

HARBOR BRANCH

FLORIDA ATLANTIC UNIVERSITY™

Ocean Science for a Better World™

BULLETIN

JANUARY 2010



John Reed is a Harbor Branch Research Professor, and serves as a principal investigator for the Robertson Coral Reef Research and Conservation Program. Reed's research emphasizes conservation of coral reefs, including Florida's deepwater *Lophelia* and *Oculina* reefs.

HARBOR BRANCH SCIENTIST INSTRUMENTAL IN PROTECTION OF DEEP CORAL ECOSYSTEMS

Harbor Branch scientist John Reed has covered a lot of territory in a career spanning over 30 years. Reed's research emphasizes conservation of coral reefs, including deep-water *Lophelia* and *Oculina* reefs. He has been co-chief scientist on 60 research expeditions over the past 30 years. His passport has been stamped in 40 countries, having worked in the waters of Samoa, Papua New Guinea, Australia, Galapagos Islands, Azores, Canaries, Cape Verde, and throughout the Caribbean. John also heads collections and taxonomy for the Biomedical Marine Research Program (BMR) at HBOI and is curator for BMR's museum (more than 30,000 deep and shallow water marine organisms). He has logged over 2000 scientific scuba dives, 35 deep-water lockout dives with helium-oxygen from Johnson-Sea-Link submersibles to depths of 300 ft, and more than 200 dives in the Johnson-Sea-Link submersibles. He has authored over 100 publications, reports, and articles on coral reef and biomedical research. John received his Master of Science from Florida Atlantic University in 1975.

John began his work on the *Oculina* reefs 33 years ago soon after their discovery in 1975. These reefs are a stunning series of 60-100 ft tall coral mounds located 300 feet deep off eastern Florida. For Reed, the discovery was the beginning of a career-spanning crusade to explore, understand, and—most importantly—protect unique and fragile deep reef systems.

Tireless advocacy by Reed led to the designation in 2000 of the 300-square-mile *Oculina* Coral Marine Protected Area (MPA). These were the first deepwater reefs in the world to be so designated, protecting them from destructive fisheries practices like bottom trawling that have devastated deepwater reefs worldwide.

For the past 10 years, John has expanded his research to include another deepwater habitat imperiled by bottom trawling. The *Lophelia* coral reefs occur at depths of 900 to 3000 feet from North Carolina to south Florida. His expeditions since 1999 documented the distribution of these reefs. During this period John discovered and mapped over 400 deepwater reefs some with pinnacle formations up to 500 feet tall.
(continued on next page)



The new 23,000 square-mile deepwater Coral Habitat Area of Particular Concern. The South Atlantic region is home to what may be the largest contiguous distribution of deepwater corals in the world, providing essential habitat for diverse communities of fish and invertebrates.

HARBOR BRANCH SCIENTIST JOHN REED, (CONTINUED)

To accomplish this *Oculina* research, Reed has used Harbor Branch's submersibles, as well as other platforms, such as remotely operated and autonomous vehicles.

Every year since 2004, John has presented his research findings to the South Atlantic Fishery Management Council. Finally, in September 2009, the Council voted unanimously to approve the Comprehensive Ecosystem-Based Amendment 1, protecting over 23,000 square miles of deepwater coral habitat. The amendment should be implemented in 2010.

Says Reed, "The Florida *Oculina* Banks were the first deepwater reefs in the world to be designated as a Marine Protected Area. Now, this new deep coral habitat of particular concern (HPAC) will be one of the largest in the world. Reefs that were once threatened are now receiving greater protection through better management and long-term solutions."



HARBOR BRANCH SCIENTISTS UNLOCK MYSTERY OF CREATING CULTURED PEARLS FROM QUEEN CONCH



In their natural form, conch pearls are among the rarest pearls in the world. One in 10,000 conchs produces a pearl, but only one in one million animals forms a gem-quality pearl. Therefore, just as was done with oyster pearls, the quest has been on for 25 years to increase yields of these rare gems by learning to culture pearls from the queen conch (*Strombus gigas*). All efforts had been unsuccessful—until now, that is.

