

The

Crest

Current Issues in Coastal Ocean and Estuarine Science

VIMS Hires New Dean and Director

Dr. John T. Wells has been appointed Director of VIMS and Dean of the William and Mary School of Marine Science. Currently director of the University of North Carolina Institute of Marine Science at Morehead City, Wells is expected to assume his new responsibilities on August 1, 2004.

"John Wells is a nationally prominent scientific leader who can bring new vision, increased name recognition, strong federal connections, and bold and inspired guidance to VIMS," says

VIMS Director L. Donelson Wright, who will be returning to his research career in VIMS' Physical Sciences Department.

"I am confident that, under his direction, VIMS will advance to a new plateau of scientific excellence and interdisciplinary understanding and that the Institute's funding base will be significantly expanded and diversified."

William and Mary Provost Geoffrey Feiss says that "John Wells

is a marine geologist of the first order with a wealth of experience around the globe. His interest in sedimentary environments will enrich VIMS' reputation for excellence in the study of estuaries like the Chesapeake Bay, and his record of attracting and managing grants will advance the Institute's efforts to protect our marine environment through externally funded research."

Wells holds a bachelor's degree in geology from Virginia Tech, a master's degree in geological oceanography from Old Dominion University, and a doctorate in marine sciences from Louisiana State University. He launched his teaching and research career in 1979 at Louisiana State University's Coastal Studies Institute, and became an associate professor at the University of North Carolina's marine science institute in 1985. He



Dr. John Wells

was promoted to professor in 1991, and named director of the institute in 1993.

The UNC Institute of Marine Sciences has a mission of providing public service through research, and is

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Hurricane Isabel Hinders VIMS Research

Hurricane Isabel slammed into the VIMS campus on September 18 during its passage across North Carolina and Virginia. Isabel's storm-surge and waves combined to destroy all three of VIMS' research piers, including the pump houses and lines that supply running seawater to Institute scientists. Waves, storm-surge flooding, and fallen trees also claimed 18,000 sq ft of workspace and displaced 34 scientific and support personnel. Several buildings on campus were without electricity for more than a week.

Director of Facilities Management Joe Martinez estimates that damages to the campus reached \$2-3 million, the highest loss in state government.

Isabel struck particularly hard at research programs involving blue crabs, benthic community ecology, food-web studies, and cobia. Blue crab and benthic community ecology researchers Drs. Rom Lipcius and Rochelle Seitz lost a large number of refrigerated samples, fiberglass tanks, and custom-

made field sampling gear when Isabel's storm surge toppled the landmark Ferry House off its foundation at the end of the Ferry Pier.

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VIMS Acquires Unique New Vessel

VIMS has acquired a virtually unused military landing craft at no cost from Army Surplus at Fort Eustis. The vessel gives VIMS scientists the ability to conduct research within the zone of breaking waves, an area that is extremely difficult to study using conventional research vessels and equipment.

The 74-ft. vessel, which has not yet been named, arrived at VIMS in mid-October from a local boatyard where an in-depth inspection found its aluminum hull and engines in excellent condition. The boat's two 12V71 Detroit Diesel engines each have less than 400 service hours.

The vessel currently has a small pilothouse, a large payload area, and a hinged bow door. Its 41-inch draft allows the vessel to literally beach itself, thus providing access to shallow, high-energy coastal waters where other research vessels fear to tread.

To provide full value to the research community, VIMS plans to outfit the craft with a four-corner anchoring system, a crane, and crew quarters. VIMS Dean and Director Don Wright estimates outfitting the vessel for research will cost approximately \$350,000. "That's a real bargain," says Wright. "Building a new vessel with similar capabilities would take at least three years and cost several million dollars."

VIMS has already raised \$138,000 from three anonymous donors to complete the initial refitting, and will seek to raise the balance in the next several months from private sources.

"Once the vessel is outfitted," says Wright, "we'll be able to lift and deploy a wide range of equipment in shallow water, quickly anchor and maintain position in rough conditions, and maintain a large working deck for placement of modular labs and equipment. We're confident that it will quickly become a workhorse in the VIMS fleet."

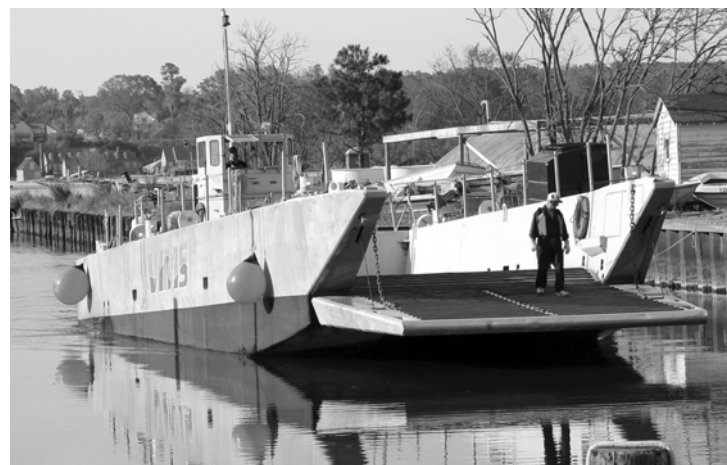
With the deck-mounted crane and a cargo capacity of 120,000 lbs (not coincidentally the weight of an M1 Abrams Tank), the vessel will be able to carry and deploy the heaviest oceanographic instruments, including data buoys and smaller research vessels such as VIMS' RV *Elis*

Olsson. The existing VIMS research fleet has a maximum lifting capability of only 500 pounds. The vessel will also be able to tow seafloor-mapping instruments, and will make it much easier to obtain sediment cores from the seafloor.

"The vessel's capabilities will make collection of near-shore and beach data much easier and less expensive," says Wright. "It will be able to single-handedly do what previously required numerous vessels and drilling rigs."

Coastal geologists such as VIMS' Dr. Jesse McNinch are particularly excited about the vessel's capabilities. McNinch studies "erosional hotspots," short stretches of sandy beach that suffer severe erosion during storms. The new vessel provides a stable platform that will make it much easier to take sediment cores within the breaker zone. "Cores allow us to explore the nature of the underlying sediments, which hold the key for better understanding and predicting shoreline erosion," says McNinch.

The vessel provides opportunities for biologists as well. Dr. Bob Diaz plans to use the craft to tow his benthic sled, a submersible, video-equipped plow that provides a continuous real-time view within the seafloor. By dragging the plow-sled behind the new vessel, Diaz can immediately charac-



The new vessel enters the VIMS boat basin with its bow door open.

terize the habitats of bottom-dwelling organisms, including sediment types and oxidation.

VIMS plans to help pay the vessel's operating costs by making it available to other users, including the Army Corps of Engineers and the U.S. Geological Survey.

"The Corps estimates that \$1 billion will be spent on beach re-nourishment projects in the U.S. in the next decade," says Wright. "Every re-nourishment project requires seismic surveys, seafloor mapping, and sediment coring—exactly what this vessel does best."

The landing craft was constructed by Marinette Marine Shipyard in Marinette, Wisconsin in 1967, underwent a complete refit and refurbishment in 1991, and was put in wet storage at the James River Reserve Fleet in 1992.

For more information visit www.vims.edu/newsmedia/topstories

Marine Science Day Scheduled

Marine Science Day 2004 will be held on Saturday May 22nd from 10am - 3pm at VIMS' Gloucester Point Campus. The day will be jam-packed with fun and educational things to see and do. Visitors can collect and observe aquatic animals on the beach, join in hands-on "critter talks," learn from chefs at seafood seminars, and attend lectures. Research laboratories and the Teaching Marsh will be open for tours and a children's pavilion will have educational activities and games for youngsters. Stay tuned to www.vims.edu or call 804-684-7846 for schedule and contest information or to find out how you can volunteer to become involved.

The Crest

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recognized for conducting scientific studies that have fundamental and immediate relevance to the citizens of North Carolina. While director, Wells oversaw the construction or renovation of three laboratory buildings and implementation of numerous partnerships with other universities and agencies.

Wells' primary research interest is coastal marine geology with emphasis on sedimentology, morphology, physical processes, and the evolution of sedimentary environments. He pursues these topics with research along the central North Carolina beaches, the lower Neuse River and Pamlico Sound, the Mississippi Delta, the west coast of

Korea, and Lake Malawi in east Africa.

