

# HARBOR BRANCH

FLORIDA ATLANTIC UNIVERSITY®

Ocean Science for a Better World®

## BULLETIN

SEPTEMBER 2010

# HARBOR BRANCH - BRAZILIAN PARTNERSHIP SEND SHIP TO GULF



Jenny Grima pipettes cells from a sponge collected during a dive, while Chief Scientist Shirley Pomponi looks on. Cellular characteristics can be compared between specimens taken from non-impacted sites with those that may have been exposed to petroleum or dispersants.

### Gulf Research Gets Underway

Crises call for swift mobilization and a high degree of flexibility, both of which have been central to the initial Harbor Branch-FAU research response to the Deepwater Horizon oil spill. More than a half-dozen scientists plus supporting technicians, graduate students, and summer interns were part of an expedition that ran through early August to establish baseline assessments and document the impacts of oil and dispersants. News crews were there to capture the research mission and included NBC, CNN and BBC. NOAA Administrator Dr. Janie Lubchenco and Larry Robinson, Ph.D., Assistant Secretary of Commerce for Conservation and Management at the National Oceanic and Atmospheric Administration (NOAA) also joined the Gulf Research Cruise to get an up-close look at this joint NOAA-FAU-CEPEMAR research effort.

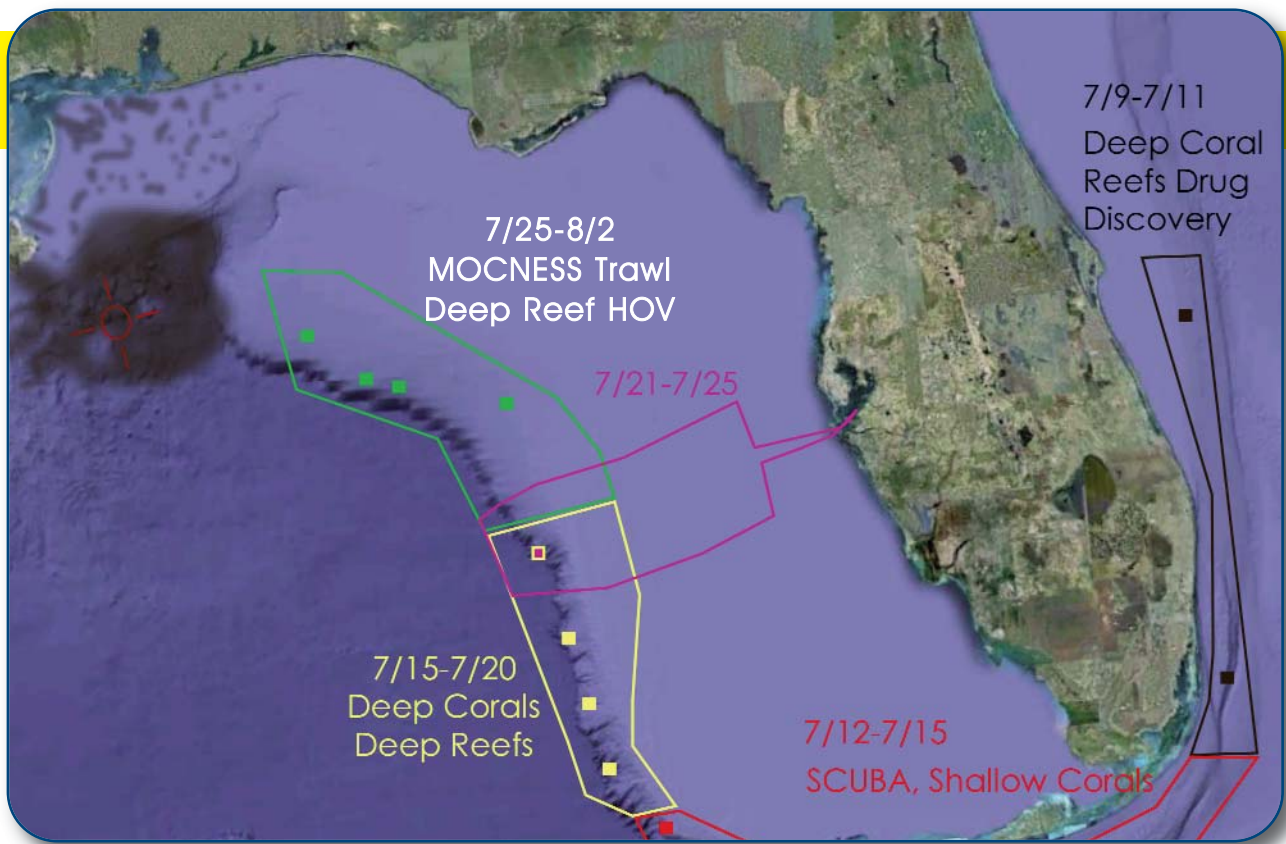
*(Story continues on next page).*



Cepemar is the Brazilian environmental services company that HBOI has partnered with for the project.



The National Oceanic and Atmospheric Administration (NOAA) filed a request to send the ship to the Gulf.



The R/V Seward Johnson was originally part of a different plan. It was scheduled to sail for the South Atlantic in late May under a lease agreement with Brazilian environmental services company Cepemar, but as the crisis developed, the National Oceanic and Atmospheric Administration (NOAA) filed a request with the company to send the ship to the Gulf. Recognizing the urgency, Cepemar and its contractor, Petrobras, agreed, allowing the ship and the Johnson-Sea-Link II submersible to support this research.

The work being conducted by the NOAA Cooperative Institute for Ocean Exploration, Research and Technology (CIOERT), which is hosted by Harbor Branch-FAU and co-led by University of North Carolina Wilmington. CIOERT had planned to conduct field research in shallow and deep coral reef areas and midwater habitats in spring

2011, but it's happening now instead with the added objective to monitor these areas for oil spill effects.

Beyond visual assessment and documentation of reef and hard-bottom habitats, planned activities include measuring stress responses of corals and other invertebrates, quantifying zooplankton, and conducting chemical analyses of species that live on the sea bottom.



