

# Impact

**VIMS** | WILLIAM & MARY  
VIRGINIA INSTITUTE OF MARINE SCIENCE

## News From VIMS

### RESEARCH HELPS IMPROVE ESTIMATES OF “DEAD ZONE” SIZE

#### New methodology has important implications for Bay management

Gauging the size of the low-oxygen “dead zone” that afflicts Chesapeake Bay each summer is both difficult and important—difficult due to the extent and variability of the problem, and important as a bellwether of Bay health.

Now, a VIMS-led study offers an improved method for estimating the dead zone’s magnitude and duration, one in which fewer field observations could actually provide a more accurate and efficient means to measure the long-term

progress of Bay restoration efforts. The study was authored by VIMS post-doctoral research associate Aaron Bever, VIMS professors Marjy Friedrichs and Carl Friedrichs, Malcolm Scully of the Woods Hole Oceanographic Institution, and Lyon Lanerolle of NOAA.

Scientists with the Chesapeake Bay Program currently determine the extent of the Bay’s dead zone by measuring oxygen levels at 30 to 60 sampling stations around the Bay. Bever and his co-authors note that this strategy provides good spatial coverage, and represents

“an invaluable long-term dataset for characterizing dissolved oxygen.” Their concern is that oxygen levels in the Bay can change more rapidly than the 7 to 14 days needed to collect data from all the widely dispersed stations.

“The current observations aren’t a real-time representation of the system,” says Bever. “Our study shows that collecting data over a 2-week period could lead to a 25 – 50% uncertainty in estimating the instantaneous volume of summertime hypoxia.”

To reduce that uncertainty, Bever and his colleagues suggest that Bay

*Continued on page 3*

### HUMANS THREATEN WETLANDS’ ABILITY TO KEEP PACE WITH SEA-LEVEL RISE

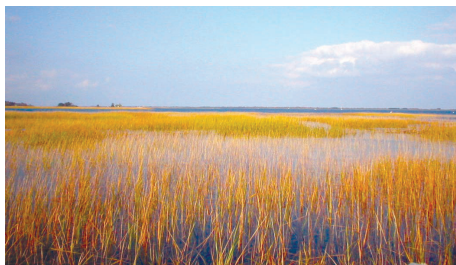
Left to themselves, coastal wetlands can resist rapid levels of sea-level rise. But humans could be sabotaging some of their best defenses. That’s according to a *Nature* review paper co-authored by VIMS Assistant Professor Matt Kirwan.

The threat of disappearing coastlines has alerted many to the dangers of climate change. Wetlands in particular—with their ability to buffer coastal cities

from floods and storms, and filter out pollution—offer protections that could be lost in the future. But, say Kirwan and co-author Patrick Megonigal of the Smithsonian Environmental Research Center, higher waters aren’t the key factor in wetland demise. Thanks to an intricate system of feedbacks, wetlands are remarkably good at building up their soils to outpace sea-level rise. The real issue, they say, is that human structures such as dams and seawalls are disrupting the natural mechanisms that have allowed coastal marshes to survive rising seas since at least the end of the last Ice Age.

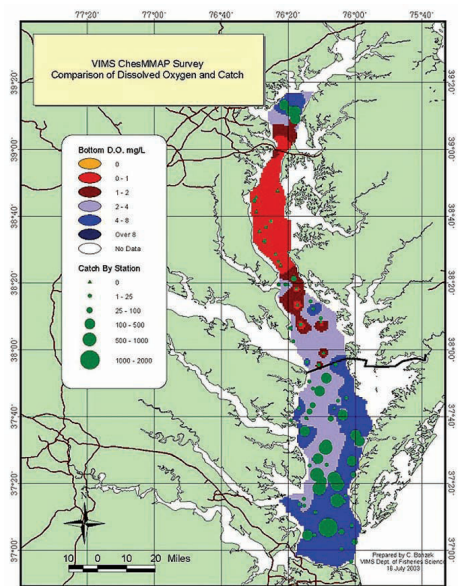
“In a more natural world, we wouldn’t be worried about marshes surviving the rates of sea level rise we’re seeing today,” says Kirwan. “They would either build vertically at faster rates or else move inland to slightly higher elevations. But now we have to decide whether we’ll let them.”— <http://bit.ly/kirwanature>

*Kristen Minogue, SERC*



*Human structures such as dams and seawalls are disrupting the natural mechanisms that allow coastal marshes to survive rising seas.*

*Photo by Matt Kirwan.*



*Low-oxygen “dead zones” are unhealthy for most marine organisms. Data from VIMS’ ChesMAMP program shows a strong correlation between low-oxygen levels and reduced catches of fish.*

## PARSONS GRANT WILL ENHANCE RESEARCH PROGRAMS AT VIMS

The Mary Morton Parsons Foundation has provided the VIMS Foundation with a leadership grant of \$400,000 that researchers will use to purchase a state-of-the-art “confocal” microscope capable of generating high-resolution 3-D images.