The new VIMS dean currently serves as editor-in-chief of the journal *Marine Geology*, and has authored or co-authored nearly 100 publications on such topics as the evolution of sedimentary environments in Louisiana's Atchafalaya Delta, the dispersal of silts in China's Yellow Sea, the effectiveness of beach scraping as a method of erosion control and its impact on barrier island ecology. Wells serves on the board of the North Carolina Coastal Federation, the board of the Carteret County Beach Commission, and the community advisory committee of North Carolina State University's Center for Marine Sciences and Technology.

Pair Pursue Promise of Proteomics

If you haven't heard of "proteomics," you're not alone. But expect to begin hearing more about this technique for analyzing all the proteins expressed by a cell, tissue, or organism. Proteomics, which was nominated by *Science* magazine as a "break-through" story for 2001, is now offering new directions in cancer research for VIMS scientists Drs. Peter Van Veld and Wolfgang Vogelbein.

Van Veld and Vogelbein are using proteomic techniques in collaboration with researchers at the Eastern Virginia Medical School to identify cancer biomarkers in wild fishes, with intriguing early results. Their study focuses on cancer-bearing mummichogs from a highly contaminated site on Norfolk's Elizabeth River called Atlantic Wood.

Proteomics is perhaps best explained in reference to the more familiar field of genomics. Researchers

expended vast effort in the 1990s to sequence the human genome—the complete set of genes required to build a functional human being. The genome provides a "DNA blueprint" for building an organism, whether human, mouse, or fruit fly.

But the genome is only the start of the story, just as a blueprint is only the start of a house. The actual construction of an organism from its genetic blueprint is accomplished through the creation and action of proteins. And unlike the genome, which remains basically unchanged from cell to cell and throughout an organism's life, the organism's proteome—its full complement of proteins—is remarkably dynamic. The proteome can differ from adult to juvenile, diseased to healthy individuals, and from cell to cell.

All these possibilities result in a proteome estimated to be an order of

magnitude more complex than the genome. Whereas scientists now think the human genome comprises 30,000 to 40,000 individual genes, the human proteome likely contains hundreds of thousands of proteins.

Efforts to develop technology for identifying all human proteins first began in the 1970s. However, the work was put on hold in the 1980s with the advancement of DNA technologies. Now that scientists have successfully charted the genome of humans, mice, and other organisms, they have renewed their focus on proteins and are applying technological advancements from DNA research to the study of proteomics. These advancements are allowing them to move beyond their previous focus—on characterizing the structure and function of proteins already known to be associated with cancer—to an analysis of an organism's full proteome, thus promising discovery of many new cancer markers.

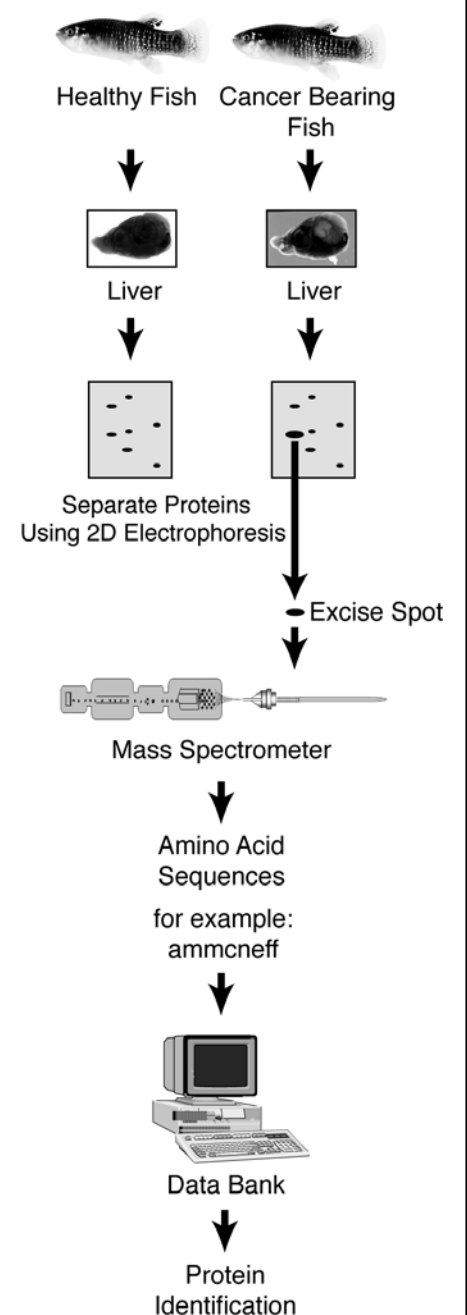
Van Veld and Vogelbein chose the Atlantic Wood site for their study because it holds a population of mummichogs with significantly elevated levels of liver, pancreatic, and vascular cancers. The site is heavily contaminated with polycyclic aromatic hydrocarbons, a class of known carcinogens that derive largely from treatment of marine pilings and other wood products with creosote. A second site, King Creek, provides a "standard" of fish living in a healthy environment.

"Being able to study a natural population of vertebrates that are continuously exposed to known human carcinogens provides an ideal arena for cancer research," explains Van Veld.

Although fish at the Atlantic Wood site eventually develop cancer, they remain resistant throughout their lives to the acute toxicity associated with exposure to creosote-contaminated sediments. In contrast, fish from King Creek die within days or weeks of

From "Fish to Gel"

A section of liver is taken from both the "control" or healthy fish and the fish known to have cancer. The proteins are separated onto a gel plate using 2D electrophoresis. The scientists then choose a spot that is over- or under-expressed, remove it from the plate, and find the amino acid sequence using a mass spectrometer. They can then access an on-line data bank to determine what the protein is (if known) or whether it is a new discovery.



Research Questions Environmental Safety of Flame Retardant

A study by VIMS graduate student researcher Mark La Guardia provides new evidence of the release and environmental accumulation of a common flame-retardant chemical. His findings come in light of a recent voluntary decision by the main U.S. manufacturer of two other closely related and widely used flame retardants to discontinue their production.

La Guardia is a graduate student under Professor Dr. Rob Hale in VIMS' Department of Environmental and Aquatic Animal Health. Hale is a leading expert on the environmental fate and effects of polybrominated

diphenyl ethers (PBDEs), a class of chemicals added to many household foam and plastic products to reduce their flammability.

The Great Lakes Chemical Corporation will stop making the PBDE flame retardants known as Penta and Octa by December 2004, based on growing evidence that the chemicals are toxic, persist in the environment, bioaccumulate, and that people are being exposed. Scientists at VIMS and elsewhere have detected rising levels of these compounds in fish, sewage sludge, and human breast milk.

La Guardia's research deals with the third member of the PBDE family, known as Deca, which is the most widely used PBDE flame retardant in the world. Until recently, most researchers thought that Deca—unlike Penta and Octa—posed relatively little environmental risk. That's because they believed Deca was not in a form readily available to organisms, knew of no obvious pathways by



Mark LaGuardia collects samples from a freshwater stream for PBDE analysis.

Continued on page 11

exposure to this sediment. The resistance to toxins observed in the tumor-bearing fish supports a theory proposed by renowned cancer expert Emmanuel Farber that chemically induced cancer is an adaptation to a harsh chemical environment.

Van Veld and Vogelbein have found that toxin-resistant Atlantic Wood fish exhibit altered protein profiles similar to those found in studies of drug-resistant mammalian tumors. The proteins identified in these mammalian studies are known to help break down and remove both chemical toxins and cancer drugs.

Van Veld says that he is "encouraged by early proteomic results and confident that proteomics will promote the discovery of new proteins, offer new ideas on the relationship between cancer and toxicity resistance, and help provide new warning signs for early cancer stages."

Images of Isabel

Debris and damage in maintenance area.



Satellite image of Isabel making landfall.

Photo Courtesy of NASA's Earth Observatory



York River storm tide under Coleman Bridge.



The electrical shop sustained severe damage.



Another view of the debris in maintenance area.



Remnants of pumphouse at the boat basin.



Debris outside the SAV greenhouse.



Ferry Pier and Ferry House after storm.



