

# HARBOR BRANCH

FLORIDA ATLANTIC UNIVERSITY

Ocean Science for a Better World™

## Bulletin

FEBRUARY 2009

### HARBOR BRANCH FORMS OCEAN EXPLORATION PARTNERSHIP WITH WAITT INSTITUTE FOR DISCOVERY

#### A GATEWAY TO THE PACIFIC AND A NEW EXPLORATION AGENDA

After 18 months of negotiations and preparations, **Harbor Branch** and the **Waitt Institute for Discovery (WID)** have just embarked on a partnership for exploration that presents both organizations with an exciting new exploration agenda. WID, one of Gateway Computers co-founder **Ted Waitt's** philanthropic endeavors, is partnering with Harbor Branch to carry out a year-long voyage of exploration. WID is interested in mapping large swaths of sea floor in deep water. Harbor Branch will support this mission with project management services, and our ship the **RV Seward Johnson**. At the same time **Harbor Branch's Center for Ocean Exploration** will take advantage of the ship's remote location to conduct research on mid-water communities. Harbor Branch engineer **Lee Frey** will also test a computer simulation that could be refined to help scientists pinpoint the locations of heretofore undiscovered seamounts. This promises to be an exciting time for both organizations.

The partnership was launched with a deep coral reef expedition off the coast of Florida, dubbed **CATALYST ONE** (more in the accompanying article). The larger CATALYST program has been established for the purpose of making cutting edge ocean exploration tools available to the science community. Those tools include the Waitt Institute's two newly built **REMUS 6000** autonomous underwater vehicles (AUVs), which can explore depths down to 6,000 meters, or 3.7 miles, below the ocean's surface. AUVs are unmanned, free-swimming, torpedo-shaped vessels that follow a preprogrammed track, during which they gather data which they bring back for downloading after carrying out missions of up to 18 hours in duration.

As of this writing, the ship has transited the **Panama Canal** and is on its way to **American Samoa**, which will be the most remote place to which our ship has ever sailed. While that might make some people homesick, our scientists and engineers relish the opportunity to work in a part of the world that is largely pristine and unexplored. Likewise, for Harbor Branch, this is a promising start to extend the reach of our ocean exploration work, both geographically and technically. To follow our progress, visit our @Sea web site ([www.at-sea.org](http://www.at-sea.org)) where we will feature dispatches from the researchers.



*REMUS 6000 AUV being recovered after a mapping mission.*



*John Reed and Ocean Systems sonar technician Don Koningsor review output from a mapping mission.*

# CATALYST ONE EXPEDITION

## DEEP CORAL REEFS DISCOVERED DURING SUCCESSFUL CATALYST ONE EXPEDITION

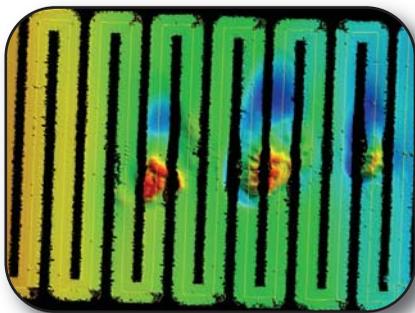
By **John Reed**, Research Professor, HBOI Center for Ocean Exploration and Deep Sea Research.



John Reed

Our mission was to use the two new **Waitt Institute for Discovery REMUS 6000 AUVs** for their first scientific expedition to map deep-sea coral reefs off the central east coast of Florida. Also important was the opportunity to test these AUVs and all their systems under very difficult environmental conditions. The trial dives were conducted approximately 50 miles offshore in the axis of the Gulf Stream with currents exceeding 3 knots, at depths greater than 1,500 feet, and over high-relief pinnacles which are steep, rugged reefs up to 200 feet tall.

The primary objective of the mission was to provide high definition side-scan sonar surveys that are critically needed in this region for the following reasons:



Three deep reef pinnacles, two of which were previously unknown. John has named this formation "Triceratops."

- to provide detailed data on the distribution of deep water reefs in order to protect them from impacts such as bottom trawling or fossil fuel exploration
- to provide the best scientific data available in order to show where other uses such as bottom trawling

may be acceptable by avoiding coral habitat.

This year the **South Atlantic Fishery Management Council (SAFMC)** has proposed a 23,000 nm<sup>2</sup> region from North Carolina to South Florida as a habitat area of particular concern (**HAPC**) for deepwater coral reefs. Maps compiled during this mission will provide critical information on potential reef areas within this proposed HAPC.

I had targeted six sites for these surveys. Four sites were near or within the proposed **Lophelia coral HAPC** and the two sites remaining were within the **Oculina coral HAPC**.

[www.hboi.fau.edu](http://www.hboi.fau.edu)

Our seven-day mission resulted in some spectacular data about these relatively unknown deepwater reefs. On the very first day, we discovered two **Lophelia coral pinnacles**. We also brought home many gigabytes of mapping data that will give resource managers at the SAFMC a more detailed and accurate picture of the areas they seek to protect.

It was exciting to see first-hand these two new AUV vehicles working under some very difficult conditions.



High seas and difficult conditions!

