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NSU Oceanographic Center

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Oceanographic Center Hosts VIPs for Tire Project

The NSUOC, working with military, federal, state, and Broward County officials, is set to begin a monumental project to remove hundreds of thousands of waste tires from the Osborne Reef in the Atlantic Ocean, off the coast of Fort Lauderdale, Florida.

Broward County is home to spectacular and economically valuable coral reefs, most just a short ride from shore, which are home to myriad soft and hard corals, including threatened staghorn and elkhorn corals of the Acropora family. The reefs also serve as home to hundreds of fish species and invertebrates.

The state of Florida is spending $2 million on the project to facilitate the removal. Recently, Tim Keeney, the U.S. deputy assistant secretary for oceans and atmosphere and a key high-level figure within the National Oceanic and Atmospheric Administration, together with Mike Sole, Florida secretary of the Department of Environmental Protection, got a firsthand look at reef damage, repair, and recovery efforts. They met with Richard Dodge, Ph.D., NSU National Coral Reef Institute (NCRI) executive director, for consultation on the project.

NSUOC/NCRI researchers and principal investigators, Richard Spieler, Ph.D.; Robin Sherman, Ph.D.; and Lance Jordan, Ph.D. candidate, plan to evaluate the recovery of fish and coral populations on the reef following tire removal. Their NOAA-funded study will provide resource managers with valuable information on restoration effects and reef recovery times.

Spieler stated, “This work provides a unique opportunity for scientists to examine the effects of the cessation of a major injury to the natural ecosystem. Will the impacted site return to a natural state similar to surrounding reefs? If so, how long will this process take? The answers are of great significance for understanding and directing current and future restoration studies.”
A group of VIPs, accompanied by Jordan, later departed from the Oceanographic Center on Thursday, June 14, to see the tire recovery going on just a mile off Fort Lauderdale beach. Following the diving, Richard Dodge met the group for a lunch hosted by Coastal America to discuss ocean policy in South Florida. At the luncheon, Tim Keeney presented Dodge with a proclamation by the President describing June 2007 as National Oceans Month.

In a preremoval press conference, Broward County Mayor Josephus Eggelletion said, “Without the cooperation and synergy of federal, state, and county governments, removal of the tires and restoration of the coral reef would be impossible.”

**OTHER NEWS**

Congressman Ron Klein visited NSUOC on August 17 to learn more about the outstanding science education and research being conducted.

Richard Dodge, Ph.D., NSUOC dean, gave a PowerPoint presentation to the Congressman and attendees regarding the importance of the marine realm in the 22nd congressional district (Klein’s). NSUOC partners attending the talk included representatives from the U.S. Coast Guard, U.S. Navy, FAU Sea Tech, and Broward County Environmental Department.

Following the presentation, there was a tour of the NSUOC campus.

Following the tour, the Port Everglades Association hosted the Congressman for a luncheon. NSU VP and COO George Hanbury, Ph.D., gave the NSU welcome stressing the “Three Es” of education, excellence, and ecology.
Professor Hosts Foreign Students

In the spirit of collaboration with colleagues at Mexican universities, and out of a desire to support the development of a new generation of Mexican biologists, Edward O. Keith, Ph.D., hosted two students from Mexico this summer. From June 3–17, Keith hosted Darwin Jimenez, a Mexican graduate student from the Universidad Juarez Autonoma de Tabasco, in Villahermosa, Tabasco, Mexico. Jimenez came to the United States to visit Keith and colleagues at other institutions, including the Harbor Branch Oceanographic Institution; the University of Florida College of Veterinary Medicine; the Sirenia Project in Gainesville, Florida; and Mote Marine Laboratory. While in Gainesville, Jimenez attended “Sea Vet,” a one-week introduction to marine mammal and reptile veterinary medicine. He is studying the habitat use and seasonal movements of the Antillean manatee (Trichechus manatus manatus) in the rivers and lagoons of Tabasco, Mexico.

Then, from August 30 to September 2, Keith hosted Ibiza Serrano, a Mexican graduate student from the University of Veracruz, Tuxpan campus. Serrano came to the United States to spend two months at Mote Marine Laboratory in Sarasota, Florida, collaborating with scientists who study manatees, dolphins, and sea turtles. Keith provided transportation between Miami and Sarasota for Serrano, whose master’s degree thesis project is a photographic identification study of bottlenose dolphins (Tursiops truncatus) in Laguna Tamiaguas, in northern Veracruz state, Mexico. She will spend two months at Mote, then Keith will bring her back to Miami for her return flight to Mexico.