Fallen tree near Nunnally Hall.

Hurricane Isabel
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"We had moved most of our gear to higher ground or secured it to the pier because we expected flooding," says Seitz, "but we never expected to lose the entire building." The loss of the Ferry House was particularly surprising because it had withstood the great "Storm King" hurricane of 1933, Tropical Storm Agnes in 1972, and several other hurricanes or tropical storms since the 1920s.

Dr. Emmett Duffy's food-web research also suffered from the destruction of the piers. Isabel's storm surge carried off 11 large fiberglass

tanks and 30 medium-sized ones, along with their associated plumbing and filtration systems. Duffy and his graduate students had been using the tanks to explore the working of food webs involving seagrass-dwelling invertebrates. To date, only one of the large tanks has been retrieved, from Queen's Creek upriver of VIMS.

Duffy says that it is hard at this stage to say how loss of the tanks will affect his research. "If everything is rebuilt in a timely way by April or May when our research resumes after winter, we should be OK, although we'll have to expend considerable time and effort to reconfigure the system. If

we lose the spring it will be a significant setback." Plans are to relocate the tanks to the shoreline between Byrd Hall and the VIMS Maintenance Complex, both to protect them from future storms and maximize researcher safety.

Mr. Mike Oesterling, a Commercial Fisheries Specialist in VIMS' VA Sea Grant Program, released fish held in the marine finfish culture facility prior to Isabel's arrival in anticipation of extended power outages and potential physical damage. "The damages to the facility's physical structure can be repaired," says Oesterling, "but the same can not be

said of the lost research animals." Particularly detrimental was release of several 2-year old cobia weighing roughly 30 pounds each, which had been raised from eggs and were to be used as brood stock in 2004. Oesterling also had to release several hundred small cobia that were to be used in tagging research for stock enhancement. The closure of the marine finfish culture facility also postponed continuing aquaculture research on cultured spot until fall 2004.

For additional data on Isabel's effects on the Bay and the VIMS campus, as well as photos and a video clip, visit www.vims.edu/newsmedia/topstories

VIMS Scientists Quantify Isabel's Impacts on the Bay

As Hurricane Isabel approached Hampton Roads, VIMS Dean and Director Don Wright was busy in his administrative role, helping Institute staff move vulnerable scientific equipment out of harm's way. But as a scientist, he couldn't resist placing one instrument directly in the storm's path.

That instrument, an Acoustic Doppler Current Profiler, or ADCP, has helped provide a unique quantitative record of the hurricane's impact on lower Chesapeake Bay and the Gloucester Point shoreline. Data from the ADCP show that Isabel created a 7-foot storm tide topped by 6-foot waves. At the height of the storm, wave crests were passing over the instrument once every 5 seconds, and the storm was forcing the entire depth of the York River upstream at a rate of 2 knots.

Wright notes that Isabel's large size compounded its impacts. "Because Isabel was so large, its winds, waves, and surge affected the Bay for an abnormally long time." The ADCP showed that storm conditions persisted in the Bay for nearly 12 hours.

Wright and colleagues anchored the ADCP in 28 feet of water several hundred yards seaward of the VIMS

campus, using long augers to secure the instrument to the muddy floor of the Bay. The instrument showed that wave-driven currents were strong enough to mobilize bottom sediments even at this depth, increasing water turbidity by a factor of two to three compared to fair-weather conditions.

The ADCP works by emitting sound waves that reflect off waterborne particles. By recording and analyzing these reflected waves, the instrument can measure the average current velocity in every 25-cm layer between the sensor and the water surface. It also measures turbulence, and the concentration of suspended particles.

Weather data provided by instruments atop VIMS' Byrd Hall show that maximum sustained winds on the campus reached 65 mph, with 90-mph gusts. The barometer bottomed out at 29.2 inches, with a rainfall accumulation of about 2.2 inches. Isabel's storm tide reached 7.9 feet above Mean Lower Low Water.

For additional data on Isabel's effects on the Bay and the VIMS campus, as well as photos and a video clip, visit www.vims.edu/newsmedia/topstories

Schaffner Elected ERF President

VIMS Professor Dr. Linda Schaffner is the newly elected president of the Estuarine Research Federation (ERF), the nation's leading scientific society for estuarine and coastal issues.

As ERF president, Schaffner chairs the Governing Board and presides at all board and business meetings. The board makes policy and is responsible for long-term planning and continuity of the Federation's programs and activities.

Past ERF President Dr. Dennis Allen, Director of the University of South Carolina's Baruch Marine Lab, says that "Defining what it takes to be a leader of a scientific society is not a simple task, but anyone who knows Linda would recognize that she possesses both the professional and personal skills necessary to be successful. Her broad background in estuarine science and coastal issues, strong work ethic, community spirit, and vision qualify her to be an excellent President. She has already generated the respect and support of a diverse governing board and we're all looking forward to working with her to make great things happen."

Schaffner plans to focus on several critical issues during her 2-year tenure, including strengthening the ERF journal *Estuaries*, enhancing the Federation's efficiency and public outreach efforts, and increasing international membership and links with foreign scientific societies.

"Estuaries and coastal systems all over the world suffer from the effects of urban sprawl, overfishing, invasive species, and other human activities," says Schaffner. "To meet these global challenges, ERF must increase its international membership and partner with scientific societies in other countries."

Schaffner has already begun her international effort with trips to Thailand and Korea, where she visited with colleagues to share knowledge and approaches concerning the effective

study and management of estuarine resources.

Prior to becoming President, Schaffner served on the ERF board for 6 years, first as a Member at Large, then Secretary, then President-Elect. As president, Schaffner says she is

trying to move ERF towards a culture of strategic thinking and planning. "I want our approach to be based on data analysis and brainstorming by our board members. As we begin to use these planning activities to formulate policy, I will be challenging the board members to identify tangible

goals and expected outcomes that we can use to gauge our successes."

Schaffner's research at VIMS focuses on the ecology of bottom-dwelling organisms and the processes of estuarine and coastal environments, including the effects of pollution and physical disturbances. She has authored or co-authored more than 20 peer-reviewed publications since 1990.

During the past 15 years, Schaffner has served on professional panels or committees for the Virginia Department of Environmental Quality, EPA's Chesapeake Bay Program, the National Science Foundation, Maryland's Chesapeake Bay Monitoring Program, the Swedish Environmental Protection Board, and many others. Schaffner also received the 2003 Outstanding Faculty Award from the Virginia State Council of Higher Education, and served as an Associate Editor for ERF's flagship journal *Estuaries* from 1998-2001.

The Estuarine Research Federation, founded in 1971, is a private, non-profit, non-partisan organization with members dedicated to advancing understanding and appreciation of the world's estuaries and coasts, to the wise use and management of these environments, and to making research results and management actions available to everyone. Academic researchers, public sector managers, teachers, consultants, students, and others interested in estuaries make up the 1,500-member organization.



Dr. Linda Schaffner

Isabel By the Numbers.....

Data illustrating Hurricane Isabel's impact on the VIMS campus

- 65 maximum sustained winds (mph)
- 90 maximum gusts (mph)
- 4.76 height of Isabel's storm surge (feet)
- 6.6 height of waves (feet)
- 3 feet of seawater in Boat Basin at height of Isabel's storm tide
- 29.2 inches of mercury (lowest barometric pressure)
- 2.2 inches of rainfall
- 820 tons of debris removed
- 40 percent of facilities maintenance buildings damaged
- 66 percent of maintenance, grounds, and housekeeping staff left temporarily without office space
- 88 percent of vessel support space damaged
- \$55,250 cost to demolish and dispose of Ferry House
- 700 linear feet of VIMS' piers destroyed
- 525 overtime hours by VIMS facilities staff

ABC Oyster Work Continues with Academy Validation

It's been a busy fall for oyster researchers at VIMS, following a mid-August validation of their work by a National Academy of Science committee tasked with evaluating the risks and benefits of introducing non-native oysters to Chesapeake Bay.

The Academy's highly anticipated report asserts that carefully regulated aquaculture of sterile Asian oysters could help the oyster industry and generate needed risk-assessment data, whereas any introduction of a reproductive population of the non-native oysters should be delayed until more is known about potential environmental risks.

