Summer 2005

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NSU Oceanographic Center

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NSUOC faculty member Edward O. Keith led a group of graduate students on a five-day cruise to the Tongue of the Ocean, Bahamas, aboard the R/V Suncoaster, accompanied by scientists from the Southeast Fisheries Science Center (NOAA Fisheries) Miami Laboratory. The cruise departed from Miami on the evening of May 5 and returned on the morning of May 10. The purpose of the cruise was to conduct visual and acoustic surveys of marine mammals and to collect physical and biological oceanographic data. The trip was designed to instruct OC graduate students on marine mammal and oceanographic data collection techniques and was made possible by a ship-time grant awarded to Keith from the Florida Institute of Oceanography.

Scientists from the NOAA Miami Laboratory have conducted visual and acoustic surveys of cetaceans in the waters of Puerto Rico and the Virgin Islands and over the southeast United States continental shelf. These surveys have indicated that numerous species of cetaceans occur in these areas, however there is a gap in knowledge in and around the Bahamas. This cruise represented an attempt to fill that gap.

The Tongue of the Ocean is an area of deep water nearly surrounded by the shallow Bahama Banks. A variety of dolphins and whales (cetaceans), including several species of beaked whales, which are usually found far offshore, are found there. This area was also the location of a multispecies mass stranding of 17 individual cetaceans (five different species) in 2000. This is one reason that more information about the species inhabiting this region is needed.

The data collection techniques used were relevant to several students who made the cruise. Susan Zaretsky was finishing her thesis on cetacean vocalizations (she successfully defended her thesis on July 15), and Jennifer Scharmitz was writing her thesis on the vocalizations of a specific cetacean genus. Melinda Bigelow, Meiling Ewing-Chow, Sarah Maurer, Stephanie Rogers, Abraham Smith, and Leslye Waugh were aboard to learn the techniques and assist with the data collection. NOAA scientists Anthony Martinez and Jesse Wicker provided the acoustic hydrophone and monitoring equipment, as well as the technical expertise.

The crew of the R/V Suncoaster—Captain Larry Braun, Asst. Captain Joseph Cross, Chief Engineer Jay Harding, Asst. Engineer George Guthro, and Steward Margaret Musmon—welcomed everyone aboard the evening of May 5. Once all of the gear was aboard and stowed for departure, Musmon served a delicious dinner. After a few more errands, the ship departed Miami about 10:00 p.m., with an unforgettable view of the city lights over the stern.

In contrast to a previous trip (Currents Winter 2004; Volume XVIII, No. 1) the wind and weather provided a smooth crossing and the ship arrived in Freeport, Bahamas, to clear customs early the next morning. After clearing Bahamian customs, the ship set out to conduct the
first day of data collection. A CTD instrument was on board to collect a temperature profile of the water. This instrument monitors the conductivity (salinity) and temperature of the water as it is lowered to a predetermined depth. To collect data with the CTD, the ship must remain stationary in the water while the instrument is deployed, using a winch, to the bottom or to a depth of 200 m, whichever is reached first. The plan was to deploy a CTD at first light and at dusk to avoid conflicting with the marine mammal surveys conducted during the majority of the daylight hours. Immediately after the CTD cast, plankton and neuston nets were towed behind the ship and yielded samples of invertebrates, fish, and plankton. These samples were divided and preserved in ethanol and formalin for later analysis at the NSUOC.

After the CTD and tows were concluded, marine mammal observations began. This involved deploying the hydrophone; a series of five sensitive underwater microphones encased in a long plastic sleeve and towed about 250 meters behind the ship. The microphones can detect any noise in the water. The output from the microphones was recorded on digital audiotape and interpreted using two computer software programs—Ishmael and WhalTrack. Ishmael displays a frequency histogram of the sounds detected, allowing for easy identification of cetacean whistles and clicks, some of which can be species specific. WhalTrack determines the bearing, relative to the ship’s course, from which the sounds arrived and facilitates visual sightings of the animals.

