


Summer 1992

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NSU Oceanographic Center

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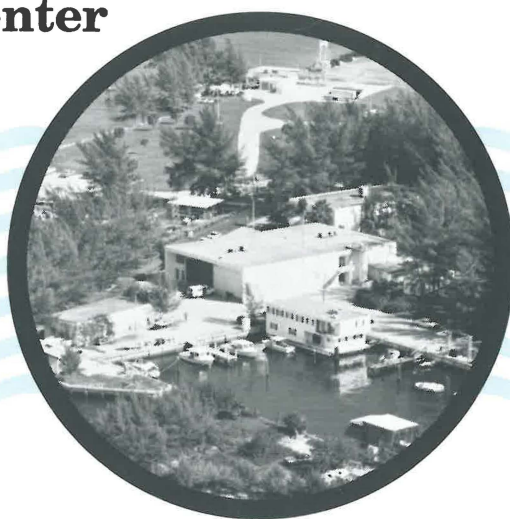
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Currents



Summer 1992 • Volume VI, Number 3

Dr. Cole Mixes Team Teaching with Beach Debris

When **Dr. Charles Andrew (Andy) Cole** came to the Oceanographic Center a year ago, he probably did not contemplate the prospect of analyzing beach debris for a living. That is only part of his story, and an intriguing one at that.

Cole is involved in a joint project with the National Park Service and NOAA's National Marine Fisheries Service (NMFS). Their charge is to measure the types and accumulation of marine debris on park service beaches. The areas under study are Olympic National Park in Washington, Channel Islands National Park in California, Padre Island National Seashore in Texas, Gulf Islands National Seashore in Mississippi and Florida, Canaveral National Seashore in Florida, Virgin Islands National Park, Cape Hatteras National Seashore in North Carolina, Assateague Island National Seashore in Maryland and Virginia, and Cape Cod National Seashore in Massachusetts. If additional funding becomes available, the group hopes to add Fort Jefferson, in the Dry Tortugas, to the list of study sites.

The group is to manage marine wildlife in the study areas. A primary concern is, of course, plastics on the beaches. The National Park Service had wanted to look at anything that washed up, but the only other categories of any consequence are glass and metal.

Park service researchers go to the study sites quarterly, then send the data to Cole for compilation. He has completed this year's report and ex-

pects it to be published in September. Some of the results of the study so far are rather surprising. For example, the amount of plastic collected comprises 90-93 percent of the total debris. Interestingly, despite newspaper horror stories, very little medical debris has been found: just 126 pieces of the 120,000 collected.

Says Cole, "Padre Island has accumulated about 20 times as much debris as any other site: over 22,000 items of debris per kilometer." Two of the more bizarre items encountered were one jeep and one 15-foot plastic hot dog.

Cole hopes to continue working on this project. At the moment, there is a great deal of variability in the data, and a longer time series is needed in order to draw more meaningful conclusions about the state of our beach trash.

During the regular school year, Cole teaches courses in Ecology and Environmental Studies to undergraduates in the Nova College Joint Science Program. This summer, he is deeply involved in an innovative team teaching effort within the Institute of Marine and Coastal Studies, in collaboration with **Dr. Bart Baca**, Center adjunct.



Dr. Andy Cole, at his office door.

The two are teaching a Wetlands Ecology course this term, for which the class meets once every other week. In addition to class time, five field trips have been scattered throughout the summer. So far, the class has visited Loxahatchee National Wildlife Refuge in West Palm Beach, which is a managed freshwater marsh. On the agenda is Corkscrew Swamp in the Everglades near Naples, and after that Baca will lead the group to the Keys to look at sea grasses and mangroves. There is also plenty to see around Broward County, and the class will visit various mitigation sites to see how they are progressing. Also on tap is one "mystery" field trip, but Cole would not elaborate on that one. (He adds that that's because even *he* doesn't know where Baca is going!)

Board of Governors Meets in June and July

The Oceanographic Center's Board of Governors met on June 18 in the Schure Building. Board members attending were **Scott Boyd, Bud Brown, Arne Carlson, Bill Darby, Chris Jacoby, Pat Kelley, Marshall Lytle, John Peet, Stan Smoker, Ron Stroud, and Anna Tallent**. Center faculty and staff who attended were **Andrew Cole, Dennis Dannacher, Richard Dodge, Pijush Kundu, Ruth Lazarus, Julian McCreary, Bonnie Pastor, and Jan Witte**.