The report's recommendations mirror those expressed in a position statement released by VIMS scientists

Anderson endorsed last February's decision by the Virginia Marine Resources Commission to allow a commercial trial of sterile Asian oysters by 10 Virginia Seafood Council (VSC) growers. They also noted "the process used so far is a model program for the rest of the coast."

The VSC trial began in late September with the deployment of about 250,000 sterile *ariakensis* oysters to 8 Virginia growers. The trial is designed to further explore the economic potential of this non-native species for aquaculture in Chesapeake Bay.

The sterile trial oysters were provided by a team of researchers in VIMS' Aquaculture Genetics and Breeding Technology Center led by Dr.

Stan Allen. Allen's group renders oysters sterile using a state-of-the-art genetic technique that is about 99.9% effective, giving growers and regulators the confidence to proceed with large-scale commercial trials under conditions of minimal risk.

Allen's team is now monitoring the status of the deployed oysters at each commercial grow-out site to ensure that the VSC test continues to meet the highest standards of science and biosecurity. In addition, they are conducting parallel experiments with a sterile, disease-resistant strain of the native oyster

Crassostrea virginica

to compare its performance to that of the non-native species.

The Academy report also validates efforts at VIMS to investigate the potential effects of *ariakensis* on Bay ecology. The report lists several issues that require further research, including the potential introduction of a new disease, competition with native oysters, dispersal of non-native oysters outside Chesapeake Bay, and market demand for non-native oysters. This additional research, says the report, will be needed before scientists can reassess the environmental risks of wider aquaculture of sterile non-native oysters or the introduction of reproductive ones.

VIMS researchers are active in each of the research areas promoted in the Academy report. Dr. Gene Burrenson and colleagues in the VIMS Shellfish Disease Laboratory are studying potential pathogens of *C. ariakensis* in its native range in China. Dr. Mark Luckenbach of VIMS' Eastern Shore Laboratory is conducting competition studies between *ariakensis* and *virginica*. Early marketing studies of *ariakensis* were conducted by scientists in VIMS' Virginia Sea Grant Marine Advisory program.

VIMS began exploring the use of non-native oysters for Bay aquaculture in 1995 at the request of the Virginia General Assembly, and began field trials with sterile *ariakensis* oysters in 1998. Those trials showed that *C. ariakensis* was faster growing than the native *virginica* oyster, better tolerated the oyster diseases MSX and Dermo, and compared favorably in taste tests.

To read the Academy report online, visit www.nap.edu/books/0309090520/html/. To learn more about Allen's VSC monitoring program, visit www.vims.edu/vsc/



ABC researchers Liz Walker, Karen Hudson, and Dr. Stan Allen prepare sterile *ariakensis* oysters for deployment to Virginia growers.

in fall 2002, and help validate their ongoing strategy for oyster research. The VIMS statement notes that carefully designed and monitored commercial trials can provide data on both the aquaculture potential and the ecological impacts of the non-native oyster *Crassostrea ariakensis*, and agrees that introducing reproductively capable *ariakensis* into Chesapeake Bay would be imprudent at the present time.

The Academy report was written by an 11-member committee of oyster experts from around the U.S. At a press conference to announce the report's release, Committee co-chairs Drs. Dennis Hedgecock and James

Newman wins SETAC Founders Award

VIMS professor Dr. Mike Newman has been selected to receive the Society of Environmental Toxicology and Chemistry's highest award in recognition of his career contributions to the environmental sciences.

SETAC North America's President Anne Fairbrother bestowed the 2003 Founders Award on Newman during the opening plenary session of the Society's Annual Meeting in Austin, Texas on November 10th. The award is given annually to a person with an outstanding career who has made clearly identifiable contributions in the environmental sciences consistent with the goals of SETAC.

Newman is a Professor of Marine Science in VIMS' Department of Environmental and Aquatic Animal Health. Department Chair Dr. Steve Kaattari notes that "this award is a real honor for Mike, and reflects on the exceptionally high quality of VIMS faculty."

During his 25-year research career, Newman has focused on quantitatively studying how contaminants such as mercury and polycyclic aromatic hydrocarbons affect populations of fish and invertebrates. He has authored or co-authored 94 peer-reviewed publications, written 4 books, edited 5 others, developed 4 software

programs for statistical analysis of toxicological data, and served as an editor for 11 different scientific publications, including *Environmental Toxicology and Chemistry*, *Risk Assessment*, and *Ecotoxicology*.

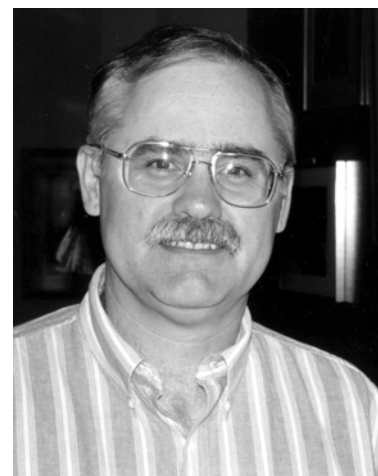
He has also served on many scientific advisory and steering groups, including the Scientific Advisory Board to EPA Administrator Christine

Whitman, numerous DOE and EPA Office of Pesticides advisory teams, the EPA Chesapeake Bay Toxics Advisory Committee, and has provided scientific review for numerous industry and government documents.

Newman is active in graduate education at VIMS, having served as Dean of Graduate Studies from 1999-2002 and teaching courses

on Quantitative Ecological Toxicology and Environmental Risk Assessment. He has taught these courses in Finland, England, Belgium, Australia, and at several U.S. universities.

SETAC is an independent, non-profit professional society for individuals and institutions engaged in the study of environmental issues, with a commitment to balance the interests of academia, business, and government. The international organization has more than 5,000 members from 50 U.S. states, 9 Canadian provinces, and more than 70 countries worldwide.



Dr. Mike Newman

VIMS Faculty Help Bring Minorities to Marine Science

Editor's Note: African Americans, Hispanics, Native Americans, and Pacific Islanders make up one quarter of the U.S. population, but less than 100 individuals from these ethnic groups hold a doctoral degree in marine science in the U.S. Barring any changes, this disparity will grow even more pronounced in the future, as these ethnic groups are expected to make up half the nation's population by 2050.

Collaborative Program Helps Fulfill Students' DREAMS

Faculty at VIMS and Hampton University are using a new 4-year National Science Foundation grant to help diversify the nation's future marine and environmental science workforce through a unique program that stresses early involvement in research and strong mentoring as a way to enhance undergraduate performance and the likelihood for success in graduate school.

The collaborative program, known as "Diversity in Research in Environmental and Marine Sciences," or DREAMS, is headed by Drs. Benjamin Cuker and

Deidre Gibson of Hampton University and by VIMS' Drs. Kam Tang, Iris Anderson, and Linda Schaffner.

What sets DREAMS apart, notes Gibson, is that "it comprehensively addresses the obstacles

faced by minority students." Those include a lack of role models, unawareness of career opportunities, and limited research experience.

Beginning this fall, Gibson and Tang selected the first group of DREAMS students from incoming undergraduates in Hampton University's Marine & Environmental Science, Biology, and Chemistry departments. Selection was based on academic performance, a written essay, and enthusiasm for the program. Additional freshmen will be selected from each incoming class through 2006.

During the next four years, DREAMS students will sequentially follow a specially designed curriculum that emphasizes classroom instruction, hands-on research, and communica-

tions skills. In their freshman year, each group will take an entry-level course that explores aquatic science through lecture, field, and laboratory experience. They will also be required to take a research skills course and attend a series of seminars by invited environmental and biological scientists.

As sophomores, students will gain broad exposure to the many research programs at VIMS by participating in each of five VIMS research areas representing biological, physical, environmental, and fisheries science, as well as coastal & ocean policy. They'll

also attend a series of career seminars given by representatives from industry, government, and academia.

As juniors, each student will conduct a yearlong research project in a VIMS laboratory to deepen his or her

learning and research experience. Students will also regularly attend VIMS seminars to learn about faculty and student research in a wide variety of marine science fields. Tang notes that "attending these seminars will not only broaden the students' knowledge, but also help them identify potential mentors for graduate studies at VIMS."