The microscope will aid researchers in many different areas—including studies of harmful algal blooms, nitrogen pollution, crustacean immunity, and shellfish disease—all of which involve graduate students in William & Mary’s School of Marine Science at VIMS. The microscope works by capturing a sequence of finely focused image layers, then stitching them together into a single picture of unprecedented sharpness.

Founded in 1988 as a private foundation to support the capital needs of other non-profit organizations, the Mary Morton Parsons Foundation has awarded approximately \$73 million to qualified grantees to date.

Professors Kimberly Reece, Wolfgang Vogelbein, B.K. Song, Jeffrey Shields, Ryan Carnegie, Michael Unger, and Assistant Research Scientist Hamish Small

all plan to use the confocal microscope to enhance their research programs.

Reece and Vogelbein will use the microscope to help monitor local waters and shellfish-growing areas for the presence of harmful algal blooms, or “red tides,” which have been increasing in Virginia with the expansion of new, potentially toxic species.

Shields and Small plan to use the scope to more accurately visualize the immune mechanisms in crabs and lobsters, while Carnegie will use it as a platform for research into parasite life cycles and the interactions among marine pathogens and their shellfish hosts.

“The microscope will increase our ability to understand the biology of pathogens in the environment, which remains entirely mysterious,” says Carnegie. “It’ll provide capabilities that far exceed existing microscopy resources. Student interest in marine diseases is high, and the microscope will be a centerpiece of graduate education efforts in this area.”

## PROFESSOR JOINS “GLIDERPALOOZA”

New Assistant Professor Donglai Gong jumped right into his research at VIMS last fall, deploying an unmanned ocean glider that joined a dozen others from academic and industry partners to simultaneously observe the coastal waters of the entire eastern seaboard.

Gong deployed his brand new vehicle as part of “Gliderpalooza,” a two-month effort to combine data collected by gliders with information from satellites, moorings, and radar to paint a detailed picture of ocean properties and currents along the continental shelf from Nova Scotia to Georgia. He launched his glider in mid-October, just offshore of VIMS’ Eastern Shore Lab in Wachapreague.

Gliderpalooza 2013 provided a comprehensive picture of temperature, salinity, and other fundamental ocean properties as the northwest Atlantic shifted from summer to winter conditions. The annual shift coincides with peaks in animal migration and hurricane activity, as well as the return of undergraduates who can use the collected data in their classes.

As if participating in Gliderpalooza weren’t enough for a maiden voyage, Gong extended his glider’s mission by sending it even farther offshore, across the continental slope and almost to the Gulf Stream before heading back.



VIMS Professor Donglai Gong with his glider.

## KIMBALL TO LEAD U.S. GEOLOGICAL SURVEY

President Barack Obama has nominated Suzette Kimball, a former researcher at VIMS, to be the director of the U.S. Geological Survey (USGS).

As director, Kimball will lead the agency’s more than 8,000 scientists,



technicians, and support staff located across the country. In addition, Kimball will act as science advisor to Secretary of the Interior Sally Jewell, in which role she will oversee the Department of the

Interior’s Strategic Science Group and chair a team of nine science advisors.

Kimball joined the USGS in 1998 as the eastern regional executive for biology. Before her involvement with the agency, Kimball served the National Park Service as southeast associate regional director and regional chief scientist from 1993-1998. Kimball has served as acting director of the USGS since February 2013.

Kimball earned a bachelor of arts from William & Mary in 1973 and later returned as the co-founder and co-director of the Center for Resource Management and Policy and associate marine scientist. While at VIMS, Kimball worked closely with Shoreline Studies head Scott Hardaway and recently retired professor Carl Hobbs on issues related to shoreline erosion, sand mining, and beach replenishment.