Dannacher reported on the April fish fry, which was attended by as many as 350 people. Feedback was very positive; unfortunately, the expenses exceeded the revenues, and next year prices may have to go up. It was agreed that the next event should be restructured to facilitate tours of the Center.

Dannacher also reported on the Oceanography Annual Fund. Alumni and Friends of the Oceanographic Center have received announcements and donation envelopes, and about 10 people have responded so far. The goal is for 100 percent participation and \$10,000 in the first year. The funds will be used to help with lab construction in the newly acquired Schure Building.

Dodge reported that a proposal for \$130,000, with matching University funds, has been submitted to the National Science Foundation. The funds would be used to build and outfit labs in the Schure Building. Work will begin soon on two labs and a wet classroom using Nova financing, but much additional funding is needed.

The major item on the agenda was the possibility of holding a Yachtsmen's Ball next year. There was much discussion on the pros and cons of such an event, stressing the level of commitment that the board must make for a successful outcome. The topic was tabled until the next meeting.

A special meeting of the board was held on July 22. Board members in attendance were **Scott Boyd, Arne Carlson, Richard Donato, John Grady, Chris Jacoby, Marshall Lytle, John Peet, Ron Stroud, and Barbara Swanson**. Faculty, staff, and

administrators included **Dennis Dannacher, Richard Dodge, Julian McCreary, Charles Messing, Richard Miller** (vice-president for development), and **Bonnie Pastor**.

Dodge announced that the National Science Foundation proposal for \$130,000 in laboratory support has been funded. The grant covers only "fixed equipment," such as cabinetry, shelving, electrical work, and plumbing. Two labs remain unfunded, and furniture and lab supplies will have to come from other sources. The construction and furnishing of each lab will cost from \$25,000 to \$30,000. Dodge distributed a "wish list" outlining the Center's goals in this regard. Donato pointed out that

the new labs could be named for donors.

Boyd announced that we have obtained a free booth for the next Fort Lauderdale Boat Show, likely to be housed in the new convention center. Board members, faculty, staff, and students will sign up to man the booth.

The primary purpose of the meeting was to discuss the proposed Yachtsmen's Ball. It was agreed that such an event is not a good idea for next year. The timing is bad for the maritime industry, and ship timetables are not conducive to holding the ball aboard a vessel in Port Everglades. It was moved that the ball be postponed, but that the idea be reconsidered at ensuing board meetings. Other options were then discussed.

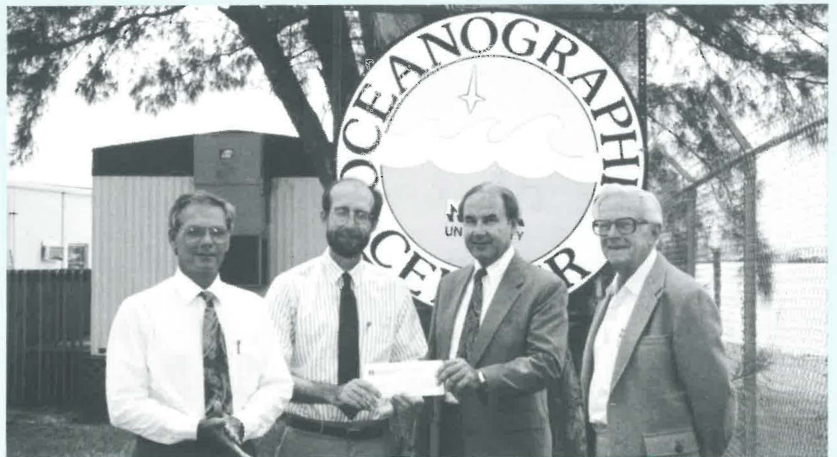
MIASF Provides Base for Tuition Assistance Fund

The Louis C. "Bud" Huch Marine Industries of South Florida (MIASF) Scholarship Fund was established on July 10 with a gift of \$1,000 from MIASF. Recipients will be deserving students enrolled in the Ocean Studies, Coastal Zone Management, or Marine Biology program. This lead gift is considered a base to begin building the fund through individual and corporate giving.

Bud Huch, who was the Oceanographic Center's "man in Development" until his death last year, had a deep commitment to the marine in-

dustry and to the excellent research being accomplished at the Center. He started the Board of Governors in 1990 and was instrumental in securing and outfitting the Center's research vessel, the *Lucy Forman*.