Year 4 is the sharing and outreach phase of DREAMS. Senior students will attend professional meetings to present their research projects to the scientific community, and share their knowledge and experience with the local community through teacher workshops, summer science camps, and field trips.

Both Gibson and Tang expect the program to continue past the initial four

Faculty and students at VIMS and neighboring institutions are working to increase the representation of minorities in marine science through a concerted strategy of training, mentoring, and financial support. The following article describes these efforts, which are aimed at both undergraduate and graduate students.

Program of Excellence Targets Minority Ph.D.s

Although several thousand minority students graduate each year with undergraduate degrees in the basic sciences, very few go on for Ph.D.s in oceanography or marine science. This means a growing pool of talented scientists isn't being tapped. In an effort to increase ethnic diversity in the ocean sciences, VIMS is teaming with Hampton University and Old Dominion University to create a Program of Excellence for educating minority doctoral students in ocean sciences. Dr. Linda Schaffner will oversee VIMS' role in the Program, which is funded through the National Science Foundation.

Applications to the Program will be sought through various science-related minority programs and from institutions known for producing minority students trained in aquatic and marine sciences. A special application will be developed

years of NSF funding. "As the program grows," says Gibson, "senior interns will be recruited to be student mentors. This will help establish DREAMS interns as role models among their peers, and help attract more underrepresented students into environmental sciences."

DREAMS, which is funded by NSF's Undergraduate Mentoring in Environmental Biology program, will build on a long-standing record of successful cooperation between VIMS and Hampton University in training students from underrepresented groups in environmental biology and marine science. Hampton University is one of the top ranked minority-serving institutions in the U.S., with a strong tradition of educating African Americans. It was ranked #4 in

to meet the requirements of both the ODU and VIMS/SMS programs including transcripts, GRE scores, letters of recommendation, and an essay. The application will include additional questions to determine the applicants' ability to meet the program requirements.

Students accepted into the Program will be supported through coursework and dissertation research with a stipend, tuition, orientations, shared course work, regular group meetings, special seminars, near-peer mentoring, and exposure to minority mentors. Participation in outreach activities and mentoring of younger students will aid in professional development.

The program is designed to support 12-15 students per year and is slated to begin during the fall semester of 2004.

the list of best colleges for Afro-American students in the January 2001 issue of *Black Enterprise*. VIMS has a strong tradition of training scientists from under-represented groups. In recent years, VIMS has granted three PhD and several Master's degrees to Hampton University alumni, and the Institute's Research Experience for Undergraduates program has served 86 under-represented students since 1989; including many HU students.



VIMS researchers Roy Pemberton (2nd from left) and Dr. Jack Musick (with book) meet with Hampton University's Deidre Gibson (center) and potential DREAMS scholars following Musick's DREAMS lecture.

Sea Grant Sponsors Seafood Education Programs

Virginia chefs and scientists gathered at VIMS on October 13 to participate in the Chefs' Seafood Symposium focusing on "Sustainable Seafood: What Does it Mean for Virginia Chefs?"

Open to all interested culinary professionals and culinary students, the event featured scientific updates on the status of selected Virginia seafood species and a panel discussion with chefs and scientists on sustainable seafood. Discussions of the fisheries for blue crab (Dr. Rom Lipcius), sea scallops (Dr. Bill DuPaul), and tuna and swordfish (Dr. John Graves), preceded a cooking demonstration by guest chef Brynjar Björgvinsson from 3 Frakkar ("3 Frenchmen") Restaurant in Reykjavik, Iceland. Chef Bjorgvinsson demonstrated several Icelandic seafood recipes, substituting Chesapeake Bay striped bass for the traditional codfish.

The 135 attendees included students and instructors from several culinary schools, including J. Sargeant Reynolds in Richmond and Henrico County Schools' Hermitage Technical Center. The students from Hermitage prepared and served the lunch for the event. A reception featuring seafood products and Virginia wine tasting followed the general sessions. The

symposium, certified by the American Culinary Federation, provides continuing education credits for certified chefs.

Virginia Sea Grant, the Virginia Chefs Association, and VIMS sponsored the program, with additional support from the Iceland Seafood Corporation, Virginia Department of Agriculture and Consumer Services Wine Marketing Office, Hermitage Technical Center Culinary Program, U.S. Foodservice, Williamsburg Inn, and Magnolia's Catering.

In addition to the Chefs' Symposium, four Seafood Education Seminars, open to the public, were held in October and November. Each seminar included a presentation by a VIMS scientist on a Virginia seafood species, followed by a cooking demonstration conducted by chefs from restaurants including River's Inn, Founders Inn, Princess Anne Country Club, and the Sanderling Inn. Following the instruction, participants enjoyed a seafood meal featuring a tasting of Virginia wines.

For more information on the symposium and other components of the Virginia Sea Grant seafood education program, see www.vims.edu/adv/seafood.

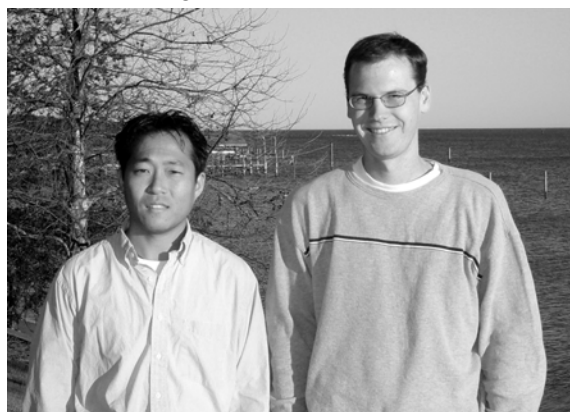
VIMS Students Chosen as Knauss Fellows

VIMS students Jacques Oliver and Bruce Vogt were two of the three graduate students from Virginia recently awarded a prestigious John A. Knauss Marine Policy Fellowship through the National Sea Grant Federal Fellows Program. This one-year fellowship matches outstanding graduate students from around the nation with hosts in legislative or executive

offices in the Washington, DC area and provides an opportunity for a better understanding of the decision-making process affecting national policy toward marine resources.

Oliver, a Ph. D. student, will be placed in the House Committee on Resources: Subcommittee on Fisheries Conservation, Wildlife, and Oceans (minority).

"I expect the fellowship will give me perspective on how science and policy interface," says Oliver. He also believes the professional skills he'll learn, such as communication and conflict resolution, will be valuable wherever his career path may lead. While at VIMS, Oliver has been studying iron and carbon limitation in plankton and related carbon cycling with advisor Dr. Hugh Ducklow.



2004 Knauss fellows Jacques Oliver and Bruce Vogt.

VIMS Hosts International Sediment Conference

An international conference hosted by VIMS researchers in early October brought many of the world's leading sediment scientists to Gloucester Point.

The 7th International Conference on Nearshore and Estuarine Cohesive Sediment Transport Processes (INTERCOH) drew nearly 100 scientists from nations around the world, including Australia, Belgium, Brazil, Canada, China, Denmark, France, Germany, India, Japan, Korea, Mexico, the Netherlands, New Caledonia, Portugal, Taiwan, the UK, Uruguay, and the U.S.

The fate of cohesive sediments like clay and mud is an important environmental issue because electrostatic charges on the surface of these particles tend to easily attract pollutants. Even "clean" cohesive sediments can cause environmental concerns. For instance, storm waves and tides can easily mix these fine-grained sediments

into the water column, blocking sunlight for photosynthesis.

Conference Secretary Dr. Jerome Maa, an associate professor in VIMS' Physical Sciences Department, says that the focus of this year's INTERCOH conference was on questions related to computer modeling of particle-bound contaminant transport in estuarine and open-coast environments.

"The research community clearly recognizes the need to carry out field and laboratory studies on cohesive sediment," says Maa, "but the considerable complexity of cohesive sediment processes requires further effort to fully address the broad range of modeling questions."

Conference proceedings are available on-line at www.vims.edu/intercoh/. For further information on computer modeling at VIMS, visit www.vims.edu/physical/research.html



VIMS Associate Professor Dr. Carl Friedrichs addresses INTERCOH participants in McHugh Auditorium.