As soon as the hydrophone was deployed, teams of visual observers took their positions above the bridge of the ship. These observers maintain constant surveillance of the water in front, and on both sides, of the ship. The visual teams and the hydrophone both attempt to detect the animals. Visual observers can see animals that are not making any sounds, while hydrophones can detect animals that may be under the water. Once animals are sighted, photographs are taken and the animals are counted and identified.

The marine mammal observations were terminated about an hour before dusk, and a CTD cast and plankton/neuston tows were conducted. After dark, the ship made way to the next day’s starting position. By the middle of the second day, the R/V Suncoaster was in the center of the cul-de-sac at the end of the Tongue of the Ocean. A large buoy tethered to the bottom in this area attracts a large number of fish, and the scientific party and crew spent several hours fishing. As a result, the menu for dinner that evening included delicious fresh fish.

Because of the threat of bad weather, the ship quickly returned to the mouth of the Tongue of the Ocean and the shelter of Grand Bahama Island and Greater Abaco Island. However, the bad weather never materialized, and the following day, the ship steamed along the eastern shore of Greater Abaco Island. The winds were light, and the day was warm and sunny. One visual observer team saw a beaked whale, but they were unable to identify it. In the middle of the afternoon, the ship reversed course and began its return to Freeport.

The following day was spent cruising just south of Greater Bahama Island. In the morning, a group of Risso’s dolphins (Grampus griseus) were observed, counted, and photographed. Unfortunately, these animals did not make any sounds that could be detected by the hydrophone. The R/V Suncoaster returned to Freeport on May 9 to clear customs and allow everyone to spend a few hours shopping for souvenirs in town. The ship departed Freeport about 7:00 p.m. As soon as it cleared the harbor, a group of Atlantic spotted dolphins (Stenella frontalis) rode the bow of the ship for about 20 minutes, allowing for a lot of picture taking and eliciting exclamations of delight.

That evening, the R/V Suncoaster made its way southwest across the Gulf Stream towards Miami. The crossing was uneventful, and the ship arrived about 8:00 a.m. Everyone felt that it had been a successful cruise.
People on the Move

Advancing the Science of Limnology and Oceanography (ASLO) is the leading professional organization for researchers and educators in aquatic science worldwide. “A Pilgrimage through Global Aquatic Sciences” was the theme of the ASLO 2005 Summer Meeting, June 19–24, in Santiago de Compostela, Spain.

Six scientists from the NSUOC and its internal National Coral Reef Institute (NCRI) traveled to this site, known for intense pilgrimages as the burial place of the apostle James (Santiago in Spanish). The “camino” or trail of Santiago features innumerable historic monuments and significant works of art built in memory to the apostle. Unlike most “nine-to-five” conferences, this international meeting adapted to the Spanish tradition. Morning sessions ran until almost 2:00 p.m. After a two-hour lunch break, sessions resumed until 7:00 or 7:30 each evening. Long hours and historic backgrounds, however, did not interrupt the purpose of sharing important science. The six NSUOC and NCRI presentations were part of the session “Applied Ecosystem-Level Research to Reverse Coral Reef Degradation.” This session was organized by scientists from the National Oceanic and Atmospheric Administration (NOAA) National Ocean Service (NOS).


- **Bernardo Vargas-Ángel**, Ph.D., presented: “Higher resolution, multilayered approach to assessing sedimentation stress in reef corals,” co-authored by Bernhard M. Riegl; Richard E. Dodge; P. Blackwelder and T. Snell; (Georgia Institute of Technology); David S. Gilliam; L. Fisher (Broward County Environmental Protection Department); Erin C. Hodel, graduate student; and D. Abigail Renegar, M.Sc.

- NCRI research scientist and director of the Guy Harvey Research Institute (GHRI) **Mahmood Shivji**, Ph.D., presented “Reproductive dispersal strategy and genetic connectivity in commensal, sponge-dwelling, coral reef invertebrates,” co-authored by Vincent P. Richards, graduate student; and J.D. Thomas, Ph.D.