At times we had 30-knot winds, 8-foot seas, and 2-knot bottom currents and still the AUVs were able to follow the planned tracks flawlessly over these rugged reefs. Certainly the combined efforts of the Waitt Institute for Discovery, the AUV crew from **Woods Hole Oceanographic Institution**, the **Waitt sonar team**, and our ship and crew from **Harbor Branch Oceanographic Institute** made this expedition a success. The **Banbury Fund** and the **Robertson Coral Reef Research and Conservation Program at Harbor Branch Oceanographic Institute** provide funding for HBOI's coral reef research programs.



"MaryAnn" being readied for launch

# HBOI-FAU ANCIENT DNA LABORATORY

From beetles to blue whales, DNA is the universal code contained in the blueprints for all life on Earth. In recent decades scientists have been able to unravel many of the mysteries previously locked away within the coils of this unique molecule.

We have all seen news stories of wrongly convicted persons exonerated by DNA evidence collected from long-ago crime scenes. Now, thanks to Harbor Branch researcher **Dr. Greg O’Corry-Crowe** and his research team, scientific mysteries dating back thousands of years can also be unraveled.

As Dr. O’Corry-Crowe explains, *“Recent breakthroughs in the fields of molecular genetics and chemistry have made it possible to recover and amplify minute quantities of DNA from ancient biological material. These advances open unique windows on life in the distant past. Whereas before researchers could only make inferences about history and evolution from contemporary observations, **groundbreaking ‘Ancient DNA’ methods now allow scientists to turn back the clock to study the genetics of life forms from long ago.**”*

*“Ancient DNA (aDNA) analyses have allowed scientists to reconstruct ancient human cultures, to identify the remains of long-dead Czars and Pharaohs, and learn how our human ancestors lived—including the renowned ‘Iceman’ frozen in an Alpine glacier some 5,300 years ago.”*

Scientists are also applying aDNA methods to other species to answer a host of scientific questions. These range from understanding the causes for the demise of Pleistocene (from 1.8 million to 10,000 years ago) fauna like mammoths and Beringian brown bears to determining the quarry of prehistoric hunters. These techniques will also help to identify population bottlenecks caused by 19th century commercial whalers who took the oceans’ great whales to the brink of extinction.

Such lines of inquiry are taking on greater relevance and urgency in light of climate change and population declines, **such as the failure of Alaska’s Cook Inlet beluga populations to recover from overharvesting.**

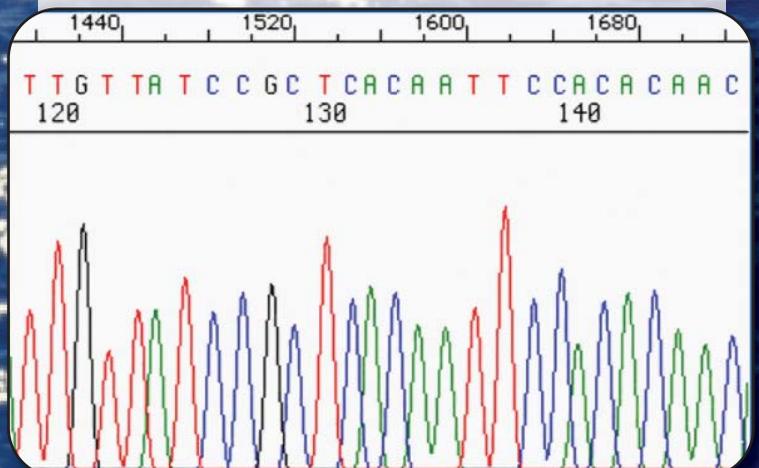
[www.hboi.fau.edu](http://www.hboi.fau.edu)

Dr. O’Corry-Crowe’s DNA research team is involved in tackling many of these issues. The team is working with a number of agencies, institutions and scientists to recover and analyze marine mammal bones and teeth from seafloor sediments and archaeological sites across the Arctic.

With the passage of time and exposure to the elements, DNA inevitably deteriorates. Under certain conditions, however, DNA is hardy enough to withstand the rigors of time. Ideal conditions for preservation are found in cold, dry environments with limited exposure to sunlight. Fortunately, such conditions have existed across polar and subpolar regions for the last 2 million years. Indeed, Dr. O’Corry-Crowe’s research in Alaska has been very fruitful, thanks in large part to the nature of the environment.

Preventing contamination of the extracted aDNA is accomplished only through the most stringent of sample handling and analysis protocols, requiring nucleic acid-free facilities with specialized aerosol filtration, dedicated equipment, bio-filtered workstations, and ultra-clean sample storage.

**Dr. O’Corry-Crowe’s objective of establishing a dedicated Ancient DNA Laboratory at Harbor Branch was realized this past November.** The research team is already getting a first look into historic and prehistoric megafauna from **Alaska’s Cook Inlet** and **Aleutian Islands**. Working with archaeologists the team has successfully recovered DNA from mammal bones up to 3,000 years old.



Sequences of the bases (amino acids) represented by the letters A, C, G, and T form the basis of the code of all life called DNA.

# "HAVE WE CURED CANCER YET?"

**By Dr. Amy Wright**

Director of the Center for Marine Biomedical and Biotechnology Research (CMBBR)

## "Have we cured cancer yet today?"

I often ask this of the Center's staff as I circulate between the labs talking to them and catching up on their research projects. The answers range from no, to not yet, to let me show you something interesting—and there have been some exciting findings over the last few months.