Video Completed for Educational Purposes

Charles Messing, Ph.D., recently completed the 45-minute educational video and accompanying teacher's guide “Hidden Oases: Florida's Deep-Sea Reefs” in partnership with the Broward School District's Broward Educational Communications Network (BECON). The video, aimed at middle- and high-school science students and teachers, is being distributed to schools in Broward County and to school districts state-wide. It was funded by the National Oceanic and Atmospheric Administration's Office of Ocean Exploration (NOAA OE) and documents the experiences of two Florida science teachers, Lis Jacobi and Tracy Griffin, during a November 2005 expedition to explore deep-sea reefs along the east coast of Florida. The expedition used the Harbor Branch Oceanographic Institution's R/V Seward Johnson and manned submersible Johnson Sea Link under the direction of Sandra D. Brooke, Ph.D. (Ocean Research and Conservation Assoc.), and John K. Reed (Harbor Branch). Messing and Jim Thomas, another NSUOC professor, accompanied the expedition, as did researchers from the U.S. Geological Survey, University of Alabama, and Smithsonian Institution.
Rare Fish Donated for Science

A cooperative commercial fisherman caught three barrelfish (Hyperoglyphe perciformis) and donated them to the Oceanographic Center in September. This species is a rare, deep-water fish usually caught further northward around South Carolina, where it supports a small commercial fishery, although they have occasionally been caught near Fort Lauderdale in the past. These are the first specimens donated to the center.

Barrelfish, like other mesopelagic fish species, are usually found at depths greater than 1,000 feet. However, many of these fish come near the surface at night to feed, which is why recreational swordfish anglers will occasionally catch deep-water fish such as escolar and oilfish in the Florida Straits. The biology of many of these species is poorly known because of these low catch rates and lack of traditional economic importance. M.S. student Bryan Armstrong is currently studying the biology of this mesopelagic fish species as part of his thesis research.

Anglers who encounter a deep-water fish species and would like to participate in this research by donating their catch to the center should contact David Kerstetter, Ph.D., at kerstett@nova.edu.

Shark Fin Soup Anyone?

Mahmood Shivji, Ph.D., director of the Guy Harvey Research Institute at the Oceanographic Center, once again had his research acknowledged, this time in the July–September issue of Conservation Magazine. The article was titled “Arresting Evidence.” It describes the illegal trade industry that deals with everything from ivory to shark fin soup. To read the article, go to www.conbio.org/CIP/article30711.cfm.

People on the Move

NCRI Executive Director Richard Dodge, Ph.D.; Associate Director Bernhard Riegl, Ph.D.; and Administrative Coordinator Wendy Wood of the Oceanographic Center’s National Coral Reef Institute (NCRI) attended the 18th United States Coral Reef Task Force (USCRTF) Meeting, held in American Samoa, during late August. Dodge made a presentation to the task force on the upcoming 11th International Coral Reef Symposium, which will take place in Fort Lauderdale in July 2008. The USCRTF was founded in June 1998, established by Presidential Executive Order 13089. NCRI was founded by congressional mandate during the same year and closely follows meetings of the USCRTF in order to remain consistent with U.S. strategies and action plans dealing with coral reef resources. The task force is composed of 12 federal agencies and 7 states and territories that have purview over coral reefs. Annually, a task force meeting is held in one of the states or territories that contain U.S. coral reefs.

On June 30, Edward O. Keith, Ph.D., spoke to the Earth Save Miami Group about “The History of Conservation in the United States.” This lecture traces the development of the concept of natural resource conservation in the United States, starting with the colonization of the North American continent by European settlers, and ending up with the modern conservation movement. The lecture explores how literature, art, and popular sentiment reflected changing attitudes about nature, from an early exploitative utilitarian approach, through a romantic idealization of nature, to the modern ecological synthesis. Key events in the history of the United States, including the Civil War, the California gold rush, the extermination of the bison, and the landing on the moon are examined with respect to their influence on the development of conservation ethics in the United States. Keith gave the same talk on September 10 at the Miami Sierra Club monthly meeting.
From June 18–22, Keith attended the 2007 International Biodiversity Conference held in Baños, Ecuador. The organizing committee of the conference invited Keith to present a paper entitled “Measuring Biodiversity.” While there, conferees visited Zoologico San Martin, an innovative zoo in Baños where animals live in large, environmentally enriched habitats, and where the zookeepers permit photographers to enter the habitats to take close up photographs of many species of mammals, birds, and reptiles, including a large number of threatened and endangered species. Conferees also visited a botanic garden on the edge of the Amazon basin that preserves a large number of species of micro-orchids.