Those interested in supporting this scholarship fund should contact **Dennis Dannacher** at (305) 475-7653, or send contributions directly to: *The Bud Huch Fund at Nova University*, Office of University Relations and Development, 3301 College Avenue, Fort Lauderdale, Florida 33314.



Dr. Richard Dodge, second from left, receives a check from Frank Herhold of MIASF. Looking on are Dennis Dannacher, left, and Board of Governors member Ron Stroud.

UNDERCURRENTS

INSTITUTE OF MARINE AND COASTAL STUDIES

FALL TERM SCHEDULE

M.S. degree specialties are **Marine Biology** and **Coastal Zone Management**. Each course carries three credit hours or may be audited. Tuition is \$275 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. The fall term extends from September 28 to December 18. For further information, call (305) 920-1909.

Marine Phytoplankton (OCMB-6060): Stresses the relationship between environmental factors and the growth, productivity, and biomass of phytoplankton in the marine environment. Field trips and lab instruction are included. Instructor: **Dr. Gary Kleppel** (Center faculty). Begins Monday, September 28.

Marine Invertebrates (OCMB-6080): Deals with the important groups of planktonic and benthic invertebrates, emphasizing taxonomy, abundance, role in food webs, feeding, growth, productivity in reproduction, and ecological interactions. Collection and identification of fauna as well as field trips are required. Instructor: **Dr. Charles Messing** (Center faculty). Begins Tuesday, September 29.

Principles of Coastal Zone Management (CZMT-0609): Describes the management of coastal resources, based on the principles and techniques of a diverse array of disciplines. Practical solutions to usage conflicts, especially within the coastal zone, are studied in relation to their impact on the basic resources available. Instructor: **Prof. Alan Craig** (Florida Atlantic University; Nova Oceanographic Center adjunct). Begins Wednesday, September 30.

Marine Ecosystems (OCOR-5602): Focuses on marine ecological processes and functions. Provides an overview of the basic concepts of marine ecology, as well as more detailed elements of the discipline, such as diversity of organ-

isms, feeding relationships, ecological roles, growth, and reproduction. Emphasis is on coastal marine communities. A CORE course for both specialties. Instructor: **Dr. Curtis Burney** (Center faculty). Begins Monday, September 28.

Winter Term Schedule

Descriptive Marine Physics (OCOR-5601): A CORE course. Instructor: **Dr. Pijush Kundu** (Center faculty).

Marine Zooplankton (OCMB-6065): Instructor: **Dr. Gary Kleppel** (Center faculty).

Florida Environmental Regulation (CZMT-0621): Instructor: **Mr. Stacy Myers** (South Florida Water Management District; Center adjunct).

Marine Botany (OCMB-6070): Instructor: To be announced.

Recent Seminars Held at the Center

Dr. Donald Olson, of the University of Miami's RSMAS, gave a talk on "The Biological Response to Meandering Currents" on May 29.

Dr. Govind Nadathur, of the University of California at Santa Barbara, presented a seminar on July 17, entitled "Toward the Molecular Analysis of Signal Transduction in Marine Microorganisms."

Dr. Frederick Zechman, of the Academy of Natural Sciences in Philadelphia, visited the Center and gave a talk on August 7, entitled "Phylogenetic Systematics of Ulvophyceae (Marine Green Algae) Based on RNA Sequence Data and Morphology."

On August 14, **Dr. David Jacobs**, of Scripps Institution of Oceanography in La Jolla, California, presented a seminar entitled "Fine-scale Velocity and Density Measurements during an Active Oceanic Mixing Event."

Joint Science Program Boasts Its First Graduates

The Center's Joint Science Program has produced its first Ocean Studies graduates. Three undergraduates received their degrees through the Department of Math, Science, and Technology of Nova College.

At the June ceremony, **Robert Miller** received the Outstanding Academic Achievement Award. His senior research project assessed the skeletal contribution of stalked crinoids to the sediments of the Little Bahama Bank. He found that crinoids do contribute significantly to the sediments and that living crinoid communities can be used as models for the study of extinct populations. Miller intends to continue his studies toward the Ph.D. degree. He has been accepted at several graduate schools, including Scripps Institution of Oceanography in California.

Kirk Berner conducted a baseline study of the effects of mangrove mitigation projects on coastal waters. He looked at ammonium concentrations in an established mangrove swamp and in a newly created mangrove wetland. He found much higher ammonium levels in the mitigation area, suggesting that the underlying sediments may be a source of ammonium to the surrounding waters. Berner plans to go on to graduate school.