Vogt's fellowship will be in the Office of the Oceanographer of the Navy, where he will coordinate research efforts between the Navy and the National Oceanic and Atmospheric Administration, and help guide international policy related to oceans and fisheries, with a focus on the Integrated Global Ocean Observing System.

"I'm interested in the policy side because that's where things happen," says Vogt. "That's where I think I can make more of a difference." Vogt's master's research with advisor Dr. Linda Schaffer has focused on sedi-

ment contamination and predator-prey interactions in Chesapeake Bay.

Oliver and Vogt's selection continues a long tradition of involvement in the program by VIMS students. Of the 44 students from institutes of higher education in Virginia who have served as Knauss fellows since the program began in 1979, 29 (65%) have hailed from VIMS.

When asked why he thinks VIMS students have traditionally been among the finalists arriving in DC each November, Oliver responds, "It's a testament to VIMS' well-rounded interdisciplinary programs."

VIMS Aquanauts Visit Inner Space

A team of VIMS scientists spent 10 consecutive days beneath the waves this summer, using the submerged Aquarius habitat as a base camp for forays to the surrounding coral reef.

Aquarius is the world's only permanent underwater laboratory. About as big as a bus, it rests 60 feet underwater and 3.5 miles offshore on Conch Reef in the Florida Keys National Marine Sanctuary. Aquarius "aquanauts" live and work on the seafloor for extended periods using a technique called saturation diving.

The July expedition was the second trip to Aquarius during the last year for Dr. Mark Patterson and his crew. Their continuing goal is to examine how reef shape and currents might affect coral bleaching. They added a new wrinkle during their most recent mission by exploring whether bacteria might contribute to bleaching as well.

Bleaching, which occurs when corals expel the algae that normally inhabit and color their tissues, has been widely linked to global warming. Even a degree or two increase in summer water temperature can stress corals and cause them to bleach. Because the algae produce food for the coral, their expulsion reduces a coral's ability to grow and reproduce, and may eventually cause the coral to die. Bleaching is

devastating coral reefs in Florida and throughout the Caribbean.

But a general rise in water temperature does not completely explain observed bleaching patterns. Small-scale variations in bleaching across a reef—one coral may bleach while another just meters away remains healthy—suggest that other factors such as current flow, oxygen levels, and now possibly bacteria, may also play a role.

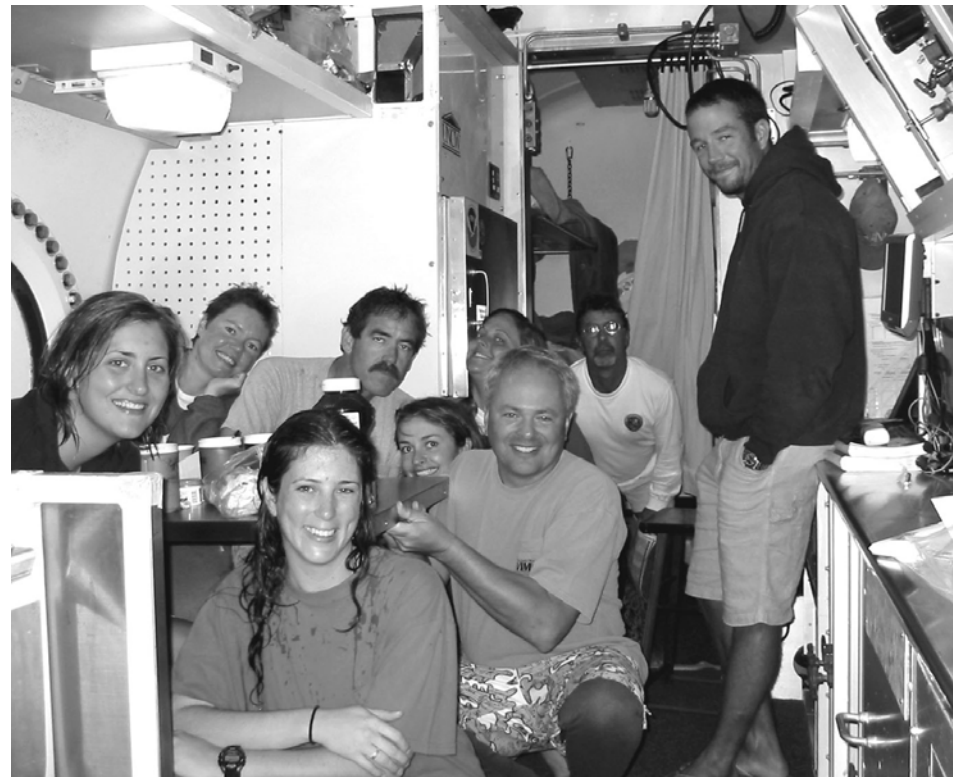
Patterson's team is exploring whether bacteria might be implicated in Caribbean coral bleaching by removing samples from bleached corals and returning them to VIMS for analysis.

Suspicious concerning bacteria's possible role in bleaching are based on a 1997 study showing that bleaching of one Mediterranean coral species is caused by a bacterial infection. The study also suggested that a rise in seawater temperature can aggravate the bacterial infection by lowering the coral's resistance, increasing the bacteria's virulence, or both.

The primary goal of the Aquarius mission is to test whether small-scale bleaching patterns might be due to the effects of localized currents. The idea is that a reef's irregular surface—marked by countless crannies and protrusions—can generate complex current patterns that might bathe one coral in overly warm or oxygen-poor water, causing it to bleach, while a nearby coral is bathed in waters more conducive to health.

Diving from Aquarius gives Patterson and his crew the time needed to thoroughly investigate how the health of individual corals relates to local water conditions. Unlike surface divers, Aquarius aquanauts can stay underwater indefinitely and have nearly unlimited bottom time during their dives. At the end of a mission, aquanauts undergo a 17-hour decompression.

Combining detailed data collected by the Aquarius aquanauts with reef-wide data collected earlier by a robotic sub will allow the team to link local bleaching patterns to large-scale current



VIMS aquanauts and topside team inside Aquarius during November 2002 mission. Clockwise from center: Dr. Mark Patterson, Kristen Delano, Lauren Batte (W&M/NOAA), Jo Gascoigne, Danny Gouge, Beth Hinchey, Janet Nestlerode, Jim Buckley (Aquarius Habitat Manager), and Byron Croker (NOAA).

patterns generated by the entire reef. Patterson's sub, nicknamed "Fetch," can dive far longer and deeper than even Aquarius aquanauts. Fetch flights can last hours and cover tens of kilometers. Unlike remotely operated vehicles (ROVs), which require cables or tethers to operate, Fetch is an autonomous underwater vehicle, or AUV, that flies freely through the water using on-board computer programs that tell it where to go and when to sample.

Fetch visited the Aquarius site on two occasions earlier this year, swimming more than 100 nautical miles over the reef and discovering interesting patterns in the distribution of oxygen. Combining the Fetch oxygen measure-

ments with the detailed data collected by the aquanauts will provide the first comprehensive look at how oxygen varies across a reef.

Graduate students Kristen Delano, Jo Gascoigne, and Janet Nestlerode joined Patterson on the July mission. VIMS graduate student Lawrence Carpenter provided topside science support, along with William & Mary graduate Lauren Batte and Randy Cutter, a former VIMS master's student.

Aquarius is owned by the National Ocean and Atmospheric Administration (NOAA) and is operated by the National Undersea Research Center at the University of North Carolina at Wilmington.



VIMS graduate student Jo Gascoigne uses a fluorometer to measure the photosynthetic ability of the algae that normally inhabit coral tissue.

After Hours Series Draws Large Crowds

The VIMS After Hours Seminar Series attracted almost 500 people to the Gloucester Point campus during its inaugural 2003 season, with lectures on sea turtles, seagrass, blue crabs, sharks, jellyfish, deep-sea squid, and bald eagles.

The 2004 Series will begin at 7 pm on January 29 with Dr. Dennis Blanton's lecture on "People and a Changing Chesapeake: The Last 5,000 Years."

Blanton, Director of the Center for Archeological Research at William and Mary, has studied virtually all

aspects of Virginia history, from the response of early peoples to sea level change to the early colonial history of Jamestown Island and Gloucester County.