From September 6–9, Keith attended the “Tercer Encuentro de Experiencias de Manejo Colectivo de Recursos Costeros” (“Third Exchange of Experiences with Collective Management of Coastal Resources”) held in Alvarado, Veracruz, Mexico. While there, Keith presented a talk about “Transporte y Bioacumulación de Mercurio en Comunidades Ribereñas del Sistema Lagunar de Alvarado, Veracruz, México” (“Mercury Transport and Bioaccumulation in Riverbank Communities of the Alvarado Lagoon System, Veracruz State, Mexico”). This presentation included the results of a study funded by an NSU President’s Faculty Research and Development Grant awarded in 2004 to Keith and his collaborator Jane Guentzel, Ph.D., at Coastal Carolina University in Conway, South Carolina.

During the summer of 2007, M.S. student Lucy Howey and Mahmood Shivji, Ph.D., of the Guy Harvey Research Institute (GHRI) initiated a project to study the habitat use and migrations of blue sharks in the north Atlantic. This research, conducted in collaboration with Brad Wetherbee, Ph.D., of the University of Rhode Island (and an Oceanographic Center adjunct faculty member), is using special archival transmitters known as pop-up satellite tags, manufactured by Microwave Telemetry, Inc., to track blue sharks as they migrate in the Atlantic. These tags record pressure, temperature, and light data while they are attached to the shark. With this data, the depth and geographic position of the shark can subsequently be inferred.

When the tag pops off the animal at a scheduled release date, it floats to the surface of the ocean and transmits the archived data to a satellite, from which it is subsequently retrieved by researchers for analysis. The GHRI team deployed 23 satellite tags over the summer and expects to hear back from the tags over periods of 4–12 months. Blue sharks are among the most intensively exploited species worldwide for their fins, and understanding their vertical movement behavior, horizontal migrations, and environmental preferences is essential for planning sound conservation measures for this ecologically critical apex predator. Howey, Wetherbee, and Shivji plan to deploy tags on additional sharks over the next year.
On June 5, M.S. student Samara Parker, with the New England Aquarium's Rescue and Rehabilitation Department, was one of a number of marine biologists to assist with the necropsy of a stranded Sei Whale. The whale washed up on a private beach in the coastal town of Manchester by the Sea, north of Boston. Parker commented that “this was a fantastic and possibly once-in-a-lifetime opportunity to examine the anatomy of this species of whale.” Parker and the other NEAQ scientists were able to collect tissue samples from all the major organs for toxicology, histology, and DNA analysis. This data is used to document any internal infections, as well as the type and amount of parasites that may be present. It was found that a number of vertebrae and front flipper bones were fractured premortem, while the parasite load was considered heavy. The consensus is that the whale was killed by a large vessel strike.

The Sei whale, *Balaenoptera borealis*, is the third largest species of the rorqual or baleen whales. At a maximum length of 60–65 feet and weighing 17–20 tons, only the fin and blue whales are larger (*American Cetacean Society* 2007). It was determined that this whale was a juvenile female 45 feet in length. Marine biologists from a number of organizations, including Woods Hole, NOAA, and the New England Whale Center, were present to gather much-needed data. Little is known about *B. borealis* because their migration patterns keep them in deep ocean waters. They rarely, if ever, come in to coastal waters.

Jose Lopez, Ph.D., was invited to give a lay lecture on September 26 to a group of high schoolers and freshman students at St. Thomas University, with an eye towards showing employment possibilities for those with a biology degree.

Lopez fielded many questions from the audience, including “What are the most important factors in getting started in science and leading to success?” Lopez’s answer was hard work, being in the right place at the right time (luck), and having good mentors and caring professors and teachers.
Richard Spieler, Ph.D., of the NSUOC; Robin Sherman, Ph.D., of the NSU Farquhar College of Arts and Sciences; and NSUOC M.S. students Bethany Basten and Kendra Maroni traveled to Salzburg, Austria, to attend the International Workshop in “Advances in Vascular Casting 2007” hosted by the University of Salzburg, Department of Organismic Biology. The conference was held July 8 through 12 and included lectures, roundtable discussions and poster sessions, as well as hands-on workshops. Bethany Basten presented a poster entitled, “Examination of Gill Development in the Yellow Stingray, *Urobatis jamaicensis*: Initial Impressions” that describes the preliminary results of her M.S. thesis research.