- **Richard E. Dodge**, Ph.D., NCRI executive director, presented “Science, management, and conservation gaps and opportunities: coral reef injuries resulting from a large-ship anchorage,” co-authored by Walter C. Jaap, Ph.D., (Florida Fish and Wildlife Conservation Commission); K. Banks (Broward County Environmental Protection Department); David S. Gilliam; Brian K. Walker, M.Sc./Ph.D. candidate; and Richard Shaul (Sea Byte, Inc.).


(Continued on page 4)
As it has for the last four years, the Oceanographic Center participated in Florida Oceans Day by manning a booth at the state capitol. Unlike past years, though, when the NSU banner was hung over the railing in the Rotunda, this year all the exhibits were outside, in the Capitol Plaza. A mild, beautiful day graced the exhibit area, with only an occasional gust of wind to challenge some of the taller exhibits. Many people stopped by to chat and ask questions, especially about the Oceanographic Center’s graduate school distance education program.

Representing the center were Richard E. Dodge, dean and executive director of the National Coral Reef Institute (NCRI), and Carol R. Fretwell, coordinator of administrative operations for NCRI.

Three Nova Southeastern University Oceanographic Center (NSUOC) and National Coral Reef Institute (NCRI) scientists and three NSUOC graduate students made seven presentations at the 32nd Scientific Meeting of the Association of Marine Labs of the Caribbean (AMLC) in Curaçao, Netherlands Antilles, June 13–17. The venue for the meeting was the Curaçao Sea Aquarium.
On May 22–24, professors Richard E. Dodge and Richard Spieler, and doctoral graduate student Pat Quinn visited Mexico to investigate study sites as part of their research project on coral reef restoration. Dodge is a member of the Coral Reef Restoration and Remediation Working Group of an international six-group project funded by the World Bank Global Environment Facility.

The Global Environment Facility (GEF) and the World Bank are funding a five-year initiative to help protect coral reefs in critical areas of developing countries. Coral reefs are the largest—and some of the most beautiful—living structures on earth, and play a key role in the livelihoods of hundreds of millions of coastal dwelling poor people, yet they are in decline in most parts of the world.

• NCRI associate director and NSUOC associate professor Bernhard M. Riegl, Ph.D., gave two oral presentations: “Geomorphology of the Southeast Florida Reef Tract (Dade, Broward, and Palm Beach Counties), USA,” co-authored by K. Banks and Werner Piller, Ph.D., (Karl-Franzens University Graz); and Richard E. Dodge, Ph.D., NCRI executive director and NSUOC dean, in the session “Remote Sensing and GIS”; and “The NCRI Monitoring Network: Multilayered Reef Assessment on a Caribbean-Wide Scale,” co-authored by Samuel J. Purkis, Ph.D.; Dodge; Bernardo Vargas-Ángel, Ph.D.; and Mahmood Shivji, Ph.D., in the session “NOAA Applied Research.”

• NCRI and NSUOC research scientist David S. Gilliam, Ph.D., gave the oral presentation “Coral Transplantation Effectiveness for Reef Restoration and Impact Mitigation off Southeast Florida, USA,” co-authored by W.C. Jaap, Ph.D., (Florida Fish and Wildlife Conservation Commission); Richard E. Dodge, Ph.D.; Brian D. Ettinger, M.Sc.; Elizabeth G. Fahy, M.Sc.; and Daniel P. Fahy, Shaun M. Gill, Jamie A. Monty, and Lauren F. Shuman, graduate students, in the session “Environmental Restoration.”

• Graduate student Vince P. Richards gave the oral presentation “Reproductive Dispersal Strategy and Genetic Connectivity in Commensal, Sponge-Dwelling, Coral Reef Invertebrates,” co-authored by NSUOC faculty J.D. Thomas, Ph.D., and M. Shivji, Ph.D., in the session “Regional Ecological Connectivity.”

• Graduate student Luz Raquel Hernández-Cruz gave the oral presentation “Synergy of Multiple Sensors as an Assessment Tool for Monitoring the Status of Acropora palmata (Elkhorn Coral) in Vieques Island, Puerto Rico,” co-authored by Samuel J. Purkis, Ph.D.; Bernhard M. Riegl, Ph.D.; and Richard E. Dodge, Ph.D., in the session “Remote Sensing and GIS.”