Joanne Filan also contributed to the baseline mangrove study. She collected mangrove leaf litter-fall as a measure of potential detritus production available for export to surrounding aquatic ecosystems. The decaying organic matter is an important energy source for detritus-based food webs in coastal waters. The data ultimately will be compared with quantities of detritus exported on ebbing tides.

Number of Graduates on the Rise

Nova University's graduation ceremony took place on June 21. Two of **Dr. Julian McCreary's** Ph.D. physical oceanography students, **Yasushi Fukamachi** and **Zuojun Yu**, took part in the ceremony, although they have not yet defended their theses. In addition, 13 M.S. students received their degrees in the 1991-92 school year:

Andy Barienbrock, MB

Robert Brock, MB

Steve Chasens, CZM

Laura Geopfert, Joint Program

David Gilliam, MB

Joanne Hidalgo, CZM

Linda Moscato, CZM

Isabel Puente, MB

Anthony Russo, MB

Dean Teeples, CZM

Denice Teeples, MB

Bill Tiemann, CZM

John Yudin, MB

CZM: Coastal Zone Management

MB: Marine Biology

Joint Program: Joint MB/CZM

New M.S. Students

The following students have enrolled since the winter 1991-92 semester:

Nicole Adimey, MB: Ohio State Univ.

Patrick Bellew, MB: Univ. of Nevada

Tom Bessler, MB: Southern Methodist Univ.

Junghee Cho, CZM: Inha Univ., Korea

Melissa Dore, CZM: Wells College

David Grey, Sp: Univ. of Florida

Monika Grossman, MB: Auburn Univ.

Larry Havill, Sp: Univ. of Florida

Roseline Hernandez, MB: Cornell Univ.

Maureen Hirst, MB: Univ. of Central Florida

Ron Hirst, Sp: Univ. of Central Florida

Kathleen Kuss, Sp: Univ. of Virginia

Susan Kuzla, Sp: Univ. of Akron

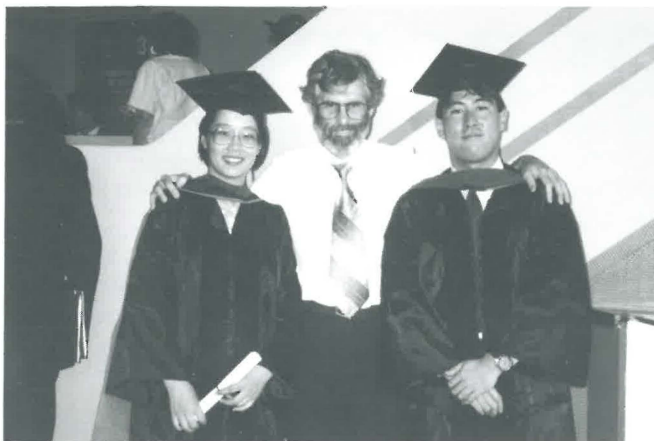
Gary Van Den Berg, CZM: South Dakota State Univ.

Stacy Wolfe, MB: Marietta College

CZM: Coastal Zone Management

MB: Marine Biology

Sp: Special Student



Proud graduates, proud major professor: Dr. Julian McCreary, center, congratulates Ph.D. graduates Zuojun Yu, left, and Yasushi Fukamachi.

Damselfish Become Models for Cancer Research

Dr. Dale Vicha, a M.S. student in Marine Biology, has been working with **Dr. Mike Schmale**, of RSMAS, University of Miami, on research using the bicolor damselfish as a model for cancer in humans. The specific type of ailment under study is neurofibromatosis, or elephant man's disease.

There are several researchers working on various aspects of the study. Vicha is doing histological examinations of a particular cell. "Fish do not have mast cells," he explains. "This cell is doing the same thing in fish tumors that mast cells do in humans. The bicolor damselfish is the only animal or fish that gets this tumor in abundance, so the fish can be maintained easily as a model for human research."

Entitled "Morphology, Location, Distribution and Abundance of the Eosinophilic Granule Cell in Bicolor Damselfish Neurofibromatosis," Vicha's thesis covers the cell's description, its comparison with human mast cells, and its reaction to the introduction of certain chemicals to see whether that cell is part of the immune system. This is the first time that this cell has been described in a natural pathological condition. In the study, two groups of fish are considered: natural fish off the reef and

those that are exposed by injection to tumors from sick fish.