*Sponges of the genus Leiodermatium have been the source of potent antitumor compounds including leiodermatolide.*

**Neopeltolide**, a chemical from a deep-water sponge that we found a few years ago, is **6000 times more effective at killing certain types of pancreatic cancer cells than it is at killing normal cells.** This is an amazing result and to put this in perspective, the drug of choice for treating pancreatic cancer is called gemcitabine and it kills cancer cells and normal cells equally well when tested side by side, in the same tests. We have a company interested in developing neopeltolide.

**Leiodermatolide**, another chemical we discovered from a deep-water sponge, has been found to be extremely potent at blocking cancer cell division without being very toxic to normal cells. Initial work done in our lab indicates that it affects tubulin, a protein important in cell division. Unlike most other compounds having similar effects, leiodermatolide does this indirectly and may provide a totally new (and more selective) way of blocking cancer cells from dividing. Defining exactly how it works is the subject of a **National Institutes of Health (NIH)** funded project – we'll keep you posted on our results.



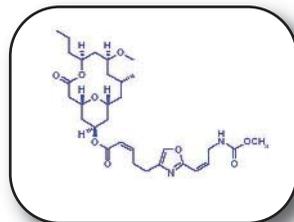
*This sponge of the family Neopeltidae is the source of neopeltolide and dictyostatin 1— two potent antitumor agents.*

We are lucky to have a network of friends in the community who are helping us move in new research directions. **Dr. Henry Gans**, a retired doctor, serves as an "idea guy". He knows of our interest in pancreatic cancer and stays current on the scientific literature. A few months ago, he sent an article from the **New England Journal of Medicine** describing a link between inflammation, pancreatitis and pancreatic cancer. If we can tap into this idea, we might be able to prevent pancreatic cancer from ever forming! In the article, researchers at the **University of California, San Francisco** described how a type of cell called mast cells can, under certain circumstances, migrate to the pancreas and initiate the formation of tumors leading to pancreatic cancer. These researchers also showed that blocking this process using "mast cell inhibitors" can stop the formation of new tumors and block growth of existing tumors. The problem is that there really aren't any good mast cell inhibitors available. So HBOI researcher and tumor biologist **Dr. Esther Guzmán** submitted a grant to the NIH to test HBOI's unique library of natural products for new mast cell inhibitors. We hope this will lead to a medicine that will block tumor formation and prevent pancreatic cancer in some people. The grant isn't funded yet, but we are hopeful it will be awarded.