*The Harbor Branch JSL prepares for another dive in the Gulf.*



*The MOCNESS Trawl – a large net used to gather deep water organisms and bring them to the surface unharmed is an example of the technology developed by Harbor Branch.*



# OIL SPILL RESPONSE

For the past four decades, Harbor Branch Oceanographic Institute at Florida Atlantic University has been conducting research in the Florida marine ecosystems that were presumed at risk for damage from the Deepwater Horizon oil spill in the Gulf of Mexico, making the Institute an exceptionally valuable resource in the drive to understand and address this ecological tragedy. Through this work, we have amassed a wealth of data on species likely to be affected, from microscopic phytoplankton to seagrasses to corals to whales, providing a record of what life was like before the petroleum started to flow. This was done to help understand the effects of exposure on the species, as well as the potential outcomes as the contamination is relayed up the food chain.

Along with historic data, our scientists and engineers can bring current understanding and capabilities to bear on this situation. Beyond the ability to assess the immediate effects of the spill on water quality and organisms in the open ocean, our expertise at depths both shallow and great provides a unique understanding of the coral reefs and other species that populate the ocean floor. Our ocean engineering and technology capabilities, which include development of sensors and undersea imaging techniques, can enable us to characterize and monitor the affected environments.

As part of a marine mammal stranding network, we can respond when affected dolphins and whales are encountered, and act to help the sick or determine what happened to those that die. While it now appears unlikely, were the oil to reach our estuaries and shores, our work with oyster reefs, seagrasses, mangroves, and salt marshes will help us gauge impacts on those marine species. When the time comes for restoration of environments and stock enhancement of species, our aquaculture expertise can support the natural recovery processes.

An in-depth exploration of these capabilities is available via our Research Toolbox located at (<http://www.fau.edu/hboi/researchtoolbox.php>).

Harbor Branch-FAU was founded to explore, protect and wisely use the oceans' resources, a mission we refer to as Ocean Science for a Better World®. We are prepared to exercise all that we know and do on behalf of one of mankind's most precious resources.