For the first time, novel and proprietary seeding techniques to produce beaded (nucleated) and non-beaded cultured pearls from the queen conch have been developed by scientists from Florida Atlantic University's Harbor Branch Oceanographic Institute (HBOI). With less than two years of research, Drs. Héctor Acosta-Salmón and Megan Davis, co-inventors, have produced more than 200 cultured pearls using the techniques they developed. Prior to this breakthrough, no high-quality queen conch pearls had been cultured. This discovery opens up a unique opportunity to introduce a new gem to the industry. This significant accomplishment is comparable to that of the Japanese in the 1920s when they commercially applied the original pearl culture techniques developed for pearl oysters.

HBOI has been working with the Gemological Institute of America (GIA) to conduct extensive laboratory testing of the queen conch cultured pearls. In its independent analysis, GIA used techniques that included conventional gemological examination, chemical composition, spectroscopy, spectrometry and microscopy. HBOI and GIA plan to jointly publish the results of these trials in an upcoming issue of GIA's scientific journal, *Gems & Gemology*.





“We used two different seeding techniques to induce pearl formation in the queen conchs,” said Acosta-Salmón. “One was a modification of the conventional technique used to produce cultured pearls in freshwater mussels, and the other was a modification of the conventional technique used in marine pearl oysters.”

Conch pearls are formed by concentric layers of fibrous crystals, and this layering often produces the desired flame structure, which is characteristic of conch pearls. The pearls have a porcelain finish and luster like the interior of the conch shell, and come in a wide variety and combination of colors including red, pink, orange, yellow, brown, and white. Queen conch pearls are measured in carats like traditional gemstones.

The size of the cultured pearls produced by Acosta-Salmón and Davis is controlled by the size of the bead and the culture time. The researchers have experimented with culture times from six months to two years; longer culture times may produce larger pearls. Queen conchs are farmed in aquaculture tanks, and the queen conch cultured pearls in the initial harvest were grown in an aquaculture facility at HBOI. Queen conchs achieve full size at about three years and have a life span of up to 40 years.

“This is a significant development for the pearl industry, and we were very excited to have the opportunity to closely examine these unique conch cultured pearls in our laboratory,” said Tom Moses, senior vice president of the GIA Laboratory and Research. “Several of the pearls we examined are truly top-quality gems. With the equipment and expertise available at the GIA Laboratory, identification criteria are being compiled to separate queen conch cultured pearls from their natural counterparts.”

Previous efforts to culture queen conch pearls were unsuccessful, probably because of the animal's sensitivity to traditional pearl seeding techniques and its complex shell. The spiral shape of the shell makes it virtually impossible to reach the gonad, one of the pearl-forming portions in pearl oysters, without endangering the animal's life.

“Perhaps the most significant outcome from our research is that the technique we have developed does not require sacrificing the conch in the process,” said Davis. “The 100 percent survival rate of queen conchs after seeding and the fact that it will produce another pearl after the first pearl is harvested will make this culturing process more efficient and environmentally sustainable for commercial application.”

Survival of the animal is critical because commercial fishing has depleted the once-abundant wild populations of queen conchs, and they are now considered a commercially threatened species in Florida and throughout the Caribbean.

There are basically two types of cultured pearls: nucleated (beaded) and non-nucleated (non-beaded). Nucleated cultured pearls are produced by inserting a piece of mantle tissue from a donor mollusk and a nucleus, usually a spherical piece of shell, into the body of a recipient mollusk. Non-nucleated pearls are produced by grafting only a piece or pieces of mantle tissue, and no bead is inserted.



FIRST-EVER

FAU HARBOR BRANCH DOCTORAL CANDIDATE EARNS DEGREE

On Thursday, October 29, Harbor Branch Natural Products Chemistry team member and Florida Atlantic University doctoral candidate Priscilla Winder successfully defended her doctoral dissertation. Priscilla's dissertation seminar was *Looking to the Deep for Novel Marine Natural Products with Therapeutic Potential*.

Successful defense of doctoral research is a major milestone for any professional scientist and the culmination of years of toil and dedication. In addition, Priscilla will hold the further distinction of being the first doctoral candidate to earn her degree under the guidance of an FAU/ Harbor Branch advisor, Dr. Amy Wright, director of the Marine Drug Discovery research group.