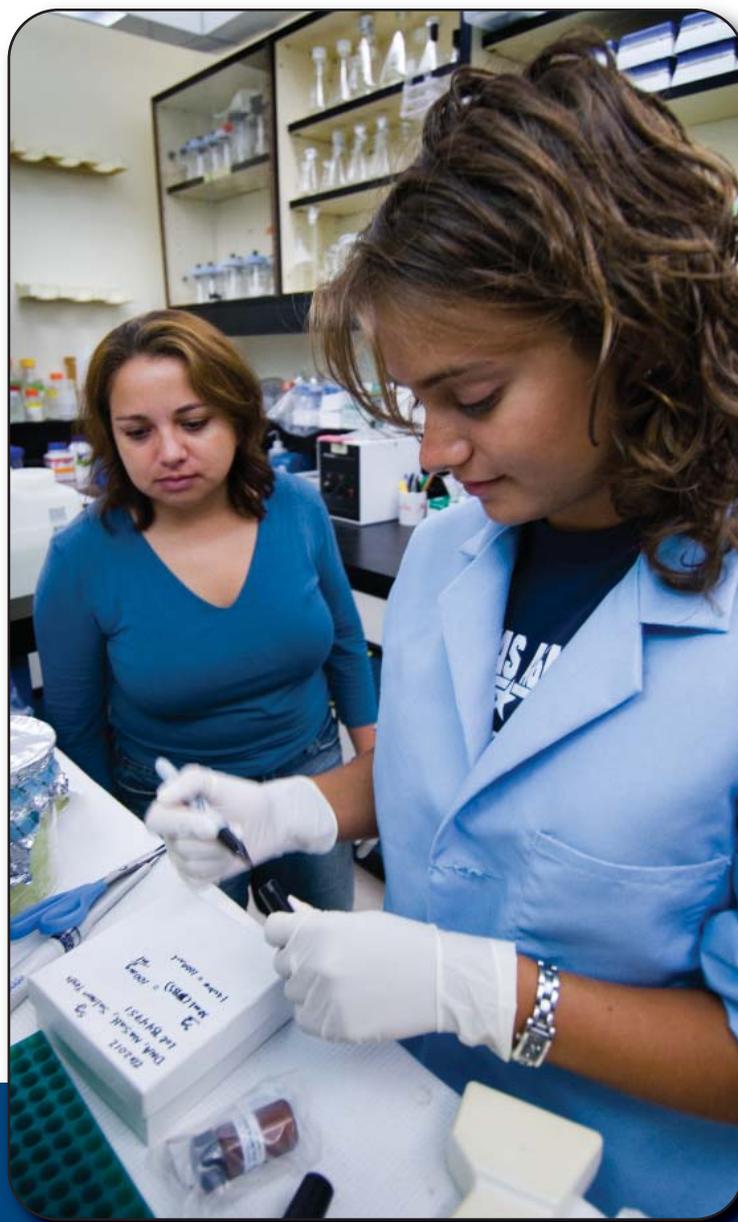


Generous gifts from **Drs. Charles and Mary Shoaf, Mr. and Mrs. George Cohon, and Mr. and Mrs. Bernard Gewirz** have also helped HBOI search for new ways of treating cancer. Their gifts are allowing us to purchase specially engineered cell lines that can detect changes in the levels of proteins that are associated with cancer. The goal is that, by testing our library of unique compounds in these cell lines, we can rapidly discover compounds that change the amount of these proteins and block cancer progression. Thanks to the generosity of these donors, we are now able to use a totally new approach to finding treatments for cancer and requesting funding from the NIH to continue the work.

Have we cured cancer yet? Not yet — but with a lot of hard work and some help from our friends, we are making strides towards the discovery of medicines for certain forms of cancer — and who knows what tomorrow will bring? One day soon when I ask, **“Have we cured cancer today?”**, I hope to hear the answer — **YES!**



*Structure of neopeltolide, a potent antitumor agent found by HBOI scientists.*



# DR. BRIAN LAPOINTE'S SEARCH FOR THE CAUSE OF HARMFUL ALGAL BLOOMS AND OTHER WATER QUALITY IMPACTS



Dr. Brian Lapointe

***“Nutrient pollution from sewage, agricultural runoff, and fossil fuel emissions is one of the biggest problems on our planet.” - Millennium Ecosystem Assessment.***

The **Millennium Ecosystem Assessment**, organized by the **United Nations Environment Program**, went on to note that land-based nutrient runoff was the primary cause of algal blooms impacting coral reefs in the **Caribbean** region, particularly **Jamaica**, where previously, many coral reef biologists had blamed the problem on overfishing.

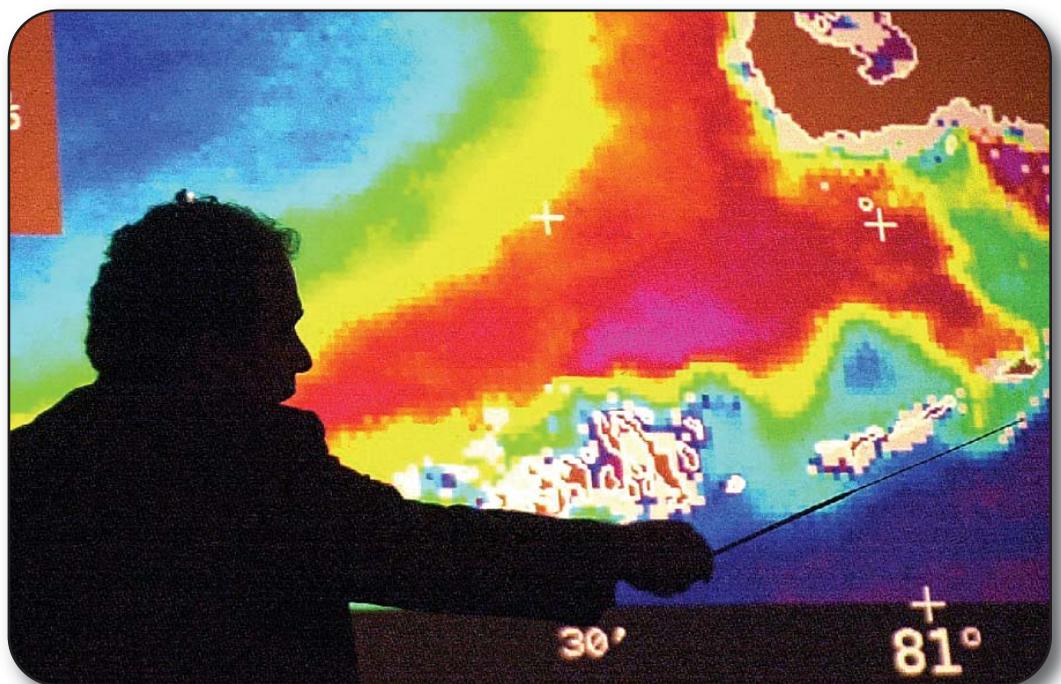
The problem of excess nutrients on coral reefs has been monitored in detail for over two decades at **Looe Key** reef in the Florida Keys by **Dr. Brian Lapointe**, a research professor in **HBOI's Center for Marine Ecosystem Health**. Dr. Lapointe has documented a 100% increase in average concentrations of biologically available nutrients like ammonium at Looe Key since the early 1980's.

Trained at Woods Hole with the late **Dr. John H. Ryther**, the pioneer in biological oceanography who first studied the role of nitrogen in stimulating harmful algae blooms in the 1950's, Brian Lapointe has been at Harbor Branch for 25 years.

Dr. Lapointe's work has attracted major media attention. Dubbed an “independent thinker” by author **Randy Wayne White**, who patterned his character **Doc Ford** after Lapointe, he is a world expert on the topic of nutrient ecology of harmful algal blooms.