*This newly discovered deepwater coral reef is the first living **Lophelia** coral reef to be documented on the west Florida shelf. Thickets of living coral 3-4 feet tall provide essential habitat for a myriad of crabs, shrimps and juvenile fish. A commercially important golden crab, **Chaceon fenneri**, finds food and refuge among the branches.*



# NASA SHIFTS GAZE EARTHWARD TO HELP SAVE OUR SEAS



*Ulva, collected from Shark River, Florida by Brian Lapointe, is a telltale sign of high levels of nutrients in the water.*

One of the oceans' best friends is Harbor Branch-FAU's Brian Lapointe, Ph.D., whose work correlating fresh water runoff and sewage outflows with harmful algal blooms (HABs) has helped shape environmental policies aimed at curbing harmful practices. Now the seas are gaining some friends in extremely high places: The National Aeronautical and Space Administration (NASA) is funding Lapointe's efforts to track HABs in the Gulf of Mexico using water sampling and satellite imagery. The goal is to characterize excessive nutrient pollution and give resource managers the information they need to improve the situation.

Lapointe and his University of South Florida colleagues are looking at the linkage between HABs such as red tide and outflows from Florida's Caloosahatchee and Shark Rivers; two major sources of freshwater discharge in the Gulf. Farmland and ranch runoff boosts nutrient levels and lowers salinity, leading to excessive and altered algal growth that blocks sunlight from reaching other species that need it for survival.

"The satellite images and the water samples tell us two sides of the same story," explains Lapointe. "It's part of a larger effort to establish nutrient standards so that we can know how much is too much, and then do something about it." He says that while the oil spill is not expected to compromise this work, the situation continues to evolve, and so his team remains vigilant.

The project also reflects an evolving vision of NASA's scientific mission away from its emphasis on the extraterrestrial. With the space shuttle program scheduled to conclude, President Obama made a pledge to, "... increase Earth-based observation to improve our understanding of our climate and our world -- science that will garner tangible benefits, helping us to protect our environment for future generations." And that's been Lapointe's mission all along.



**Brad Bedford**



**Brian LaPointe leads this work.**



# SUMMER INTERNS LIVEN UP CAMPUS



## **2010 Harbor Branch Summer Interns**

*From left to right: Emily Packard, Nicolas Agostinelli, Swati Ghosh, Elizabeth Marchiondo, Kelly Maers, Ashley Lave, Lydia Moreland, Brittany Reinard, Robyn Schmidt, Ximena Toro, David Debortoli, Jennifer Reed, Kristin Stacy, Richard Mulroy, Maureen Williams, Jessene Aquino Thomas, Jaine Perotti, Ryo Isshiki*

While many college students are deep into a summer of flipping burgers or lifeguarding, a few others used coral models to test the effects of petroleum and dispersants on those species, or researching novel marine microbes in the drive to develop alternative fuel sources. The latter variety is the kind that finds its way to the summer intern program at Harbor Branch-FAU, which this year – the program's 36th – included students from Florida, North Carolina, New York, Indiana, and India. Thanks to generous support from the Link Foundation and the Gertrude E. Skelly Charitable Foundation, the interns took on a variety of marine science and engineering challenges that provided varied experiences and broader knowledge in their chosen fields.



# SYSTEM BEARS WITNESS TO HOME-GROWN INGENUITY



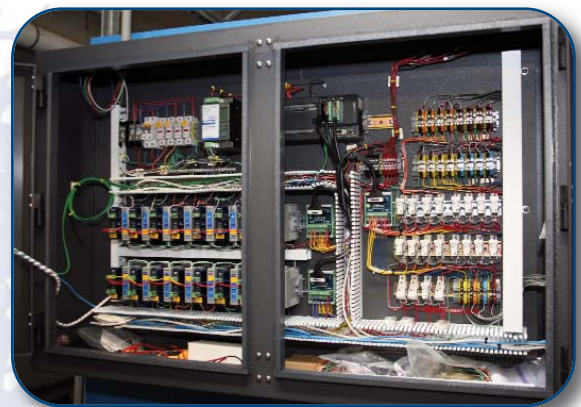
*Paul Wills can check the oxygen levels in his research tanks from any computer in the world using the system that he and USDA/ARS aquaculture engineer Tim Pfeiffer designed and built.*

Experiments such as the pompano aquaculture grow-out require precisely controlled environments to ensure scientific integrity. If dissolved oxygen in culture water, for example, varies greatly between tanks under comparison, the ability to draw conclusions about the experiment can be severely compromised or nullified entirely. The waste of time and money resulting from a preventable occurrence can spell doom for a research project. Although there are systems available to monitor and regulate conditions in the tanks, their high cost can be prohibitive.