Priscilla is no stranger to firsts. As an undergraduate she was a member of the inaugural Harbor Branch/FAU "Semester by the Sea" program in 2001. She went on to complete two consecutive summer internships in 2001 and 2002 with the Harbor Branch Marine Biomedical and Biotechnology Program, funded by the Gertrude E. Skelly Charitable Foundation. Later Priscilla became a Harbor Branch employee and at the same time began working toward her doctorate.

It's also a first for Dr. Wright, who has served as major professor for master's candidates at USF and the Medical University of South Carolina, but has not chaired a doctoral committee until now.

Dr. Wright shared her thoughts after Priscilla's successful defense. "It has been a pleasure to have Priscilla in the lab. Not only is she a very talented organic chemist but she is also a wiz at fixing things. She has been invaluable in helping her co-workers keep equipment running and has pioneered development of new methods on our LC-MS (Liquid chromatography-mass spectrometer) which have helped everyone become more productive in their work." Not content to only work on high-tech equipment, Priscilla also uses her mechanical abilities to fix old cars.

Immediately after graduating, Priscilla began a postdoctoral fellowship at Harbor Branch in Dr. Wright's lab during which she intends to focus on the discovery and characterization of sponge compounds with the potential to treat pancreatic cancer.

"This experience has been great," Priscilla exclaims. "FAU introduced me to the great research going on at Harbor Branch and then afforded me the opportunity to obtain my Ph.D. under one of the top people in the field of marine natural products chemistry. I have participated in research cruises and I've been part of *Johnson-Sea-Link* submersible dives to explore areas never before seen at the bottom of the sea."

While it is certain there will be many more FAU/Harbor Branch doctoral degree awards in the coming years, Harbor Branch wishes to take this opportunity to congratulate Priscilla Winder as the first to record this important accomplishment.





CLELIA

ASSUMES AMBASSADOR ROLE

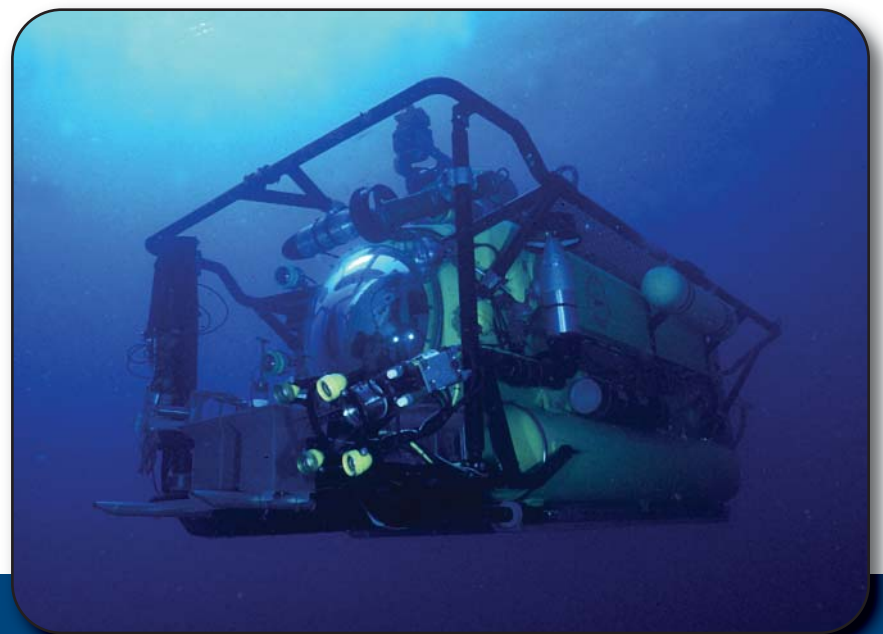
The research submersible *Clelia* is now on display at the Georgia Aquarium in Atlanta, serving as an ambassador for deep-sea research and exploration.