Both Basten and Maroni extended their stay in Austria an additional week to work closely with Alois Lametschwandtner, Ph.D., of the University of Salzburg, who is a member of Basten’s thesis committee.

Vascular corrosion casting is aptly defined by biology-online.org as “a tissue preparation technique that involves the injecting of plastic into blood vessels or other hollow viscera and treating the tissue with a caustic substance. This results in a negative copy or a solid replica of the enclosed space of the tissue that is ready for viewing under a scanning electron microscope.” Both Basten and Maroni are using vascular corrosion casting as the primary method for their thesis research, “Microvascular Anatomy of Fetal Respiration in Yellow Stingrays (*Urobatis jamaicensis*)” and “A Comparison of the Vasculature of the Spiral Valve in the Yellow Stingray (*Urobatis jamaicensis*), Siberian Sturgeon (*Acipenser baerii*), and the North American Paddlefish (*Polyodon spathula*),” respectively. After all casting is complete, directed independent studies are conducted with Patricia Blackwelder, Ph.D., of the NSUOC, on the scanning electron microscope for closer examination of the structures.

Kathy Maxson, librarian, attended the joint 33rd Annual IAMSLIC Conference and 17th Annual SAIL Meeting October 7–11 in Sarasota, Florida. The almost 100 attendees represented 18 states and 12 countries. The theme “Changes on the Horizon” was reflected in the many programs on emerging technologies, digitation of primary materials, coral reefs and mangroves, and gray literature. Maxson presented a poster highlighting the upcoming 11th International Coral Reef Symposium coming to Fort Lauderdale, Florida, July 7–11, 2008.
Ph.D. Degree Offered

The Oceanographic Center offers a doctoral degree in oceanography/marine biology. The program requires a minimum of 90 credits beyond the baccalaureate. At least 48 credits must consist of dissertation research, and at least 42 credits must consist of upper-level coursework. Required courses include the four M.S. core courses. Other upper-level coursework is usually in the tutorial mode with the major professor. Tuition is $4,950 per quarter.

Seminar and Defenses

Thesis

Jessica Watters, “The effects of ecological light pollution and silhouette height of the nesting densities of Caretta caretta in Broward County, Florida.” Committee: Curtis Burney, Ph.D.; Keith Ronald, Ph.D.; and Lou Fisher (Department of Planning and Environmental Protection). June 22.

Lindsey Klink, “An overview of international mooring programs and the effect of mooring use on coral reef offshore Broward County, Florida, USA.” Committee: David Gilliam, Ph.D.; Richard Dodge, Ph.D.; and Ken Banks, M.S. (Broward County Department of Planning and Environmental Protection). June 28.

Connie S. Versteeg, “Surface associated amoebae on the ctenophore, Mnemiopsis sp.” Committee Members: Andrew Rogerson, Ph.D. (Marshall University, Huntington, West Virginia); Anthony Moss, Ph.D. (Auburn University, Auburn, Alabama); and Curtis Burney, Ph.D. September 28.

Pat Bellew, “The crinoid genus Endoxocrinus in the Bahamas: an assessment of morphological variability.” Committee: Charles Messing, Ph.D.; Tatsuo Oji, Ph.D. (University of Tokyo, Japan); and Richard Dodge, Ph.D. October 2.


Meghan Bills, “Temporal and spatial distribution of the Atlantic bottlenose dolphin, Tursiops truncatus, along the southeast coast of the United States.” Committee Members: Edward O. Keith, Ph.D.; Lance Garrison, Ph.D. (NOAA); and Sam Purkis, Ph.D. October 8.

Capstone


Students’ Posters Win Awards

**Abby Renegar**, Ph.D. candidate under Patricia Blackwelder, Ph.D., recently attended the Microscopy and Microanalysis Conference held August 5–9, at the Broward County Convention Center. She presented an invited talk, “Microscopy and Microanalysis in Marine Invertebrate Biology” in the Technologist’s Forum Symposia, as well as a poster titled “Ultrastructural Analysis in the Elucidation of Disease in Corals” which won two awards:

1st Place—MSA Student Poster in the Application of Microscopy and Microanalysis to the Biological and Life Sciences

2nd Place—Diatome Award, sponsored by Diatome U.S., presented to the posters illustrating the best use of diamond-knife ultramicrotomy in either the biological or physical sciences