But where there's a Wills, there's a way. Using funds from the Florida Fish and Wildlife Conservation Commission and the U.S. Department of Agriculture, Agricultural Research Service (ARS), Harbor Branch-FAU's Paul Wills, Ph.D. and ARS Engineering Scientist Tim Pfeiffer, Ph.D. designed, assembled, and programmed their own monitoring system using off-the-shelf components for about one-fifth the cost of a manufactured system. At the heart of their system is a micro programmable logic controller (PLC), which is the same technology used to operate manufacturing

assembly lines. The system is configured to monitor oxygen levels in the tanks, add oxygen, and, if necessary, shut off the automatic feeders.

Features of the system include a touch screen user interface, the ability to access the system via Web browser, and a flash drive that can hold 10-15 years of data. It can even send messages to a mobile device to alert investigators about emergency conditions.



*A detailed view of the system.*





*Terri Breeden and Chris Robinson scanning a pompano for an ID tag, much like those used by veterinarians to tag pets.*

# LIKE GROWING FISH IN A BARREL

There are plenty of reasons to feel good about fish aquaculture. It eases the pressure on natural fisheries by providing a renewable alternative. It creates jobs while expanding our domestic food supply. And perhaps best of all, it helps put delicious fish in frying pans, ovens and barbecues everywhere.

Thanks to collaborative research between Harbor Branch-FAU aquaculture researchers and USDA, Agricultural Research Service (ARS) scientists, the future is looking better every day. Pompano, a fish highly valued (and priced) for its flavor, was the subject of some of their most recent ARS-funded work: a grow-out experiment testing the effects of changes in water salinity on physiological measurements.

“Marine fish are constantly battling water loss as their cells work to maintain function in their high-salinity environment,” explains HBOI-FAU associate research

professor Paul Wills, Ph.D., a co-principal investigator on the project. “We’re working to discover the conditions that maximize fish growth and profitability.”

In a recent experiment with the pompano, the water salinity was set to three parts per thousand – it’s more than 30 parts per thousand in the ocean – and the researchers worked to optimize the feed rate under those conditions. In the study that ended in May, the salinity was increased to 12 parts per thousand, which is the point at which the pompano’s cells are in harmony with the environment. The goal was to see how the low-salinity challenge and return to equilibrium affected the fish. Beyond looking at blood chemistry and the enzyme systems related to osmotic circulation, researchers looked at a measure of greater interest to our palates: filet yield.

# FIRST POST-MERGER PH.D. CANDIDATE GETS DOWN TO WORK



*Amber Garr will do her doctoral research on the effects copper and zinc have on conch restocking success in the Florida Keys.*



Many researchers have earned their doctoral degrees on the Harbor Branch campus, and many, many more will do so in the future. But all of those future Ph.D.s who emerge from the Harbor Branch-FAU campus will do so in the wake of Amber Garr, the first doctoral candidate to begin her dissertation research here since the institutions merged. She got the go-ahead from Megan Davis, head of her advisory committee, in April.

Garr is a Harbor Branch-FAU Marine Ecosystem Health Research Associate who has been studying aquaculture since becoming a Harbor Branch intern in 2000. The next year she was hired as the Conch Program Manager, which would eventually lead to the focus of her dissertation research: copper and zinc toxicity in queen conch. Despite a 1986 recreational harvest ban, added to a 1975 commercial harvest ban, the conch population has not rebounded appreciably in

Florida. Her research will include one weekend per month in the Florida Keys during the April to October queen conch mating season.

Other projects in which Garr has played a central role include aquaculture of apple snails to support conservation of the Florida snail kite, an endangered bird of prey that relies on the gastropods as a primary food source, and production of the first comprehensive "Conch in the Classroom" curriculum that has been translated into Spanish and used by teachers and students throughout the U.S. and Caribbean. She represents the type of home-cultured talent for which Harbor Branch-FAU increasingly will become known.