• Also in the same session, Ph.D. candidate Brian K. Walker gave the oral presentation “Mapping Coral Reefs of Southeast Florida, USA,” co-authored by Bernhard M. Riegl, Ph.D., and Richard E. Dodge, Ph.D.

• Kevin E. Kohler, M.Sc., senior programmer at NSUOC, presented the poster “Coral Point Count with Excel Extensions (CPCe): A Windows-Based Program for the Analysis of Coral and Substrate Coverage Using the Random Point Count Method,” co-authored by Shaun M. Gill, graduate student.

The Targeted Research Project will focus on those areas of the world that have significant coral reef resources, establishing “Centers of Excellence” in Mexico, Tanzania, and the Philippines and twinning these with existing centers of excellence in Australia. These centers will serve as regional hubs for training scientists in cutting-edge techniques and for applying the findings in practical ways to improve the management of these beautiful, economically vital—and threatened—treasures. There are six thematic based working groups: Bleaching and Local Ecological Responses; Disease, Connectivity, and Large-Scale Ecological Processes; Restoration and Remediation; Remote Sensing; and Modeling and Decision Support Tools.

NSU scientists visited reef sites at Akumal and Puerto Morales, as well as the National University of Mexico (UNAM) to meet with scientists of the bleaching and the disease working groups to discuss mutual strategies.
From June 2–16, Edward O. Keith, Ph.D., was in the Philippines conducting a second year of study of the cetaceans in the Tañon Strait, which lies between the islands of Cebu and Negros in the central Philippines. He was with his collaborator, Lemuel Aragones, Ph.D., who is with the Rosenstiel School of Marine and Atmospheric Sciences, University of Miami. This project began last year when Aragones and Keith received a President’s Faculty Research and Development Grant from NSU. Their work this year was supported by a grant from the Sea World Busch Gardens Conservation Fund, and the deans of NSU’s Farquhar College of Arts and Sciences and Oceanographic Center.

The project has two major objectives: 1) to repeatedly photograph whales and dolphins in the Tañon Strait in order to identify individual animals, observing and recording their behavior and estimating their populations, and 2) to work with dolphin and whale watching tour operators and local municipalities to develop policies and procedures to regulate this ecotourism activity in order to prevent disturbance of the animals and competition between tour operators.

During 2004, Keith and Aragones took thousands of digital and film photographs of the spinner dolphins (Stenella longirostris), spotted dolphins (Stenella attenuata), and bottlenose dolphins (Tursiops truncatus). They also recorded the vocalizations of some of these species and conducted extensive interviews with the local fisherfolk and tourists (Currents Summer 2004; Vol. XVIII, No. 3). Aragones and Keith also organized a series of workshops on the need for a set of rules governing the operation of the dolphin watching vessels in order to minimize the impact of the tours on the animals. These workshops also indicated the need for cooperation between the various municipalities on both sides of the Tañon Strait as well as between the different tour operators. After their return, the photographs were examined and a catalog of about 30 known individuals was developed. The analysis of the interviews indicated that most respondents found the whale and dolphin watching tours to be interesting and educational, and that most would be willing to pay a small fee to support whale and dolphin conservation efforts.

On their return visit this year, Aragones and Keith continued their photographic identification studies, spending most mornings on small boats searching for dolphins, photographing them, and recording their vocalizations and behavior. They utilized an underwater video camera to monitor the behavior of the animals below the surface of the water. Several other species of cetaceans were also sighted and photographed, including Risso’s dolphins (Grampus griseus) and dwarf sperm whales (Kogia sima).

Argones and Keith also conducted a seminar/workshop in the town of Bais City on the establishment of rules and regulations governing dolphin and whale watching, which began as an ecotourism industry there. The work products of this workshop were varied and many. One group, made up of representatives of many local city and town governments, drafted some boilerplate language for a municipal ordinance that each of their respective city and town councils could adopt for the governing of the dolphin and whale watching tour boats in waters under their jurisdictions. A second group, made up of the tour operators, organized themselves into the “Tañon Strait Association of Cetacean Watchers.” They drafted a constitution and bylaws for their organization and elected officers.