The lectures, which are free, will continue throughout the year, generally on the last Thursday of each month. Reservations are required due to limited space. Call (804) 684-7846 or e-mail programs@vims.edu for reservations and information.

Funding for the After Hours Series is provided by the CBNERRVA and CCRM programs at VIMS.

VIMS Study Highlights Link Between Biodiversity and Ecosystem Function

As human activities continue to reduce the diversity of plant and animal communities around the world, researchers are striving to understand how loss of biodiversity will affect ecosystems and the services they provide.

A recent food-web study by VIMS researchers Emmett Duffy, Elizabeth Canuel, and Paul Richardson shows that reduced biodiversity may affect ecosystems in a much more complicated way than suggested by early experiments with plants only, and that interactions between plants and animals are critically important in determining the ultimate effects of human-induced biodiversity loss.

The research, reported in the June issue of *Ecology Letters*, has been selected by the editors of *Science* magazine as a “highlight of the recent literature.” Lead author Duffy is an Associate Professor of Marine Science in VIMS Department of Biological Sciences.

Ecologists have been focusing on the relationship between biodiversity

loss and ecosystem function for the last decade, spurred on by increasing numbers of disappearing species, several high-profile reports, and the 1992 U.N. Convention on Biological Diversity.

Past work has focused on manipulating the number of plant species in a system and examining consequent changes in biomass and productivity. Such experiments typically show that reducing plant diversity lowers plant production. Duffy and his colleagues added a new layer of realism by adding herbivores to these experiments, and found that decreasing the diversity of these grazing organisms in a seagrass ecosystem actually increased plant diversity and biomass.

“Because grazer-mediated effects on the ecosystem are opposite those associated with plants,” says Duffy, “the effects of plant and herbivore diversity on ecosystem functioning may counteract one another as diversity is lost in nature.” Thus, the *Science* editors note, “food web interactions may be critically important in determin-

ing the ultimate effects on ecosystems of human-induced biodiversity loss.”

When Duffy’s team increased the diversity of the herbivore community, its ability to efficiently use resources and produce biomass increased as well, a finding that may have practical importance for fisheries. “Small crustaceans like the grazers we studied dominate the diet of shallow-water fishes. Thus, our results suggest that high biodiversity at this intermediate trophic level may enhance energy transfer up the food chain, and may help boost fishery yields.”

Duffy’s research is helping to fill a critical gap in scientific understanding. A recent National Research Council report says that a better understanding



Small grazing herbivores like these amphipod crustaceans help maintain the health of seagrass beds.

of biodiversity and ecosystem functioning is one of the “grand” challenges of environmental research for the next generation. The National Research Council, the principal operating arm of the National Academy of Sciences, is a private, non-profit institution that provides scientific and technical advice under a congressional charter. The Council report was sponsored by the National Science Foundation.

To learn more about ecological research at VIMS, visit www.vims.edu/bio/mobee/.

News Briefs

Hudson Stars in Lab Safety Video

VIMS research technician Karen Hudson plays a feature role in a new 14-minute lab safety video designed for high school science classes. The video was filmed at VIMS by Coastal Training Technologies, Corp., a Virginia-Beach-based supplier of safety training videos to academic institutions and companies around the U.S. Coastal Video compensates VIMS for use of its facilities by providing complimentary copies of other training videos to the VIMS Safety office.

VIMS Contributes to Marine Census

Drs. Mike Vecchione and Deborah Steinberg shared their research with colleagues during the first full meeting of the 10-year, \$1 billion Census of Marine Life initiative at the Smithsonian Institution in October. More than 300 scientists from 53 countries are at work on the Census, designed to assess the changing diversity, distribution, and abundance of ocean life. After 3 years of work, Census scientists have catalogued 15,304 species of

marine fish, about 5,400 other animals, and numerous marine plants. CoML scientists estimate that 210,000 marine life forms are currently known, but the final tally could be 10 times higher.

Japanese TV Highlights *ariakensis*

Recent media coverage of VIMS’ research on the non-native oyster *C. ariakensis* included a 5-minute segment produced by TV Tokyo’s Washington Bureau. The segment aired on a nightly Japanese news program that typically reaches 1 million viewers. Dr. Stan Allen’s interview with correspondent Mika Otsuka was subtitled in Japanese. The native range of *C. ariakensis* includes Japan, where its native name “suminoe” means “from the clear water of a big river.”

W&M Recognizes Hurricane Clean Up Crew

Fifty-eight VIMS employees were recognized by the College of William and Mary for “going above and beyond the call of duty” in their response to Hurricane Isabel and its aftermath. W&M president Tim Sullivan granted a

day of leave and complimentary tickets to the W&M/New Hampshire football game to all members of the Facilities Management Department (including grounds, housekeeping, and maintenance personnel), as well as to selected faculty and staff from Accounting, Safety, Security, Vessels, and the Eastern Shore Lab. Hourly employees received a gift certificate to the W&M bookstore. VIMS Maintenance Superintendent RV Carmean was noted as one of the most valuable contributors to the effort. As one faculty member put it, “there are few who fretted as much, worked as hard, and got as little sleep before, during, and after the hurricane as RV.”

Mini-School Explores Ocean’s Role in Climate

Drs. Deborah Bronk, Walker Smith, and Deborah Steinberg helped the public understand the role of marine plankton in climate change during the latest in a continuing series of VIMS “Mini-School of Marine Science” programs. “Global Change and You” attracted more than 300 people of all ages to the Science Museum of Virginia in Richmond

during September. Forty participants added a daylong fieldtrip to VIMS. 65% of participants noted that the mini-school had substantially or significantly increased their knowledge of the subject.

Summer Programs Inform Visitors

VIMS’ weekly public tours, Summer Saturdays, and Bay Exploration Field Trips helped 427 citizens of all ages discover more about VIMS, marine research, and Chesapeake Bay. Public tour participants learned about the aquaria in VIMS’ Visitor Center, spoke with scientists about current research while visiting a laboratory, and gained appreciation for the ecological importance of tidal wetlands on the teaching marsh tour. The Summer Saturdays programs allowed children and adults to speak with aquarists and seine for aquatic animals. The Bay Exploration Filed Trips, hosted by the Chesapeake Bay National Estuarine Reserve, took participants on day-long educational canoe trips focusing on shallow-water habitats. Stay tuned to www.vims.edu for similar opportunities for fun and learning next summer.

CCRM Kicks Off Trans-Atlantic Collaboration

Dr. Carl Hershner and a team of scientists from VIMS' Center for Coastal Resources Management (CCRM) spent a week this summer at the Coastal and Marine Resources Centre (CMRC) in Cork, Ireland. The visit was part of a Memorandum of Understanding between University College Cork (UCC) and VIMS that was signed in March 2003. The agreement involves finding ways for estuarine and coastal researchers to share ideas and methods from both sides of the Atlantic Ocean.

As with CCRM, CMRC scientists focus on investigating the interactions between coastal resources and human populations, with a practical goal of encouraging sustainable use and helping policy makers adopt and implement scientifically based management plans.

During the visit, CCRM scientists demonstrated the shoreline inventory methods that they have developed

using advanced GPS (Global Positioning System) receivers. These techniques are of special interest to the Irish scientists as they work to create digital atlases of shoreline conditions in the Cork Harbor estuary. Both centers are working on computer programs that help resource managers access and use inventory information. The two groups exchanged ideas and experiences in development and implementation of these programs.

On the final days of the visit, scientists discussed opportunities for collaborative research and agreed to participate in a project proposed to the European Union. The visit laid the groundwork for future staff exchanges to further the transfer of methods. This planning has already brought one of the CMRC staff to VIMS for an extended internship in the CCRM Coastal Inventory Program.

Other areas of collaboration, such as seabed mapping and the integration

of GIS (Geographical Information Systems) with wave climate models has already proved valuable to both resource management centers. Hershner explains, "Having partnerships with universities abroad is extremely valuable. It strengthens our own Institute and helps determine the best methods for handling coastal shoreline and watershed management issues right here in Virginia."

CCRM employees Marcia Berman (on ladder) and Harry Berquist (at stern) spent a day reviewing shoreline survey techniques in Cork Harbor with CMRC scientists Valerie Cummins and Vicki O'Donnell (at wheel).