Between 2003 and 2007, Dr. Lapointe investigated harmful algal blooms impacting coral reefs between Broward and Palm Beach counties on Florida's east coast. The alien invader **Caulerpa brachypus**, a native of Pacific waters likely imported to Florida's east coast in the ballast of cargo ships or possibly by the aquarium industry, **generated one of the most prolific blooms to affect South Florida's coral reefs**. Research using stable nitrogen isotopes allowed Dr. Lapointe and his research team to link the rampant spread of these blooms to various sources of land-based nutrient pollution, including the ammonium-rich discharges from the ocean sewage outfalls between Miami and Delray Beach.

By 2007, officials with the **Florida Department of Environmental Protection** announced that *“The weight of evidence on coastal water quality and coral reef health calls into question the environmental acceptability of continuing ocean outfall discharges”*. This echoed what residents of Key West had learned years earlier, aided by Lapointe's research. They cast their vote for clean water in a referendum to fund Advanced Treatment of their municipal sewage, which means nitrogen and phosphorus are removed from wastewater leaving the treatment plant.



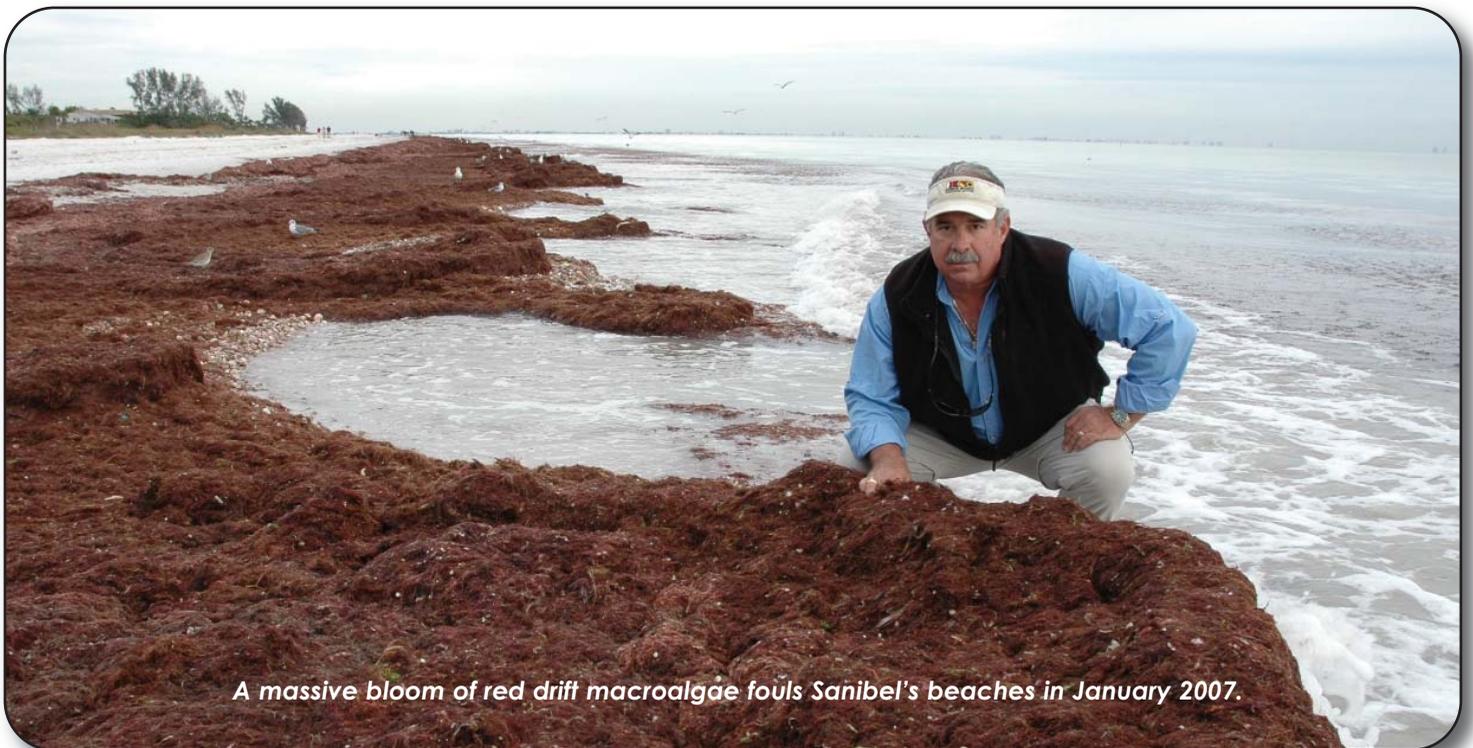
Dr. Lapointe lectures on the dead zone in the Florida Bay/Florida Keys Region.