On the second day of the workshop, Keith and Aragones conducted a series of hands-on demonstrations for the participants. Participants went on a dolphin-watching cruise, and the appropriate behavior of the vessel, the crew, and the visitors was demonstrated. A new version of a “script” for the tour guides was also introduced. The objectives were to improve the quality of the experience for the visitors, to minimize disturbance of the dolphins and whales, and to increase the status of the crews of the vessels and the tour guides as professionals.

All of this laid the groundwork for the establishment of a unified conservation and management plan for the entire Tañon Strait, where 11 of the 24 species of marine mammals found in the Philippine Islands can be found. The dolphin and whale watching tours have become a significant source of income to the municipality of Bais City, and have the potential to become a source of income to other municipalities in the area, as well as to private tour operators. In order to be sustainable, however, this small ecotourism industry must operate with regard to the safety and security of the dolphins and whales in Tañon Strait, the tourists who visit, and the crews of the vessels.

Two spinner dolphins exhalting at the surface. The lower animal is blowing bubbles, a behavior known as a “trumpet blow.” This can indicate that the animal is excited or concerned about something.
In May, M.S. student and NCRJ research assistant Lauren Shuman participated in another research cruise to the Bahamas aboard the University of Miami's R/V F.G. Walton Smith. Shuman is part of a team led by Howard R. Lasker, Ph.D., that is monitoring populations of the Caribbean gorgonian, *Pseudopterogorgia elisabethae* along the southern edge of the Little Bahama Bank. This research team, consisting primarily of Lasker’s graduate students from State University of New York at Buffalo, established these monitoring sites in May 2004 and revisits them every six months. Lasker developed this project to detect effects that harvesting of *P. elisabethae*, which is used in the cosmetics industry, may have on recruitment and population structure. Recruitment is monitored following annual spawning events on the Little Bahama Bank, and the origin of recruits is assessed from DNA microsatellite analysis of the recruits. Shuman is also working with Lasker to create a Web-based field-guide to gorgonians, photographing and collecting specimens on these Bahamas dives.

Charles Messing, Ph.D., visited the National Museum of Natural History, Smithsonian Institution, on July 1 to begin his sabbatical research on crinoid systematics. He also met with Smithsonian research scientist Stephen D. Cairns, Ph.D., with whom he will be working on deep-sea corals in the Strait of Florida this fall.

Veljko Dragojlovic, Ph.D., gave an oral presentation at the 229th American Chemical Society National Meeting and Exposition held in San Diego, California, on March 15. It was titled, “Adaptation of phase-vanishing and solid-solid reaction to undergraduate organic chemistry laboratory.”

Ph.D. candidate, Dan Fahy went to Taipei (Northern Taiwan) for the seventh Indo-Pacific Fish Conference and presented a talk on May 17. His talk in the Reproductive Mechanisms of Chondrichthyes section was based on his ongoing reproductive study on yellow stingrays and was titled “Preliminary observations on the reproductive cycle and uterine fecundity of the yellow stingray, *Urobatis jamaicensis* in southeast Florida, USA.” A paper will be submitted from the proceedings.

Students in Andrew Rogerson’s laboratory have been on the move this summer, receiving specialized training to further their research. Christina Gwaltney and Connie Versteeg spent a week in June at the Woods Hole Oceanographic Institution learning molecular sequencing techniques for naked amoeboae under the supervision of Rebecca Gast, Ph.D. At the same time, Megan Shoff traveled to Ohio to learn molecular identification protocols for acanthamoebae under the supervision of Greg Booton, Ph.D., of Ohio State University.

In July, Gwaltney returned to the north to participate in a one-week PRIMER workshop held at the EPA facility on the University of Rhode Island Bay campus. PRIMER, a statistical software program with a variety of applications for large environmental data sets, is used by several researchers at NSUOC, as well as by scientists with the Rookery Bay National Estuarine Research Reserve, where Gwaltney’s research is based.