## OCEAN SCIENCE LECTURE SERIES

**The September lecture is:**

*Monitoring Indian River Lagoon Seagrass Beds*  
Lori Morris, St. Johns River Water Management District  
Wednesday, September 22, 7 p.m.

*The Ocean Science Lecture Series is sponsored in part by the Friends of Harbor Branch.*



# SEARCHING FOR A REASON



When something important ends up on the ocean floor that doesn't belong there, Harbor Branch-FAU Ocean Engineer Andy Sherrell often gets a call. This past spring, he helped in the search for the data and voice recorders of Air France Flight 447, which went into the Atlantic Ocean on June 1, 2009, taking the lives of all 228 people aboard. Sherrell, who has been involved in several such

missions, was asked to participate by Woods Hole Oceanographic Institute, which had been commissioned by Airbus and the Bureau d'Enquêtes et d'Analyses, the French agency charged with investigating aviation accidents.

He was responsible for processing and analyzing the sonar imagery generated by the autonomous underwater vehicles: in essence, searching for the fingerprint of aircraft debris. Although the team was disappointed to have not found the wreckage, it did successfully map an area approximately the size of Delaware at depths ranging from 1.25 to 2.6 miles – a true accomplishment for the team and its technology.



*This patch of ocean, halfway between Brazil and Africa was Andy's office.*



## PRESIDENT SAUNDERS SPENDS A DAY WITH DOLPHINS

The Harbor Branch marine mammal program carried out a two-week dolphin health assessment (HERA) spanning most of the Indian River Lagoon. Partners from the Georgia Aquarium and NOAA, as well as many dedicated volunteers, made this health assessment a success. Read about it in the next issue of the Harbor Branch Bulletin.



*FAU President M.J. Saunders takes part in the field examination of an IRL dolphin.*



*It's the end of a successful day on the water. (from L to R) Larry Fulford, capture boat captain; Larry Hansen, collections specialist; Steve McCulloch, HERA manager; Greg Bossart, Chief Veterinary Officer and Senior Vice President of Veterinary Services, Georgia Aquarium; Forrest Townsend, HERA veterinarian; M.J. Saunders, FAU President.*



*Jennifer Bossart divulging the secret for sustained afternoon energy to President Saunders – oreo cookies!*





John Reed studies coral reefs with particular emphasis on deep corals, such as *Oculina* and *Lophelia*.

# GETTING A GULF BASELINE

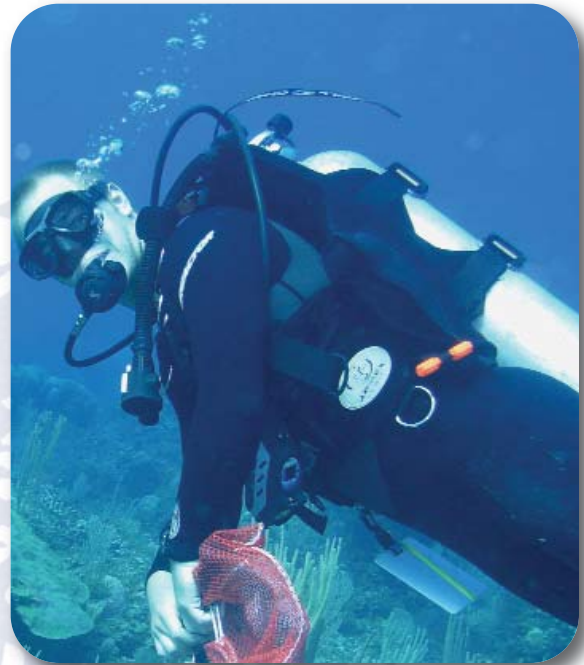


The baseline is essential to science because without knowing pre-experiment conditions, it's impossible to characterize post-experimental changes or effects.