*Dr. Lapointe examines red microalgae underwater in the Florida Keys.*

Finally, clean water policy appears to be spreading up the east coast of Florida where the northern limit of Florida's threatened coral reefs also need protection from excess nutrients. Brian is evangelical about getting that message out to many countries affected by nutrient pollution and has worked in **Jamaica, Turks & Caicos, Trinidad & Tobago, Bonaire, Curacao, Martinique, and St. Lucia.**

"We do work that has critical implications for ocean policy and the future well-being of our environment and society. Knowing what the cause and effect is for pollutants in our coastal waters, as well as the sources of these pollutants, will allow us to protect and carefully use these environmentally sensitive areas in a more sustainable fashion." **Dr. Brian Lapointe, Research Professor, Center for Marine Ecosystem Health, Harbor Branch.**



*A massive bloom of red drift macroalgae fouls Sanibel's beaches in January 2007.*

**Visit the OCEAN DISCOVERY CENTER at HARBOR BRANCH to learn more about Dr. Lapointe's research.**

# SUSTAINABLE SALTWATER FISH FARMING

**“With increasing seafood demand, collapsing wild fisheries, and a seafood trade deficit, US marine aquaculture development is critically needed”**, says **Dr. Megan Davis**, director of HBOI’s **Center for Aquaculture and Stock Enhancement**. Wild harvest of seafood has remained static at about 150 billion lbs. per year since the 1980’s. To keep pace with a growing world population, aquaculture’s contribution to seafood demand must rise from 40% to 50% in the next 25 years.

The expansion of the U.S. aquaculture industry is challenged by several factors. The most important constraints are the high cost and limited availability of coastal land and water resources, environmental impact concerns, high production costs, appropriate feeds that use sustainable alternatives to fish meal, lack of quality eggs and larvae, and insufficient technology transfer to producers and the workforce.

Scientists who are part of a cooperative research program between **Harbor Branch Oceanographic Institute at Florida Atlantic University** and the **USDA Agricultural Research Service** are making great strides in addressing the critical concerns that are holding back the growth of the domestic aquaculture industry.

A 25,000 ft<sup>2</sup> water reuse aquaculture facility, part of the **Harbor Branch Aquaculture Development Park**, is being used to grow juvenile fish to market size, develop energy efficient production systems, formulate diets with ingredients to replace fish meal, and improve techniques for the reliable production of eggs and larvae for year-round availability.

## Program Highlights:

- Studies have been conducted with species as diverse as southern flounder, summer flounder, hybrid striped bass, and black sea bass. More recently, research is focusing on Florida pompano and cobia
- Year round spawning of black sea bass and Florida pompano was developed, which will ensure a steady supply of fingerling fish for stocking tanks and ponds
- Large scale production of larval pompano was developed using improved system and feeding techniques; this will reduce costs and improve production output
- Optimal protein and protein to lipid ratios for both Florida pompano and black sea bass were established and showed improved growth and survival



**Meghan Anderson, Research Technician, is feeding larval fish.**

Using an integrated approach, researchers are **developing techniques to grow saltwater fish in low cost, energy efficient low salinity (near freshwater) water reuse or recirculating aquaculture systems**. The technology from this program will advance saltwater aquaculture technologies for inland locations, which will have a significant impact on the agricultural sector of Florida and the southeast United States. These technologies will make domestic aquaculture more competitive by reducing negative environmental impacts, lowering production costs, improving availability of fish eggs and larvae, and freeing up scarce and high-value coastal lands for activities other than fish farming. Increasing domestic aquaculture production is also an important national security priority. Heeding the lessons of the Nation’s dependence on foreign oil, the US needs to develop its domestic aquaculture capacity. Doing so will positively affect the US seafood trade deficit, increase employment opportunities for inland rural sectors and displaced farmers, increase crop diversity, and enhance food biosecurity.

**Timely delivery of the information is being provided through workshops, conferences, and publications.**

Dr. Davis is very excited about the advances of this program and states, *“The next steps are to take the research breakthroughs and develop production-scale technology to a level where it provides the industry with an economically viable business opportunity.”*



*Terry Breeden, research technician, holds a 6 pound harvestable cobia.*

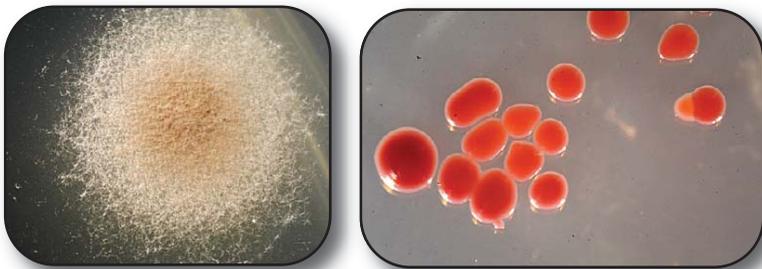
- Soybean meal and poultry by-products can be substituted for fish meal, which will help with ecological and economic sustainability
- Airlift technology supplies sufficient aeration for fish and filter needs, which allows for high production of fish at a lower cost
- System components in a low-head water reuse system were evaluated for ammonia removal, solids removal, water, energy, and supplemental oxygen use
- Growout of hybrid striped bass, Florida pompano and cobia to market sizes has been completed in large scale production systems in relatively short periods of time
- Juvenile Florida pompano can be grown to market size (1.5 lbs) in low salinity systems in less than one year
- Cobia were cultured in water reuse systems to 5 lbs in 7 months with excellent fillet yield
- Frequent workshops, seminars and conferences have provided stakeholders and the public with up-to-date information

## PRODUCTION OF BIOFUELS USING MARINE MICROBES

We have all seen the price of gas fluctuate wildly over the last year and it looks as though price increases are set to continue. There has been a move towards alternative energy sources for a number of years, with the goal of relieving our nation's dependence on oil reserves. **Among these alternative sources is the production of fuels from plant materials** — both waste materials from forestry and crops grown specifically as a fuel source.