**Other News**

**Center Hosts Florida Coastal Ocean Observing System (COOS) Caucus Meeting**

On June 7, nearly 40 ocean scientists and managers from across Florida participated in a meeting of supporters of the concept of a Florida Coastal Ocean Observing System (Florida COOS). NSU’s Oceanographic Center hosted this meeting with attendees Dean Richard Dodge and professors Alex Soloviev and Sasha Yankovsky. The caucus was convened by the University of Miami and the University of South Florida. Members of the NSU Institute of Government and Public Policy served as the meeting facilitators.

Representatives included scientists and managers from ocean-related industry, the federal government (National (Continued on page 8)
Oceanic and Atmospheric Administration), state agencies (Department of Environmental Protection and Fish and Wildlife Commission), and a host of academic and research organizations (UM, FAU, USE, FSU, FIT, UNF, More, Florida SeaGrant).

The caucus rationale was that the United States is in the process of coordinating the development of an operational, integrated, and sustained ocean observing system (IOOS). Information from this IOOS system will serve national needs for

- detecting and forecasting oceanic components of climate variability
- facilitating safe and efficient marine operations
- ensuring national security
- managing resources for sustainable use
- preserving and restoring healthy marine ecosystems
- mitigating natural hazards
- ensuring public health

The IOOS will be composed of a number of regional associations. Florida is in the unique position of falling within the realm of two regional associations, the Southeast Coastal Ocean Observing System RA (SECOORA) and the Gulf of Mexico Coastal Ocean Observing System RA (GCOOS). Hence a Florida strategy is urgently needed to focus attention on Florida’s roles within each RA.

Caucus meeting outcomes included emphasis on the need to engage the state and the regional associations of SECOORA, and GCOOS more actively, and with a more united front, than in the past. It was agreed that with unity comes strength in action to help promote the interests of Florida, the state with the most ocean coastline on the east coast. SECOORA is still in a formative stage, hence, there will be effort focused on developing Florida’s participation in coming months.

The NSU Orlando SEC provided a perfect venue for the meeting. It was convenient to all and was praised by participants for its great meeting facilities and the professional manner of the staff.

The FL COOS Caucus plans to meet again in August, with a larger group.

Georges Weatherly, Ph.D., Professor from Florida State University and Richard Dodge, Ph.D., Dean of NSUOC at the Florida COOS Caucus. (Dr. Weatherly is a noted oceanographer and is also one of the first 17 graduates of NSU!)

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Center Scientists to Evaluate Tomorrow’s Seabed Mapping Technology

The NSU Oceanographic Center has entered into a collaboration to test a cutting-edge marine mapping tool. The tool, developed by Optech Internation Inc., combines a marine Lidar and a hyperspectral imaging system into a single unit mounted on a low-flying aircraft. Using a pulsed laser fired out of the underside of the aircraft, the unit delivers an unrivaled capability to map the shallow seafloor. Grady Tuell, Ph.D., managing director of Optech Internation Inc., visited the center on June 2 to discuss the possible collaboration. Sam Purkis, Ph.D., and a team from the NSUOC will provide Optech with the required optical seabed measurements at the time of flight. The test will be carried out in late June in the shallow waters off Dania Beach, right on the door step of the Oceanographic Center. The collaboration is envisaged to yield important data and positions the NSUOC at the cutting edge of today’s marine airborne technology.

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Two Scientists’ Research Featured

Oceanographic professor Mahmood Shivji, Ph.D., is featured in the latest Sea Grant Florida publication, Ahead of the Class, a publication focusing on marine education. The article brings (Continued on page 9)
attention to the work, led by Shivji, that is assisting NOAA in its efforts to identify and prosecute U.S. fishing vessels suspected of catching and selling protected shark species. Shivji developed a rapid and reliable DNA test that can identify shark species from fins and other body parts, which helps fisheries managers enforce protective measures for overfished shark populations. Just recently, Shivji’s research helped federal prosecutors confirm the presence of prohibited species in four of five investigations, resulting in fines of more than $100,000. His work has been featured in international journals, newspapers, radio, and TV, including NBC TV’s EcoWatch. To read the complete article, go to the Sea Grants Web site at www.FLseaGrant.org.