VIMS recently recognized VIMS Ph.D. student Mark Stratton as the recipient of the SunTrust Mid-Atlantic Foundation Fellowship for 2013-2014. Stratton received \$2,900 in support of his efforts to improve fisheries management by incorporating new environmental and biological information into the assessment of fisheries stocks. Photo by Erin Kelly.

“Our goal was to collect preliminary data for future studies of the slope sea,” he says. “We’re building towards a larger study, leveraging the resources and knowledge the broader observing community can provide.”— <http://bit.ly/gongvims>

## STUDENT SHOWS MIDDLE SCHOOLERS THE “INS AND OUTS” OF A FISH

Students at Booker T. Washington Middle School in Newport News could tell something was “fishy” when VIMS graduate student Jami Ivory entered their afternoon Life Science class.

Ivory is a fellow in the PERFECT/ GK12 program at VIMS. The program—now in its 5th year—pairs graduate students with K-12 teachers allowing them to mentor and learn from each other.

Ivory is paired with Tim Jones—a 7th-grade science teacher at B.T. Washington. Jones and Ivory decided to make a recent class more engaging by dissecting

a mackerel in an effort to bring fish anatomy out of a textbook and into the real world.

The PERFECT program, or Partnership between Educators and Researchers for Enhancing Classroom Teaching, is funded by the National Science Foundation’s GK-12 program, which supports fellowships and training for graduate students in science, technology, engineering, and mathematics (STEM) through interactions with teachers and students.



VIMS graduate student Jami Ivory (left) prepares to dissect a mackerel in order to teach her 7th-grade Life Science class the anatomy of a fish. Photo by Erin Kelly.

## ALUMNA CHOSEN AS KNAUSS FELLOW

VIMS alumna Samantha Bickel continues a venerable VIMS tradition with her selection as a John A. Knauss Marine Policy Fellow for 2014.

Bickel—who completed her Ph.D. in 2013—was selected for the highly competitive fellowship through the National Sea Grant Federal Fellows Program. Since its inception in 1979, the program has brought 37 VIMS students and recent alumni to our nation’s capitol to join other highly qualified graduate students from across the nation with hosts in legislative or executive offices on Capitol Hill.

Bickel began work in early February as an Environmental Science and Policy Specialist in the Offshore Wind and Ocean Renewable Energy office at the U.S. Department of Energy, with a focus on environmental issues related to the harvesting of offshore wind and wave energy. Bickel says she will help determine the program’s research priorities, participate in conferences and other outreach programs, and create and distribute materials that communicate the program’s mission and activities.

“The DOE is trying to find alternative energy sources—such as offshore wind farms—as well as wave-energy converters and other types of nonconventional hydropower,” says Bickel. “There isn’t a lot known about the environmental impacts for deploying these devices, so I’m looking forward to exploring those effects.”

Bickel says she is excited to have an opportunity to gain some experience outside of an academic environment. “I’m looking forward to acquiring some insight into how governmental processes work,” she says. “I’m also excited to be gaining a lot of contacts in different agencies, and having the opportunity to interact with researchers at other universities, as well as industry partners.”

The Knauss program—named for former NOAA administrator and Sea



VIMS alumna Samantha Bickel

Grant founder John A. Knauss—is administered through Sea Grant, a nationwide network of 32 university-based programs that work with coastal communities to foster science-based decisions about the use and conservation of aquatic resources. The Virginia Sea Grant program is housed on the VIMS campus and administered through VIMS and the College of William & Mary.



VIMS professors Kenneth Moore and Deborah Steinberg have been selected as recipients of 2014 Plumeri Awards for Faculty Excellence at the College of William & Mary. The award—now in its sixth year—recognizes 20 faculty members for their exemplary achievements in teaching, research, and service. Moore and Steinberg will each receive \$10,000 which they can use for research, summer salaries, or other stipends associated with scholarly endeavors, with the ultimate intention of enhancing faculty interaction with students.

## AUDIENCE PUMPED UP DURING TACK LECTURE

The audience put on quite a show during Professor Deborah Steinberg’s Tack Faculty Lecture at the Kimball Theater in Williamsburg in October.