Dr. Richard Spieler is Vicha's major professor, and **Dr. Curtis Burney** serves on his thesis committee. Vicha hopes to finish his studies by the end of the year and then go on to do more research, perhaps some teaching as well. Currently, he works full time as a veterinarian at the Animal Medical Hospital in Fort Lauderdale. He obviously enjoys working with small animals and hopes to extend his territory to include marine animals for a slight change of pace.



Dale Vicha, with an aquatic friend.

Tiny Crustaceans Under Study

Barbara Maloney, a M.S. student in Marine Biology, is studying a group of tiny, shrimp-like crustaceans that live in the Center's boat basin. Her thesis topic is "Population Dynamics, Emergence Cycles and Life Histories of Three Cumacea (Crustacea: Peracarida) in Dania, Florida."

Maloney's major adviser is **Dr. Charles Messing**, and **Dr. Richard Dodge** serves on her committee. She has enjoyed the assistance of **Dr. Susan Corey** of the University of Guelph (ret.), an expert on reproductive behavior; **Dr. Les Watling** of the Darling Research Center in Maine, an expert on crustacean taxonomy; and **Dr. Richard Heard** of the Gulf Coast Research Laboratory in Mississippi, who has provided family- and genus-level identifications for the study.

Most cumaceans recorded from Florida waters have not yet been described, and no records of cumaceans from southeast Florida have ever been published. Cumaceans are important parts of the diets of some bottom-dwelling fishes, however, and as a result may be critical components of local inshore food webs.

Maloney believes that there are five



Barbara Maloney in the laboratory.

to seven local species of Cumacea, and at least one of these is definitely new and unnamed. During her study, she tried various sampling methodologies before hitting on the right ones. She spends a great deal of time sorting her specimens from the mud or other plankton, separating the different species, identifying the various life history stages, and measuring all of the individual specimens.

After completing her M.S. work, Maloney would like to go on for the Ph.D. degree. Ultimately, she wants to do research on marine organisms and teach at the college level. She has

already gained some excellent teaching experience, having been a teaching assistant in a freshman biology lab for the past year and a half in Nova's new Life Sciences Program. She also has been teaching a course at Broward Community College called "Adventures in Aquatic Science."

Apart from teaching, Maloney has been involved in "Marine Science under Sails," a nonprofit environmental education corporation that provides schools with field programs dealing with various ecosystems, such as mangroves, beaches, and hardwood hammock areas. For the second summer, she is assisting **Cathy Mattison** with the Broward County Sea Turtle Project.



Maloney, holding a plankton net tow.

Student Update

M.S. student **Brant Touchette** attended the Nineteenth Annual Conference on Wetlands Restoration and Creation, held May 14-15 at the Plant City campus of Hillsborough Community College. He presented a paper entitled "Effects of an Oil Spill in a Mangrove Mitigation Site," which will be included in the proceedings of the meeting.

Several recent and soon-to-be graduates are employed by Dade Environmental Resource Management (DERM). They include **John Farina** (head of the Compliance Section), **Craig Grossenbacher**, **Jan Kosinsky**, **Kevin Mayo**, **Linda Moscato**, **Isabel Puente**, and **Bill Tiemann**.

Andrew Barienbrock, who received his degree in Marine Biology in

1991, is an environmental specialist for water facilities at the Florida Department of Environmental Regulation in Fort Myers. Meanwhile, **Rowena Garcia**, who is nearly finished with her thesis, has accepted a position with the Florida Department of Environmental Regulation in Marathon, Florida. Among her many duties will be conducting on-site inspections of wetlands, biological and ecological studies, and evaluations of proposed dredge-and-fill activities. **David Stout** is nearly finished with his nonthesis option paper and recently accepted a position with Broward County's Office of Natural Resource Protection.

Marine Biology graduate **Robert J. Brock** writes that he recently passed his qualifying exams for the Ph.D. degree in Environmental Biology at the

University of Florida. He is currently writing his dissertation, entitled "Assessment of Aquatic Food Web Alterations in the Presence of the Asiatic Clam, *Corbicula fluminea*." While working on his degree, Brock served as an adjunct professor in the Environmental Science Program at Santa Fe Community College in Gainesville, where he taught ecology, limnology, and oceanography. Brock received teaching enhancement awards from the National Science Foundation for the past two summers, which took him to Scripps Institution of Oceanography in La Jolla, California, and to Denver. He is now working for the Environmental Branch of the U.S. Army Corps of Engineers in Jacksonville. A busy man!