In order for these plant materials to be used as fuels they need to be broken down into their components — simple sugars that can then be converted into ethanol through fermentation, a similar process to that used for making beer and wine. Most methods use chemicals and heat to break down the plant material. This generates potentially harmful waste products that need to be disposed of and costs money to provide energy to heat the system.

**Microorganisms have an amazing ability to use materials present in their environment as food.** In order to do this, many produce enzymes which can break down large molecules into usable components: a microbe which grows on plant materials breaks down large carbohydrates such as cellulose into sugars that can then be used for growth.



Microbes from the Harbor Branch Marine Microbial Culture Collection

The **McCarthy lab** in the **Center for Marine Biomedical and Biotechnology Research** has started a program to provide a new method of breaking down plant material into simple components that can be used in making biofuels using the marine microbes in the extensive **Harbor Branch Marine Microbial Culture Collection**. The collection contains over 19,000 bacteria and fungi that have been isolated from the marine environment over the last 25 years. Most were cultured from deep-water marine sponges collected using the **Johnson-Sea-Link** submersibles. **Dr. McCarthy** is looking at enzymes produced by these microbes as an efficient way to break down many types of plant materials so that they can then be used for bioethanol production. **He is also looking at other enzymes called lipases which can be used in the production of biodiesel from plant oils.** This is the first time that marine microbes have been used in this way. His goal is to contribute to develop new technology for use in the process known as biomass conversion.

*"This is a very exciting opportunity to use our existing microbial collection in a totally new way. We have already identified some enzymes from marine microbes, and are expanding our search for additional enzymes pending grant funding. There is currently so much interest in alternative energy that we are entering the field at a perfect time and will hopefully make an impact,"* stated **Peter J. McCarthy**, Ph.D. research professor, **Center for Marine Biomedical and Biotechnology Research Harbor Branch Oceanographic Institute at Florida Atlantic University.**

## HARBOR BRANCH BUILDS A PLATFORM TO REHABILITATE *Winter* THE DOLPHIN!

The **Marine Mammal Rescue and Research team, Harbor Branch engineers and fabricators** and the **Clearwater Marine Aquarium** have teamed up to build a platform to aid in the rehabilitative efforts of the dolphin "**Winter**." Winter was rescued in the Indian River Lagoon. She was caught in a crab trap which caused her tail-fluke to die and fall off. New prosthetic technology is giving her the opportunity to have a tail and the new physical therapy platform will allow trainers to "walk" Winter as she adjusts to her new tail. At Harbor Branch, **Steve McCulloch** and **Dr. Juli Goldstein, DVM** have served as consultants for the **Clearwater Marine Aquarium** medical and behavior staff on care, treatment and how to condition the animal so that it can be rehabilitated. Harbor Branch Engineering fabricator **Jack Yager** built the 4-tiered platform.



Fabricator Jack Yager and MMRC program manager Stephen McCulloch inspect the completed platform for Winter.

## HARBOR BRANCH RECEIVES PRIVATE SUPPORT

Contributions play an important role in the continued success of Harbor Branch programs. The **Ocean Engineering and Technology Center** was the recipient of a \$1.4 million gift-in-kind providing two single-man submarines and high definition camera equipment. The subs provide additional resources for Harbor Branch to conduct underwater research. The donor, **DeepSee, LLC**, is an oceanic exploration and submarine leasing company. The **Edward W. Snowdon Charitable Trust** made a \$50,000 contribution to benefit the **Edward W. Snowdon Harbor Branch Research Endowment**. The endowment supports the use of ocean engineering and technology resources for marine biomedical and biotechnology research.

Marine mammal research will benefit from a gift of **Seadoos** from the **Bombardier Recreational Company**. The two personal watercraft boats are valued at over \$20,000 and will be used for open water rescue missions.

**The Link Internship program**, providing annual scholarships supporting summer interns at Harbor Branch, received a commitment from long-time supporter **Marilyn Link** in the form of a gift annuity and pledge of \$50,000 to fund the permanent named endowment program. **The internship program has been a part of Harbor Branch for over 35 years.** The Link Foundation made a \$55,000 annual gift to support internships.

**Sheila and Francois Brutsch** made a \$10,000 gift in support of Aquaculture. The Harbor Branch Support Fund has received \$10,000 gifts from the **Alex G. Nason Foundation, Inc.**, **Jim Seitz** and a matching gift from the **IBM Corporation**. The support fund benefits general research and programs. **The Bay Branch Foundation** made a \$10,000 contribution in support of Ocean Engineering and Technology.

The fall membership drive for the Harbor Branch Associates generated \$45,000 through individual efforts. The Associates hosted a recognition luncheon honoring the major contributors to the **Ocean Discovery Center**. **Dr. Shirley Pomponi** was the featured speaker and updated the group on Harbor Branch.

The **Harbor Branch Oceanographic Institution Foundation, Inc.** contributed over \$1.2 million in support of Harbor Branch research during the first six-months of the fiscal year 2009.

The funding represents proceeds from the Harbor Branch specialty license plate program — *Wild Dolphins, Florida Whales, Support Our Seas and Aquaculture*.