The yellow sub was built by Perry Systems in the 1970s and was purchased by Harbor Branch in 1992 to round out the institution's fleet of undersea vehicles, joining the Johnson-Sea-Link I and II submersibles. She was extensively refurbished by Harbor Branch submersible crew with new compressed gas cylinders, cables, batteries and a redesigned electrical system. Collection devices designed and built by Harbor Branch engineers were added, including a manipulator arm with claw, scoop and suction attachments as well as a variety of work platforms. Special fittings were incorporated to facilitate launch and recovery from Harbor Branch ships. *Clelia* could dive to a maximum depth of 1,000 ft., where the JSJs can dive to 3,000 ft.

Clelia made 629 dives as a Harbor Branch research submersible. She was utilized by our scientists on drug discovery missions to collect deep-sea marine organisms and to survey the deepwater *Oculina* coral reefs in the Gulf Stream off Florida's east coast. Her powerful motor and big main propeller allowed *Clelia* to maneuver successfully against the strong currents present in the stream. *Clelia* made several dives to the wreck of the Civil War ironclad *USS Monitor*, surveying the site for the NOAA Monitor National Marine Sanctuary. In 1994, she was the submersible that shuttled researchers and filmmakers to the famous wreck of the 720 ft. ore carrier *Edmund Fitzgerald* that went down in a storm on Lake Superior in November 1975, claiming the lives of all 29 crewmembers. On another mission, she carried a 1,000 lb. laser line scanner for 3-dimensional imaging studies of the seafloor in the Bahamas and the Gulf of Maine. *Clelia* made her last dives for science in September 2001, surveying deepwater *Oculina* reefs off Florida's coast, north to the rocky live-bottom reefs off the coast of Sapelo Island, Georgia.

In her new capacity at the Georgia Aquarium, *Clelia* is the centerpiece of an educational exhibit illustrating methods for conducting research in the deep sea. The aquarium sees over three million visitors each year, and *Clelia's* presence there will highlight Harbor Branch's role in deploying human occupied vehicles (HOV's) to explore the ocean depths.

Dr. Greg Bossart, formerly director of the Marine Mammal Research and Conservation program at Harbor Branch, and now senior vice president and chief veterinary officer at the Georgia Aquarium, e-mailed the photo of *Clelia* on display and said the exhibit is quite popular so far. Graphics and a video loop have been created to explain her Harbor Branch history.



2009



A GREAT YEAR FOR FLORIDA ATLANTIC UNIVERSITY'S HARBOR BRANCH OCEANOGRAPHIC INSTITUTE

Florida Atlantic University's Harbor Branch Oceanographic Institute has enjoyed a banner year in 2009. Research staff grew to 93 in 2009, up from 80 in 2008. A \$44 million renovation and new construction phase is underway to accommodate planned growth of research programs.

2009 ACCOMPLISHMENTS:

- Florida Atlantic University's honored Harbor Branch Senior Research Scientist Amy E. Wright, Ph.D., as a 2009 "Researcher of the Year."
- Harbor Branch aquaculture researchers cultivated gem-quality Caribbean queen conch pearls for the first time—a research breakthrough that is expected to lead to commercialization.
- NOAA announced Harbor Branch as the location for a new Cooperative Institute for Ocean Exploration, Research and Technology.
- Our ship completed its longest and most remote deployment—a six-month mission to explore the central Pacific Ocean with funding from the Waitt Institute for Discovery.
- Thirty years of Harbor Branch deep-reef research and conservation work proved instrumental in the South Atlantic Fishery Management Council's recommendation to create a 23,000-square mile Marine Protected Area stretching from North Carolina to the Florida Keys.
- Two million dollars was awarded to FAU/Harbor Branch by the Navy to develop laser technologies that can "see" objects in murky water and use light for undersea communication.
- Culture techniques were developed by FAU/Harbor Branch and the University of Florida to grow the sunray venus clams, a highly prized culinary delight.
- Renovations and new construction totaling approx \$44-million dollars have begun. Roads and infrastructure are being upgraded, old buildings have been razed, two buildings are being substantially renovated, and a new research building will be built using these funds.
- The Marine and Oceanographic Academy (MOA) established at Harbor Branch by the St. Lucie County School Board has grown to the point that it now occupies a new, stand-alone campus within a campus. Twenty percent of the school's science classes are taught by FAU/Harbor Branch faculty.