Through the NOAA Cooperative Institute for Ocean Exploration, Research and Technology ([www.CIOERT.org](http://www.CIOERT.org)), Harbor Branch-FAU researchers John Reed and Joshua Voss, Ph.D. recently participated in a cruise that used remotely operated vehicles (ROVs) to film and photograph the depths of the Flower Garden Banks National Marine Sanctuary (FGBNMS) approximately 100 miles off the coasts of Texas and Louisiana. The project also leverages expertise from the National Center for Coastal Ocean Sciences and University of North Carolina Wilmington, another CIOERT partner, and is intended to provide baseline information on the fisheries and reef habitats in advance of a proposed experimental fishing closure within the sanctuary.

During the May cruise, 84 ROV passes were completed in depths from 60 to 400 feet, providing a unique look at the coral, algal, and soft-bottom communities and the fish and other creatures that live there. In addition, a fisheries sonar system was used to determine the abundance and distribution of fish across 100 nautical miles in the sanctuary. Another look at shallower reef areas is planned for later this summer.

Although this research project was planned before the Deepwater Horizon tragedy, the data may also be used to determine any potential impacts should oil move west into the area. With good fortune, the currents will favor the Flower Garden Banks and the oil won't threaten this truly spectacular ecosystem.



Josh Voss on a recent dive



# EXECUTIVE DIRECTOR SEARCH UNDERWAY



Florida Atlantic University is undertaking a far-reaching search for an executive director for Harbor Branch Oceanographic Institute.

In June, Florida Atlantic University launched its search for the next executive director of Harbor Branch (see [www.fau.edu/hboi/execdirectorsearch\\_main.php](http://www.fau.edu/hboi/execdirectorsearch_main.php)). The new executive director will be joining Harbor Branch-FAU at a particularly pivotal juncture: a time of renovation and renewal. FAU seeks a dynamic and visionary leader that is ready to take advantage of strategic collaborations within Harbor Branch and FAU, and with other institutions, agencies, and organizations. To continue the integration of Harbor Branch into FAU, s/he will be responsible for FAU's marine science, engineering, and technology programming, of which Harbor Branch is a part. Florida's Research Coast is picking up momentum.

## CELEBRATE NATIONAL ESTUARIES DAY 2010!



*Explore ~ Learn ~ Protect ~ Enjoy!*

**Saturday, September 25th - 10am-3pm**

FAU Harbor Branch Oceanographic Institute  
5600 US Highway 1 North, Fort Pierce

*Bring your family and friends, spend the day, and celebrate the natural treasure in our own backyard... The Indian River Lagoon!*

- Meet Harbor Branch scientists, enjoy live plant and animal displays and marine science exploration stations.
- Take a guided boat tour on the Lagoon (additional charge, space is limited).
- Kids' arts and crafts, games, food and more.
- **Admission is free!**

**For more information, call 772-242-2293**



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FLORIDA ATLANTIC UNIVERSITY\*

Ocean Science for a Better World®

5600 US1 North  
Fort Pierce, FL 34946

Florida Atlantic University, a member of Florida's State University System, was established by legislative act in 1961. In addition to its original 850-acre campus in Boca Raton, FAU has campuses in Fort Lauderdale, Davie, Dania Beach, Jupiter, Port St. Lucie and Fort Pierce. Fully accredited by the Southern Association of Colleges and Schools, FAU is currently serving 28,000 regularly enrolled, degree-seeking students through its 10 colleges.

FAU's Harbor Branch Oceanographic Institute is dedicated to exploring the world's oceans—integrating the science and technology of the sea with the needs of humankind. Harbor Branch is involved in research and education in the marine sciences; biological, chemical, and environmental sciences; marine biomedical sciences; marine mammal conservation; aquaculture; and ocean engineering.



## VISIT THE HARBOR BRANCH OCEAN DISCOVERY CENTER!

Mark your calendars for  
**National Estuaries Day 2010 – September 25th.**  
**Free public event at Harbor Branch!**

*Gift Shop and "Friends of Harbor Branch" program office located on site.*

**Hours:** Monday-Friday, 10 a.m. to 5 p.m.; Saturday 10 a.m. to 2 p.m..

**Phone:** 772-242-2293

*Group tours please call 772-242-2417 for scheduling.*



Harbor Branch specialty license plates  
**support** research, conservation and education.