Also present were **Robin Sherman**, Ph.D., who presented a poster by **Bethany Basten**, co-authored by Sherman, A. Lametschwandtner, and R.E. Spieler, titled, “A unique arterial anastomosis among the efferent epibranchial arteries and the dorsal aorta in the yellow stingray, *Urobatis jamaicensis*: A preliminary examination.” Recent graduate, **Erin Hodel** presented a poster from her thesis work entitled, “Histopathological assessment and comparison of sedimentation and phosphate stress in the Caribbean staghorn coral, *Acropora cervicornis*.” Hodel was one of 10 students to receive the Microscopy Society of America (MSA) Presidential Scholar awards, for which she received complete registration, meals, and travel expenses for the meeting, in addition to admittance to the presidential reception at the Museum of Art, Fort Lauderdale.

Featured at the meeting was the world’s largest SEM, the Visitec Mira SEM. (see picture on back page)

**Publications**


Alumni News

Yashusi Fukamachi earned his doctoral degree in October 1992 under the guidance of Julian McCreary, then dean of NSUOC. The title of his dissertation is “Instability of density fronts in layer and continuously stratified models.”

Following his graduation from NSUOC, he was hired as an assistant professor at the Institute of Low Temperature Science, Hokkaido University, in Sapporo, Japan. Although his dissertation was a numerical modeling study of instability phenomena in the mid-latitude ocean, he gradually shifted his field and research style after his return to Sapporo, since his institute specializes in field-oriented research of the cryosphere. His current research interests are ocean circulation and interaction between sea ice and ocean in seasonal sea-ice zones such as the Southern Ocean.

In the last 10 years, he has participated in numerous oceanographic cruises in the Sea of Okhotsk, which is a marginal sea of the North Pacific located between Japan and Russia, and the southernmost sea-ice zone in the northern hemisphere. In 1998–2000, he and his colleagues carried out an international study in the Sea of Okhotsk, cooperating with researchers from Russian and U.S. institutions, as well as other Japanese institutions. In this study, they revealed the detailed nature of the East Sakhalin Current for the first time. The East Sakhalin Current is the major current in the Sea of Okhotsk and has considerable effects in the intermediate layer of the North Pacific.

From winter of 1999, he has been measuring sea-ice thickness using moored ice profiling sonars in the Sea of Okhotsk. Even in this satellite era, sea-ice thickness remains one of the most difficult quantities to be measured by remote sensing. For this reason, it is quite important to carry out direct measurement of ice thickness to improve remote-sensing algorithms. The data have revealed the detailed nature of sea-ice thickness in the Sea of Okhotsk for the first time. His group is one of several groups that are actively carrying out such observations.

In 2003 and 2005, Fukamachi participated in the Australian Antarctic Research Expedition’s Southern Ocean cruises to carry out a mooring experiment of a deep western boundary current southeast of the Kerguelen Plateau, which is the largest plateau in the ocean, located in the Indian sector of the Southern Ocean. He worked with Australian co-investigators from the CSIRO (Commonwealth Scientific and Industrial Research Organization) Marine Research in Hobart. During the cruise in 2003, he had a chance to visit one of the Australian Antarctic stations, the Mawson Station (see photo above). He is now working on the data obtained from this experiment. These data should reveal the volume transport of the northward-flowing Antarctic Bottom Water along the Kerguelen Plateau for the first time. The Antarctic Bottom Water is cold, dense...
John Hocevar, 1993 NSUOC graduate, (see Currents Winter, 2005/06) recently led an expedition aboard the Greenpeace ship Esperanza, using submarines and an ROV in the Bering Sea to explore the largest underwater canyon in the world for the first time. Their findings included visible damage from trawl fishing in deep remote areas, species that are probably new to science, and corals and sponges not known to live in the area. You can see blogs, images, and other interesting information on their Web site: www.greenpeace.org/usa /campaigns/oceans/bering-sea-tour-2007.

Chuck Messing, Ph.D., is on their Scientific Advisory Committee, and will be helping identify any crinoids found. Jim Thomas, Ph.D., will be helping identify amphipod species.

Fukamachi will return to the Southern Ocean next February to deploy moorings including ice profiling sonars in a coastal polynya (thin-ice zone with high ice production) near the Amery Ice Shelf. They are designed to reveal ice-production rate and formation processes of the Antarctic Bottom Water in this region. This experiment will be a part of the international efforts associated with the International Polar Year.

The fall term student orientation and barbeque was held on September 29. On a newly built deck, faculty and staff members and students enjoyed nice weather and good food following the orientation for new students (including the 36 enrolled for the fall term).