FAU WANTS MORE

POSTDOCS & GRAD STUDENTS AT HARBOR BRANCH

Harbor Branch is announcing an expanded postdoctoral fellows program that will attract new talent and forge research and collaboration links with the colleges of engineering and science. In order to capitalize on the opportunity to grow FAU's research base, President John F. Pritchett has approved the program, which is planned to start in the next fiscal year.

Many Harbor Branch faculty started their careers at Harbor Branch as postdocs, attracted by the chance to work with Harbor Branch's distinguished researchers. Postdocs also sought out Harbor Branch for its emphasis on providing researchers access to, and tools for, working in the field—from aquaculture tanks on land to submersibles in the deep ocean.

The infusion of talent, new knowledge and novel approaches that postdocs bring also help to keep existing research programs on the cutting edge and enable faculty at FAU to multiply their efforts by working with, and directing the research of, postdoctoral fellows.

Postdoctoral fellowships will be available to persons who have completed their doctoral studies.



HARBOR BRANCH OCEANOGRAPHIC INSTITUTE AT FLORIDA ATLANTIC UNIVERSITY

OCEAN SCIENCE LECTURE SERIES

- January 13** **AMY WRIGHT** – *Florida Biotech: Harbor Branch's Role in the New "Life Sciences Cluster"*
- January 20** **SHIRLEY POMPONI** – *Drugs from the Sea: Sponges as Chemical Factories*
- January 27** **SUSAN LARAMORE** – *Oysters Got the Blues: Emerging Bivalve Disease and Climate Variability*
- February 3** **STEVE MCCULLOCH** – *The Status of Marine Mammals in the IRL and a Stranding Center Reborn*
- February 10** **BRIAN LAPOINTE** – *Reefs, Wreckers and Shipwreckers in the Florida Keys*
- February 17** **JOSHUA VOSS** – *A Decade of Demise? Charting the Past, and Future, of Florida's Coral Reefs*
- March 3** **TAMMY FRANK** – *Ocean Exploration and Deep-Sea Research: Trials, Tribulations and Discoveries*
- March 10** **PAUL HARGRAVES** – *The Life that Lives on Us*
- March 17** **DENNIS HANISAK** – *"Algae? This is a Color?"*
- March 24** **SARA EDGE** – *Using Molecular Genetics to Measure the Impacts of Global Climate Change on Reef Building Corals*

All lectures are presented weekly on Wednesdays at 4 p.m. and 7 p.m.
An opportunity to meet the speaker follows each presentation.
Light snacks are provided after the 4 p.m. lecture and an appetizer buffet
and cash bar follow the 7 p.m. presentation. The lectures are open to the public
and free of charge. For more information, call **(772) 462-2506**.

**5600 US 1 North
Fort Pierce, FL 34946**

FRIENDS OF HARBOR BRANCH

The Ocean Science Lecture Series is sponsored in part by the Friends of Harbor Branch. Gifts in support of Harbor Branch benefit the programs and activities of Harbor Branch Oceanographic Institute at Florida Atlantic University.

FRIENDS OF HARBOR BRANCH/FAU SCHEDULE UPCOMING TRIPS – 2010 & 2011

JANUARY 25

ECO-BOAT CRUISE & MUSEUM TOUR

Enjoy a unique boat cruise on the Indian River Lagoon combined with a tour of the UDT Museum on North Hutchinson Island. Begin the trip with a cruise aboard the "GATOR" on the lagoon with Audubon warden Captain Chop Lege and a Harbor Branch scientist. The "GATOR" will deliver the group to a dock where we will be transported over to the UDT Museum for a tour and lunch. Cost: Members-\$55; Nonmembers-\$65

FEBRUARY 4

DAY TRIP – GREEN TOUR

U.S. Department of Agriculture (USDA) in Fort Pierce. Group will meet in the lobby of the USDA building at 9:45 AM. Tour will include a picnic lunch. Cost: Members-\$20; Nonmembers-\$30

APRIL 16-17

OVERNIGHT TRIP TO QUAIL CREEK PLANTATION, OKEECHOBEE

Experience the Florida outdoors on an authentic Florida ranch. Stay overnight in a new cabin and experience early-morning and late-afternoon wildlife tours and a campfire gathering following a delicious supper in Quail Creek Lodge. Double accommodations available. Call the Friends Office for more information. 772/465-2400 ext. 226.