Seminars and Defenses

SEMINAR
Three scientists from the U.S. Geological Society presented a seminar on July 15 as a “USGS Coastal Research Sampler.” The three talks were:

Christian Langevin, “Groundwater discharge to Biscayne Bay”

Clinton Hittle, “Freshwater flows to Florida Bay”

Eric Swain, “Hydrodynamic model of Taylor Slough and Northeastern Florida Bay”

THESIS

Susan C. Zaretsky, “A comparison of bottlenose dolphin (Tursiops truncatus), Atlantic spotted dolphin (Stenella frontalis), and the pilot whale (Globicephala sp.) vocalizations in the western north Atlantic and northern Gulf of Mexico.” Committee Members: Edward O. Keith, Ph.D.; Keith Ronald, Ph.D., and Lance Garrison, Ph.D., (NOAA Fisheries Laboratory). July 12.

CAPSTONE
Allison Rangolan, “Impacts of harmful algal blooms (HABs) on finfish and shellfish industries.” Committee Members: Don S. McCorquodale, Ph.D., and Andrew Rogerson, Ph.D. April 27.


Cover of journal with figures by Sam Purkis.

Artwork from an article by Sam Purkis, Ph.D., a research scientist with NCRI, has been used on the cover page of the June edition of the journal IEEE Transactions on Geoscience and Remote Sensing. The figure is taken from Purkis’ article in the same issue that describes the use of field spectral measurements to aid the monitoring of reef environments from space. The article stems from a long-term monitoring project in the Arabian Gulf, off of the coast of Dubai. It is envisaged that, in the near future, satellite remote sensing will be routinely used to monitor the status of coral reefs on a global scale, and as such, the technique will have relevance to the detection of habitat shifts related to global climate change. For further information, see “Publications” on page 11.
M.S. degree specialties are marine biology, coastal zone management, marine environmental science, and physical oceanography. Each course carries three credit hours or may be audited. Tuition is $595 per credit hour (50 percent less for audit). Classes meet once a week from 6:30 to 9:30 p.m. at the Oceanographic Center (unless otherwise specified.) The fall term runs from Sept. 26–Dec. 16. (unless otherwise specified). Registration ($25 nonrefundable fee) begins two weeks prior to the start of classes. For further information, call Andrew Rogerson or Melissa Dore at (954) 262-3610 or 800-396-2326, or email imcs@nsu.nova.edu. More information can be found at the NSUOC Web site: www.nova.edu/ocean.

Fall Term 2005
September 26–December 16

Marine Ecosystems
OCOR-5602
A core course focusing on marine ecological processes and functions. Emphasis will be devoted to coastal marine communities. Instructor: Curt Burney, Ph.D., associate professor, burney@nsu.nova.edu

Biostatistics I
OCOR-5603
A core course, Biostatics I is a basic course on the practical applications of descriptive and inferential statistics with emphasis on principles and methods of summarizing and analyzing biological data. Instructor: Mark Farber, Ph.D., adjunct professor, mfarber@nsu.nova.edu

Concepts of Physical Oceanography
OCOR-5607
A core course, physical oceanography covers basic ocean physics with a focus on the large scale circulation of the oceans and their relation to weather and climate. Students are required to take either this course or OCOR-5601 as a CORE course. Instructor: Sean Kennan, Ph.D., assistant professor, skennan@nsu.nova.edu

Marine Biodiversity
CZMT-0685/MEVS-5107/OCMB-6315
This course will discuss multiple aspects of marine biodiversity including definition and importance of marine biodiversity to marine conservation issues, threats to marine biodiversity including non-indigenous species introductions, impediments to marine conservation, and scientific constraints. Management approaches will be discussed and evaluated. Instructor: Jim Thomas, professor, thomasjd@nsu.nova.edu

Environmental Chemistry
OCMB-6190/MEVS-5350/CZMT-TBD
The course deals with contemporary environmental issues including the green house effect and global warming, chemistry of the ozone layer, toxic organic chemicals, the chemistry of natural waters, and some aspects of green chemistry. Regulatory laws, compliance, and enforcement will also be taught. Instructors: Veljko Dragojovic, Ph.D., associate professor, veljko@nsu.nova.edu and Don McCorquodale, Ph.D., adjunct professor, mccorq@nsu.acast.nova.edu