Stephanie Morris, with coral samples.

Effects of Renourishment on Corals Under Study

Since the summer of 1991, M.S. student **Stephanie Morris** has been studying the effects of sedimentation on corals due to renourishment of Hollywood and Hallandale beaches in South Florida. She collected the necessary data from treatment sites in these areas.

During the renourishment project, sand was dredged from the ocean floor and deposited on the beach. It was hypothesized that the dredging caused a variety of stress effects in two species of stony coral found near the project area: *Dichocoenia stokesii* and *Solenastrea bournoni*. The parameters under study include bleaching, polyp expansion, and extension growth rates.

Four stations were set up along the beach, two control sites near the dredging project and two off John U. Lloyd Beach State Park. The corals in each station were photographed once each month for six months to document behavioral responses to the sedimentation. Last October, following the dredging and monitoring period, the corals were removed to the laboratory and sliced. Morris then measured the amount of growth of each specimen outward from skeletal stain lines created at the beginning of the project.

It was found that the growth rate of one species, *S. bournoni*, was significantly depressed as a result of the sedimentation, but there was little or no effect on *D. stokesii*. Bleaching was

found to be greater in *S. bournoni*, coinciding with the high sedimentation rates. Polyp expansion was shown to be higher in *D. stokesii*, but did not correlate with high sedimentation. "Expansion is one way by which corals can clear sediment from their surfaces," Morris explains. "Low expansion may indicate that the corals are relying on other means for sediment removal, such as mucus entanglement or wave and current action."

Shrimp Farming Catches On

M.S. student **Sofia Russell** hopes to set up her own shrimp farm one day. Meanwhile, she is working on laboratory experiments in that field. The title of her thesis project is "A Carbon Budget for Intensively Managed Shrimp Ponds," and her committee consists of **Dr. Bart Baca**, her major professor, and **Drs. Pat Blackwelder** and **Curtis Burney**.

Russell works closely with **Dr. Stephen Hopkins**, director of the Waddell Mariculture Center in Bluffton, South Carolina, where the shrimp ponds are located. According to Russell's thesis proposal, "Penaeid shrimp culture ... requires a high density of cultured organisms and is in need of research to help in measuring and reducing the energy needed for successful culture. The Waddell Mariculture Center has been conducting a number of studies, mostly concentrated on reducing water exchange.... Extensive water quality and growth measurements allowed the production of a nitrogen budget ... for tracking the movement of nitrogen (i.e., protein) from feed, to shrimp, and to wastes. To gain more insight into the process of shrimp production, and to determine areas where costs can be reduced, the next step would be to construct a carbon budget. In the most efficient pond, carbon from feed should be part of growing shrimp and ultimately (in part) liberated as CO_2 ."

Water samples from three Waddell ponds are sent to Russell, who measures the total organic carbon in the

Morris hopes to defend her thesis, entitled "Effects of Sedimentation Due to Dredging on Two Species of Stony Corals of Southeast Florida," this fall. **Dr. Richard Dodge** is her major professor, and **Dr. Walter Goldberg** of Florida International University and **Dr. Curtis Burney** serve on her committee. She has accepted a position locally with Robert H. Miller and Associates, where she will be working as a wetlands biologist.



Sofia Russell, at the computer.

water over the five-month shrimp-growing season. Dr. Baca explains, "From these measurements, she will be able to piece together part of the puzzle on the optimal feed and water exchange requirements for shrimp culture, thus providing present and would-be farmers with more information that can improve their success. To further, and in fact make possible, her research goal," he continues, "Gold Circle has provided a \$1,000 scholarship for Sofia to conduct the analytic work. She expresses her deep appreciation, and we look forward to her results and the fruits of her labor (served with cocktail sauce, of course)."

Gold Circle is a women's organization of Nova University. **Dr. Stephen Goldstein**, vice-president for corporate and foundation relations, was instrumental in steering Russell's scholarship request through the appropriate channels. Thanks to him as well.

Russell expects to defend her thesis before the end of the year. After graduation, she wants to go on for her Ph.D. in aquaculture. Then she will be able to seriously contemplate a shrimp farm of her own.

Research Begun on Yellow Stingray

James Sulikowski and **Patrick Quinn**, working under the direction of **Dr. Richard Spieler**, have begun M.S. research projects on the yellow stingray (*Urolophus jamaicensis*). Deciding to set up a dual study, the two became dive partners and research assistants for each other at the beginning of August.

