is a biodegradability study of Corexit 9500 in seawater. This study revealed that some of the components of the dispersant degrade quite rapidly (within days), while other components (such as DOSS) are more persistent. In our projects, we use a variety of analytical techniques. For example, we have used comet and EROD assays for toxicity studies and high performance liquid chromatography with tandem mass spectrometry for dispersant characterization and detection.

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

We have been screening seafood collected from the Gulf of Mexico for DOSS (a major component of Corexit) as well as its metabolites. It has been interesting to see what types of seafood seem to be more prevalent at containing these compounds.

## 4. What types of seafood have you been focusing on? What types seem to be impacted the most? The least?

We have tested fish, oysters, crab, and shrimp. Oysters and fish test positive\* (in the part-per-billion range) for DOSS more often than crab and shrimp. However, one of the metabolites of DOSS has been found in crab.

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

My background is in Chemical Engineering and I am an Assistant Professor in the Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology at Mississippi State University. I also have an appointment with the Mississippi State Chemical Laboratory, which was involved in testing seafood immediately after the oil spill to determine safety for human consumption.

## 6. Can you tell us more about your collaborations with your fellow GoMRI researchers from Duke University and Stony Brook University?

The collaboration includes Drs. Anne McElroy and Bruce Brownawell of Stony Brook and Dr. Lee Ferguson of Duke University. Each member of our collaboration has a different focus area while maintaining the overall objective of better understanding the fate of dispersants. Dr. McElroy's emphasis is on toxicity, while Dr. Brownawell studies the sorption of dispersant components in sediments. Dr. Ferguson's group at Duke has made great progress in being able to better characterize dispersant components, and my area focuses detecting dispersants in seafood. Without a doubt, it has been a team effort.

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

We would add more metabolites to our study as well as expand the scope of our toxicity studies.

*\*All seafood we have tested so far has been safe.*

## 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.*



Photo Credit: LSU Media Relations.

**One of the many GoMRI legacies, which is specifically described in GoMRI Legacy #2, is the involvement of graduate students in the program who will become the next generation of oil spill researchers.**

**Question:** How many graduate students are or have been involved in the program to date?

**Answer:** Over 750 graduate students, including 440 Doctorate and 310 Master's candidates, have been or are involved in GoMRI research. These students hail from around the world and across many disciplines.

**Question:** What is the distribution of their fields of study?

**Answer:** Almost half of the students are associated with RFP-I, which was the first major GoMRI consortium initiative. That said, consortia from RFP-IV are rapidly ramping up their graduate student workforce. Regarding research areas, about a third of the students are fairly evenly distributed across GoMRI Themes 1 (Physical processes), 2 (Chemistry), and 3 (Environmental). A surprisingly large proportion are also heavily involved in Theme 4 (Technology), indicating that GoMRI is not only training the next generation of oceanographers but also involving them in developing the most recent tools for oil spill research.

**Question:** What role do they play in the research?

**Answer:** Students are the engines of GoMRI's research efforts. Along with the 1,278 scientists and 196 Postdocs, students serve as essential team members for much of the research underway. They are the workforce onboard the ships and in the labs, bringing creativity, curiosity, and energy to the GoMRI scientific program. A number of outstanding students, recognized as GoMRI Scholars, have been featured on the GoMRI website. Each student has a wonderful story about why they are involved in science and how GoMRI is affecting their life/career path. Students are working on exciting things such as novel dispersant technologies, marine life from single-cell organisms to fishes, habitats from seafloor coral and hydrocarbon seeps to marsh insects, toxins that may affect human stem-cell behavior and fish DNA, and modelling oil movement through the water column and on the sea surface.



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