Concepts in Fluid Mechanics
MSPO-5000
A core in the physical oceanography M.S., this course introduces the principles of continuity, momentum, and energy applied to fluid motion. Instructor: Alexander Soloviev, Ph.D., associate professor, soloviev@nsu.nova.edu

Waves in the Ocean
MSPO-5250
The course will focus on gravity, inertial-gravity and vorticity waves, mechanisms of their generation, and their role in the variability of hydro physical fields in the ocean. Instructor: Alexander Yankovsky, Ph.D., assistant professor, sasha@nsu.nova.edu

Winter 2006
Tentative Schedule
January 2–March 24

Environmental Chemistry
OCMB-6190/MEVS-5350/CZMT-TBD
The course deals with contemporary environmental issues including the green house effect and global warming, chemistry of the ozone layer, toxic organic chemicals, the chemistry of natural waters, and some aspects of green chemistry. Regulatory laws, compliance, and enforcement will also be taught. Instructors: Veljko Dragojovic, Ph.D., associate professor, veljko@nsu.nova.edu and Don McCorquodale, Ph.D., adjunct professor, mccorq@nsu.acast.nova.edu

Coastal Dynamics
MSPO-5210
The course will describe major elements of the circulation on the continental shelf and slope. The topics will include: wind-driven currents, upwelling, coastal-trapped waves; tides and tidal mixing; and physical-oceanographic description of the U.S. continental shelves. Prerequisite: Concepts in Physical Oceanography. Instructor: Alexander Yankovsky, Ph.D., assistant professor sasha@nsu.nova.edu
Distance Education

The following courses are scheduled. Please check our Web site at www.nova.edu/ocean/disted.html for updates. For more information about our distance education program, please contact Jane Dougan at douganj@nsu.nova.edu.

- Coastal Policy, CZMT-0612
- Marine Geology, OCOR-5604
- Biology of Sharks, OCUG 3400
- Environmental Remote Sensing (RS) and Geographic Information System (GIS), CZMT-0655-DE1

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 $4,074 per quarter.

Congratulations to NSUOC’s First Distance Learning Graduate!

More than Yvonne Haberer’s family and friends were beaming proudly as she walked across the stage at the 2005 commencement ceremony to shake President Ray Ferraro’s hand. Dick Dodge, Ph.D., dean of the Oceanographic Center; Andrew Rogerson, Ph.D., professor and associate dean; and Jane Dougan, coordinator of distance learning, were also delighted to congratulate the first graduate of the Oceanographic Center’s online M.S. in Coastal Zone Management.

Haberer’s mother and father, Duane and Sharon Haberer, and her sister, Melissa Haberer-Potthast, flew in from Illinois. Her best friend, Tambour Eller, came in from Jacksonville.

The distance M.S. program came into effect after Haberer had already begun her online studies in the fall of 2002. The flexible distance format means that students, theoretically, can begin their graduate studies with an individual course, or after completing a four-course distance Graduate Certificate in Coastal Studies.

Haberer reflects that for full-time working professionals such as herself, the distance format is “invaluable.” A biologist and environmental project leader for the U.S. Army Corps of Engineers, Haberer is based in Jacksonville, but her work has taken her to coastal projects in Puerto Rico, the U.S. Virgin Islands, and throughout Florida. She wanted to be able to pursue a graduate degree while continuing her full-time work, and says that “the quality of online courses offered were way above my expectations. The program has allowed me to gain additional technical expertise in the marine science field and to establish a network of contacts within the research community. The online CZM program is the ideal method of delivery for the working professional. It has strengthened my understanding of the problems and conflicts associated with the coastal zone and provides me with the technical expertise necessary to make better decisions and more effectively manage the coastal environment.”

Publications


Susan Zaretsky after successfully defending her thesis.

A leaping spinner dolphin (Stenella longirostris) in the Tañon Strait. They are called “spinners” because of their energetic leaping and spinning behaviors.

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