APRIL 22

EARTH DAY EVENT

RIGHT WHALE RECOVERY EFFORTS: BAROMETER OF THE EARTH & OCEANS HEALTH

2 p.m. - 5 p.m. – Johnson Education Center – Speakers will include: Tom Prichard, Florida Fish & Wildlife; Dr. Jim Hain, Woods Hole Oceanographic Institute and Marineland Right Whale Project; Dr. Ed Gerstein, FAU and Marineland Acoustic Monitoring Project; Julie Albert, Marine Resources Council; and Steve McCulloch, HBOI/FAU. More details to follow.

APRIL 23

PREMIER OF THE FILM, "OCEANS"

Majestic Theater in Vero Beach. 7 p.m. Opening will include a guest speaker from Harbor Branch and HBOI exhibits in the main lobby of the theater. Ticket proceeds to benefit Harbor Branch.

For more information, call 772/465-2400 ext. 559.



Charitable Gift Annuity Rates	
Your Age	Your Annual Rate of Return
50	4.4%
55	4.8%
60	5.0%
65	5.3%
70	5.7%
75	6.3%
80	7.1%
85	8.1%
90+	9.5%

Charitable Gift Annuities

May benefit you while supporting FAU's Harbor Branch Oceanographic Institute

A charitable gift annuity is a type of charitable gift that generates fixed payments to you for life while ensuring a significant gift to Harbor Branch Oceanographic Institute (HBOI) after your lifetime. Charitable gift annuities in support of HBOI can now be established through the FAU Foundation.

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Visit <http://fauf.fau.edu/giftplanning>, call 772.465.2400 x204 or e-mail gift.planning@fau.edu to find out more.

EXPLORE THE OCEAN DISCOVERY CENTER'S HANDS-ON TOUCH TANK NEW FOR 2010!



Darby Gibbons (1948-2009)



Harbor Branch queen conch will be among the live animals housed in the new touch tank exhibit.

Ocean Discovery staff members have been hard at work setting up a new hands-on Touch Tank exhibit debuting in January 2010. The tank will house a variety of live specimens including horseshoe crabs and Harbor Branch-reared queen conch. This new display is made possible through generous contributions to a memorial fund established in remembrance of Harbor Branch extended family member Darby Gibbons whose name the exhibit will bear.

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

Hours: Monday-Friday, 10 am - 5 pm;
Saturdays 10 am - 2 pm.

Phone: 772-465-2400, ext. 293.

Group tours please call ext. 417 for scheduling.

www.hboi.fau.edu



“We deeply appreciate all of you who are helping us drive the message home.”

HARBOR BRANCH SPECIALTY LICENSE PLATES ARE KEY TO FLORIDA’S FUTURE

Florida is a top destination to live, work and play. Tourism and recreation help fuel Florida's economic engine. You can help ensure Florida's ocean resources will be conserved for future generations to enjoy.

Purchase one of the four Harbor Branch specialty license plates that help support research, conservation and education in the following areas:



Marine Mammals

Protect Wild Dolphins
www.protectfloridadolphins.org

Protect Florida Whales
www.protectfloridawhales.org;

Ocean Health and Exploration

Save Our Seas
www.savefloridaoceans.org

Aquaculture
www.floridaaquaculture.org.

WHAT’S ON YOUR PLATE?

Here is a “snapshot” of personalized Harbor Branch specialty plates spotted around Florida. For a few extra dollars a year, you can make a difference...and a personal statement!



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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.

NEW!



VISIT THE HARBOR BRANCH OCEAN DISCOVERY CENTER!

The Harbor Branch Ocean Discovery Center is the public gateway to Harbor Branch Oceanographic Institute at Florida Atlantic University.

Featuring interactive exhibits, live animal displays, a video theater, and other displays exploring the marine world and research efforts at Harbor Branch.

New for 2010: Explore our Touch Tank!

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: 772-465-2400, ext. 293.

Group tours please call ext. 417 for scheduling.