Gifts in support of Harbor Branch are administered through the **Florida Atlantic University Foundation, Inc.** A complete donor listing is available on the Harbor Branch website, [www.hboi.fau.edu](http://www.hboi.fau.edu).



# Get Involved!

**WE URGE YOU TO GET INVOLVED TODAY. Private gifts are essential for the continued growth and development of HARBOR BRANCH OCEANOGRAPHIC INSTITUTE at FAU.** Gifts in support of Harbor Branch at FAU come from individuals, corporations, foundations, federal, state and local entities. The Harbor Branch Development Office facilitates annual giving, endowments, major gifts, planned gifts, gifts-in-kind and other programs in support of Harbor Branch at FAU.

Gifts may be given in the form of cash, securities, real estate, tangible personal property/gifts-in-kind and planned giving such as bequests, annuities, trusts and life insurance. To give by check, please make it payable to HBOI-FAUF.

**For more information regarding the many options available, contact:**

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To give on-line go to:

**[www.hboi.fau.edu](http://www.hboi.fau.edu)**



# Harbor Branch Oceanographic Institute at FAU has a New Website!

Go to [www.hboi.fau.edu](http://www.hboi.fau.edu) to find out the latest research, exploration, technology and educational programs at Harbor Branch. **View video, photos and in-depth ocean science research.** See what events are scheduled on campus. Go to the “**at Sea**” button to see our latest ocean expeditions. Click on the “**Marine Mammal Rescue**” button to see the latest marine mammal rescue efforts. **Spread the word of the new website** to your friends and ask them to sign up for the Harbor Branch e-bulletin.

## Ocean Science Lecture Series

- **February 18** PAUL HARGRAVES - What's in a Name: "Red Tides" or HABs – Should We Worry?
- **February 25** TAMMY FRANK - Spines, Slime, and Camouflage: How to Avoid Becoming a Deepsea Meal
- **March 4** SARA EDGE - Detecting Coral Responses to Stress Using Microarray Technology
- **March 11** ESTHER GUZMAN - Marine Drug Discovery: Bringing Cures to the Surface
- **March 18** AMBER SHAWL & MEGAN DAVIS - Snails, Whorls, and Pearls: The Gastropod Research Program at Harbor Branch
- **April 1** DENNIS HANISAK - Shifting Baselines: Water Quality in the Central Indian River Lagoon

## Semester by the Sea 2009

**Semester by the Sea** (SBTS) started in January, with 12 FAU undergraduates beginning a semester-long immersion in marine science, with emphasis on marine biology. In addition to courses offered in previous years

(**Marine Science, Marine Biodiversity, Marine Biology, and Functional Biology of Marine Animals**), this year's program offers two new courses. The first, **Principles of Aquaculture**,

is a team-taught course led by **Dr. John Scarpa** that covers the basic planning and culture requirements of aquatic organisms (aquatic plants, mollusks, crustaceans, and fish), as well as culture systems, disease diagnosis, and business

feasibility analysis. The second, **Oceanographic Experience for Undergraduates**,

offers students a week-long experience in March that includes an oceanographic cruise off the coast of Florida to collect biological samples and physical-chemical data for subsequent analysis in the laboratory. The funding for the ship time was

obtained via a successful proposal to the **Florida Institute of**

**Oceanography** by the lead instructors for that course,

**Dr. Tammy Frank** and **Dr. Ned Smith**. Our thanks go to **Lon and**

**Audrey Kight** for their generous donation which is supporting the

Oceanographic Experience course. SBTS 2009 runs until April 29.



[www.hboi.fau.edu](http://www.hboi.fau.edu)

**Join the Harbor Branch Associates Membership Program  
and its events. Please call 772-465-2400 ext. 559.**

# LAKE BAIKAL EXPEDITION

Harbor Branch's Executive Director **Dr. Shirley Pomponi** and Chief Submersible Pilot **Don Liberatore** joined **Dr. Anatoly Sagalevitch**, head of the **Deep Manned Submersible Laboratory** at the **P.P. Shirshov Institute** in Moscow to initiate participation in a two-year expedition to study the biology, geology and archeology of Lake Baikal, the world's deepest (1,637 meters) freshwater lake in Russia's Siberian region. Scientists are conducting these studies using two deep diving Russian manned submersibles, **Mir-1 and Mir-2**, each capable of diving to 6,000 meters. Before the dive to 1,058 meters (nearly 3,500 feet), **Shirley and Don presented Dr. Sagalevitch with an FAU flag** which also accompanied them on the dive. In 2007, Dr. Sagalevitch was named "Hero of Russia" by the Prime Minister for his dives in the summer of 2007 with the Mir submersibles under the ice to place the Russian flag on the ocean bottom at the North Pole. *"It is a great honor to be involved in these studies of the unexplored deep regions of Lake Baikal,"* said Dr. Pomponi. *"The lake is home to dozens of species of fish and invertebrates found nowhere else in the world, and there is no doubt that many more new species will be discovered during the 2008-09 expedition."*



**Don Liberatore, Dr. Anatoly Sagalevitch and Dr. Shirley Pomponi** prior to their dive in Lake Baikal, the world's deepest freshwater lake, in Russia's Siberian region.

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