Very little is known about this species of ray. In fact, the two men were unable to find any information in the literature. They are intent on changing that situation.

The yellow stingray is small, as rays go, rarely exceeding two feet from nose to tail. Sulikowski is interested in studying the population and size distribution of these interesting creatures. He will cover the reef area off John U. Lloyd Beach State Park in Broward County. He will use the Center's R/V *Lucy Forman*, assisted of course by Quinn. The team will dive to the bottom, catch the requisite number of rays, and take them to the boat. There they will be anaesthetized, weighed, measured, and



James Sulikowski, left, and Patrick Quinn.

tagged. After they have been revived, the rays will be returned to the approximate area of capture. Over a 12-month period, Sulikowski will carefully monitor individual rays to learn as much as possible about their movements, growth patterns, and sexual maturity. He will be looking for any seasonal patterns that may emerge, as well.

Quinn will be looking at quite different characteristics of the yellow stingray. His area of study will take in the nearshore and reef areas off the coast of Broward County. Assisted by

Sulikowski, he will also catch his subjects, but they will be returned to the laboratory for study. There Quinn will perform stomach/gut analyses on the rays to determine their feeding habits. He will also make gonadal index comparisons, looking at the weight of gonads compared to body weight. This part of the study will be done in conjunction with a histological analysis to determine sperm and egg development patterns and the extent of sexual

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People on the Move

Dr. Charles Andrew Cole attended the annual meeting of the Society of Wetland Scientists in New Orleans, June 1-5. He presented a talk entitled "Conflict at Cape Hatteras: Coastal Water Quality in a Resort Environment."

Cole will travel to Columbus, Ohio, September 13-17 for INTECOL IV, an international wetlands conference sponsored by the Ohio State University. The general theme will be "Global Wetlands—Old and New," in honor of the 500th anniversary of the discovery of the New World. He will present a paper entitled "A Theoretical Framework for Use in Wetland Creation: Odum Revisited."

Dr. Gary Kleppel attended a workshop on the southeast U.S. continental shelf, held in Charleston, South Carolina, June 29-30. The workshop was sponsored in part by Sea Grant,

and Kleppel presented a talk on results of his Florida Sea Grant work at the Gulf Stream front.

Kleppel and M.S. student **Kevin Carter** embarked on a 10-day research cruise in the Gulf of Mexico on R/V *Bellows*, July 29 to August 7. It was the second in a series of cruises sponsored by the Florida Department of Natural Resources. The purpose of the study was to understand the processes that result in variability in coastal biological production off Florida, especially fish recruitment and the occurrence of toxic red tide.

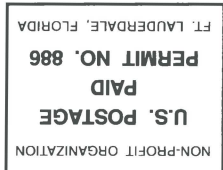
Dr. Charles Messing attended a meeting July 10-12 of Friends of Echinoderms at the Harbor Branch Oceanographic Institution in Fort Pierce, Florida. He presented a paper on the results of his ecological research on deep-water sea lilies in the Bahamas. On July 26, Messing participated in a one-day cruise to the Bahamas aboard Harbor Branch's research vessel, *Edwin*

Link. The purpose of the cruise was to retrieve a deep-sea, time-lapse camera that was deployed in May to photograph crinoids in action.

On August 1, Messing, along with M.S. students **Barbara Maloney** and **Gayle Stone**, sampled benthic invertebrates in the Intracoastal Waterway adjacent to Port Everglades. Since August 1991, sampling has been done once every six months for the Port Everglades Authority.

Messing traveled to Los Angeles August 12-15. He was invited to visit the Los Angeles County Museum of Natural History to examine its crinoid collection.

Dr. Julian McCreary, director, will spend the month of November in India. He will visit the National Institute of Oceanography in Goa, at the invitation of **Dr. Satish Shetye**. The two theoreticians will collaborate on a study of the dynamics of Indian coastal currents.



Research Begun on Yellow Stingray

(Continued from page 7)

maturity. Of major interest in the overall study is the breeding cycle of this particular type of ray.

The two researchers have placed three mature rays in a tank at the Center for observation. By keeping them in captivity over the next year, they hope to learn more about their breeding habits. One ray has given birth, but the young did not survive. Another is pregnant, so hopefully there will soon be offspring to study. The third is a male, so his work is already cut out for him.



Researchers display an elusive yellow stingray.



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