Donning “anglerfish hats” with glow-in-the-dark “lures,” the capacity crowd of nearly 400 people helped Steinberg recreate the look and feel of bioluminescence in the deep sea, one leg of their virtual voyage “From Plankton to Planet.” They also sampled jellyfish in Chesapeake Bay, dove the sapphire blue waters of the Sargasso Sea, collected lobster larvae from the Amazon plume, and weathered 50-foot waves on their way to Antarctica.

Steinberg’s presentation was the fourth installment of William & Mary’s Tack Faculty Lecture Series, and the first by a professor from VIMS. The once-a-semester lectures showcase the work of a W&M scholar or researcher for the rest of the university and the local community. The series is made possible by a generous commitment from Martha ‘78 and Carl Tack ‘78, who were in attendance. To view a synopsis of the lecture online, visit <http://youtu.be/l6iSvX3SXlw>

VIMS research helps improve estimates of “dead zone” size, continued from page 1

scientists use a subset of only 13 stations during each research cruise. “We found that sampling fewer stations can actually provide a better estimate of the extent of hypoxia within the Bay,” says Marjy Friedrichs. “Fewer stations means quicker sampling, which is important because oxygen levels in the Bay vary markedly with time as influenced by tides, winds, and other factors.”— <http://bit.ly/cbhypvol>

## UPCOMING EVENTS

### VIMS Public Tours

Fridays, starting May 30, 10:30 am – 12 pm. Our weekly public tours give you a behind-the-scenes look at VIMS.

### Inside to Seaside

June 6, 1 – 2:30 pm

This hands-on summer program gives families an up-close look at animals that live in Chesapeake Bay through a visit to the VIMS aquarium area followed by an educational collecting and seining adventure on the nearby beach.

### June Discovery Lab

June 10, 6 – 8 pm

Join Chris Petrone from Delaware Sea Grant for his presentation on horseshoe crabs!

### Water Fest 2014

July 19, 10 am – 3 pm. Dare Marina, Yorktown The Colonial Sail and Power Squadron hosts their fifth annual fundraiser in support of VIMS. Travel a course on Chisman Creek to enter the raffle, then visit Dare Marina for nautical shopping, games, free food, and entertainment. Call Bill Walsh at 800-554-4581 for more information.

Visit [www.vims.edu/public](http://www.vims.edu/public)

## MARINE SCIENCE DAY MAY 17, 2014

Join us on Saturday, May 17th, from 10 am-3 pm for VIMS' annual open house, a fun-filled event for the whole family. At the VIMS Gloucester Point campus, there will be exhibits, children's activities, seining on the York River, lab tours, seafood cooking demonstrations, mini-lectures, and much more. All activities are free, as is parking. The event proceeds rain or shine. Visit [vims.edu/msd](http://vims.edu/msd) for more information.

Sponsors for this year's event are Dominion, Christopher Wren Association for Lifelong Learning, Owens Foundation, Wanchese Fish Company, John and Julie Dayton, Rappahannock Concrete, Luck Stone Corporation, Bobby's Auto Service Center, Phillips Energy, Inc., Chesapeake Bank, Teagle Insurance Agency, Green Planters Landscape and Garden Center, Crown Pointe Marina, Hogg Funeral Home, Chesapeake Marine Training Institute, Colonial Virginia Bank, and Gloucester Toyota.

## ESL CHALLENGE GRANT REACHES MILESTONE

An endowment initiated in 2012 to provide resources for educational and research activities at VIMS' Eastern Shore Laboratory in Wachapreague has met its match requirement of \$100,000.

The endowment was created to support ESL faculty and students, and to boost their efforts to restore shellfish and seagrasses, enhance shellfish aquaculture, monitor water quality, and study the biology and ecology of fishes. The endowment may also support new directions in research, educational outreach, and equipment as needed. The founding donor hopes this will encourage others to build on this endowment in the future.

Matching gifts for the ESL Endowment were provided by Mr. and Mrs. L.D. Amory, III, The Honorable and Mrs. Robert S. Bloxom, Mr. and Mrs. R. Bruce Bradley, Mr. and Mrs. W. David Elliott, Mr. and Mrs. Terence D. Malarkey, Mr. A. Kenneth Scribner, Jr. in honor of his late wife Mrs. Sue Faulkner Scribner, the Ronald West Family Foundation, and two anonymous donors.

[www.vims.edu/impact](http://www.vims.edu/impact)

Virginia Institute of Marine Science  
P.O. Box 1346  
Gloucester Point, VA 23062-1346