Safety of Flame Retardant continued from page 3

which the compound could enter the environment, and because it was considered non-toxic.

But La Guardia's findings add to a growing body of evidence that Deca is entering natural systems in large amounts and may breakdown to more toxic and bioaccumulative products. These products may impact normal development of the nervous system, which may, in turn, affect memory and learning in young animals, including humans.

In his study of a freshwater mid-Atlantic stream, La Guardia found extremely high concentrations of Deca, although the exact source of the compound remains unknown. He also found that the stream's sunfish are taking up BDE-209, the main compound in Deca, and appear to be breaking it down into other, more hazardous PBDE compounds.

La Guardia notes that "Deca is in the environment, it's in fish, and it may be breaking down into other PBDE compounds with suspected health risks."

La Guardia presented his findings at the annual meeting of the Society of Toxicology and Environmental Chemistry (SETAC) in Austin, TX in early November.

WILLIAM & MARY
VIRGINIA INSTITUTE of MARINE SCIENCE

Web Update

Welcome
Research
Education
Advisory Services
Administration
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News & Media

Community Ecology
Dr. Rochelle Seitz's Community Ecology Laboratory conducts field studies on the ecology of bottom-dwelling coastal and estuarine invertebrates, and explores how the structure and function of these benthic communities affects and is affected by organisms higher on the food chain. Visit www.vims.edu/bio/community/

DREAMS
This site describes the "Diversity in Research in Environmental and Marine Sciences" program, a VIMS-Hampton University collaboration to help diversify the nation's marine science workforce through strong mentoring and early involvement of under-represented minority students in research. Visit www.vims.edu/dreams/

IVARS
This site describes Dr. Walker Smith's research program to study Interannual VARIations in the Ross Sea. IVARS seeks to explore how the marked seasonal and year-to-year oceanographic changes that characterize this coastal Antarctic ecosystem affect its living communities, including extensive colonies of penguins, birds, and mammals. Visit www.vims.edu/bio/ivars/

Non-Native Oyster Trials
Researchers in VIMS' Aquaculture Genetics and Breeding Technology Center (ABC) have developed an independent program to monitor the status of sterile ariakensis oysters in the latest and largest commercial test of this non-native species. Visit www.vims.edu/vsc/

OIE Reference Lab
VIMS' Shellfish Diseases Laboratory is the sole OIE Reference Laboratory for the oyster diseases MSX and Dermo. OIE is the Office International Epizooties, a France-based international advisory organization on infectious animal diseases. OIE is the World Trade Organization's official arbiter for issues involving wild or aquacultured marine animals. Visit www.vims.edu/env/research/shellfish/oie/

REU Applications
Application forms for VIMS' Summer Intern Program, which each year places 12-15 undergraduates with faculty mentors for a research experience, are now available online. Applications are due by February 16, 2004. All students, including those traditionally under-represented in the marine sciences, are encouraged to apply. Visit <http://tethys.vims.edu/reu/apply.cfm>

Storm Surge
A new sea-level analysis by VIMS emeritus professor Dr. John Boon helps explain the unexpected reach of Hurricane Isabel's storm tide, and suggests that future storms will pose even greater flood risks. Boon also argues that changing the way storm tides are referenced could help coastal residents understand and minimize potential impacts. Visit www.vims.edu/physical/research/isabel/

Calendar of Events

—January 2004—

- 20 Annual Fund Board of Directors Meeting
- 22 VIMS Council Meeting
- 28 Volunteer Meeting/ Reception
- 28 - 30 Winter Botany Class
- 29 After Hours Lecture- "People in the Chesapeake: The last 5000 yrs"

—February 2004—

- 24 - 25 Advanced Soils Class
- 26 After Hours Lecture - TBA
- 27-28 Blue Crab Bowl, at Old Dominion University

—March 2004—

- 8-12 Spring Break
- 18 CIVIC Leadership Institute
- 23-26 Wetland ID/Delineation Class
- 25 After Hours Lecture - TBA
- 26 Shore and Beach Annual Conference

—April 2004—

- 16-17 Alumni Weekend
- 21 VIMS Council Meeting
- 22 Riparian Buffers Class
- 23-26 National Ocean Sciences Bowl, Charleston, South Carolina
- 29 After Hours Lecture - TBA
- 30 Black Tie Gala / Art Show

— Other Upcoming Events —

- May 8-9 Raft Up for VIMS, Deltaville
- May 22 Marine Science Day
- May 26-27 Advanced Soils Class

For an up-to-date listing of public events and seminars at VIMS, visit the new on-line calendar system at www.vims.edu/calendars/

For more information call 804/684-7101 or 804/684-7846.

Visit our website at www.vims.edu

VIMS to Hold First-Ever Alumni Weekend

VIMS alumni are invited to return to the Point for VIMS' first-ever Alumni Weekend. The weekend kicks off on Friday, April 16 with VIMS' annual awards ceremony, followed by a luncheon with faculty, staff, and students. Following lunch, a campus tour will highlight current research and recent additions to the Gloucester Point campus. A deep-sea biology class lecture will be open to those wishing to attend. Past and present students alike will be interested in a "Life After VIMS" panel. Friday will close with a "TGIF" gathering sponsored by the Graduate Student Association (GSA).

On Saturday the 17th, weather permitting, staff from the Chesapeake Bay National Estuarine Research Reserve will take attendees on a canoe trip to the Goodwin Islands. The events come to a festive end Saturday evening with the traditional VIMS' Spring Cook-Out Bash sponsored by the GSA, with honored guest Dr. John Wells, VIMS' future Dean and Director.

Full details will be sent to VIMS' alumni along with news about a new alumni fellowship challenge. Please contact Reunion Chair Mo Lynch at mlynch@vims.edu or Page Hayhurst in the VIMS Development Office at page@vims.edu.

VIMS Welcomes Three New Council Members

VIMS recently welcomed Keith Campbell, Ted Gottwald, and Chris Hall to 4-year terms on its 30-member advisory board. Each will bring strengths from their business, environmental, and recreational affiliations.

D. Keith Campbell is the founder and Board of Directors Chairman for Campbell and Company, one of the world's largest derivative investment managers. Campbell also heads the Campbell Foundation for the Environment, a private foundation dedicated to finding solutions to the environmental problems facing Chesapeake Bay and other areas. He is an active member of

the Board of the Coastal Conservation Association, the Board of Trustees of the Chesapeake Bay Foundation, and the Board of Directors of the Oyster Recovery Partnership. Campbell and his wife, Pat, live in Lutherville, MD.

Thomas (Ted) Gottwald is CEO of Ethyl Corporation. He previously served as the Chief Operating Officer, Divisional President of the company's Petroleum Additives Division, and General Manager of the Film Products Division of Tredegar (an Ethyl spin-off). Gottwald is a native of Richmond with a BS in chemistry from Virginia Military Institute and an MBA from

Help VIMS Reach Campaign Goal

VIMS has initiated its first major fundraising campaign, an effort to raise \$23 million over the next 5 years to support the Institute's mission of research, education, and advisory service. To date, VIMS has raised more than \$6 million toward that goal. Campaign funds are being used for capital projects, equipment, research programs, and endowments to attract and retain the best students and faculty to VIMS.

Why support VIMS?

Virginia's coastal and marine resources are a vital part of our economy, heritage, and quality of life. Recreational boating and fishing alone generate more than \$500 million per

year in the Commonwealth, with commercial fishing adding another \$465 million in economic benefits. In 2001, millions of beach-goers brought an additional \$2 billion into the state's economy.

The Commonwealth supports less than half of VIMS' budget; the balance is raised from grants and private sources. Your gift enables VIMS to conduct critical research, provide sound science to policy makers and resource managers, and broaden our knowledge of the marine environment.

How can you help?

- Give or facilitate corporate donations and sponsorships
- Become a VIMS Associate with an annual gift or donation of stocks or securities
- Make a gift of property or donate a vessel
- Include VIMS in your estate plans—vehicles like charitable remainder trusts and life insurance policies can create tax benefits in addition to helping VIMS research programs
- Volunteer your time
- Spread the word—help us grow our Crest mailing list, e-mail event list, and media relations database

To learn more, go to www.vims.edu/campaign or contact the Development Office at (804) 684-7099