2009 Annual Report The Virginia Institute of Marine Science July 1, 2008 through June 30, 2009

Virginia Institute of Marine Science

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Dear Friends of VIMS:

The 2009 fiscal year was one of challenges for VIMS, as it has been for higher education throughout the Commonwealth and nation. At the same time, it was a year of significant achievements for the VIMS community, and a year in which our generous donors helped us maintain cutting-edge research and provided critical support for our students.

In April we were honored by the presence of many dignitaries, including Cynthia Andrews, when we dedicated Andrews Hall and our Seawater Research Laboratory. The lab, with an “acre under a roof,” is one of the largest facilities of its kind anywhere. Together, these buildings provide 110,000 square feet of cutting-edge research and office space—our largest capital project ever.

This year also saw construction begin on a new concrete pier to replace the pair of wooden piers that had been damaged by recent storms.

We welcomed faculty member Dr. Aaron Beck into the Department of Physical Sciences. He received his Ph.D. from Stony Brook University and joined us after doing post-doctoral work at the Max Planck Institute in Germany. A geochemist, he will be developing a trace-metal research program to examine the health of Chesapeake Bay and the coastal ocean. This work will have important implications for the food web and human health.

During the year, 20 students received their Master’s degrees and 14 received their Ph.D. This past spring we accepted one of the best incoming classes ever: 27 new students, 3 of whom had perfect scores on the quantitative portion of the Graduate Record exams.

Students and faculty continued to garner awards and recognition.

Several graduate students received awards for oral and poster presentations at regional and national meetings. Heidi Geisz was among a handful of graduate students nationwide selected to participate in the 32nd-annual Antarctic Treaty Consultative Meeting, which marked the 50th anniversary of the Treaty’s signing and the conclusion of the International Polar Year.

Professor Deborah Bronk was appointed to a 2-year term on the Carbon Cycle Science Working Group, part of the U.S. Climate Change Science Program that coordinates research among 13 federal agencies. Professor John Graves was appointed to the Department of Commerce’s top advisory body for the management of commercial and recreational fisheries in U.S. waters. Professor Eugene Burreson received the Honored Life Member Award from the National Shellfisheries Association for outstanding contributions to the field of shellfish biology. Professors Roger Mann and James Bauer served on Governor Kaine’s Climate Change Commission. Because of Hampton Roads' vulnerability to climate-change impacts and vital importance to our economy and national security, planning for climate change is a strategic imperative for the Commonwealth and federal agencies.

Another sign of VIMS’ health as a scientific institution is its ranking in an analysis of the worldwide scientific literature by Thomson Reuters. It shows the work of VIMS professors Deborah Steinberg and James Bauer helps define a “research front” in the biological effects of ocean chemistry.
Generous donors who have established fellowship endowments have allowed the VIMS Foundation to support 12 students from 10 endowment funds in the 2009-2010 academic year. This support is ever more critical as stipends for VIMS graduate students lag behind those of our competitors. A highly unusual gift occurred when David Clifford donated the assets of his firm Fetch LLC to VIMS and the College of William and Mary, including several autonomous underwater vehicles and a patent for the “brains” of these exploratory robots. In 2009, we were also honored to receive a bequest from long-time VIMS friend and former VIMS Council member Matthew (Tim) Blackwood, a yachtsman and lover of Chesapeake Bay. The bequest totaled more than $100,000, and income from the new Blackwood Endowment will support VIMS’ greatest needs from year to year. This type of support is a great vote of confidence in VIMS’ future success, and we are deeply grateful to Tim.

The summer of 2009 saw the launch of five weeklong summer camps made possible by a private gift to the VIMS Foundation and a pledge to continue these camps for the next four years. Camps were offered to students from 1st through 8th grade. Their activities are pictured in this report and provide a wonderful way for VIMS to reach out to the children and families of our surrounding community.

In late 2007, the VIMS Foundation Board decided to join the William and Mary Investment Trust (WAMIT) to handle the Foundation’s investable assets. Foundation assets have grown significantly in the last several years, even though they decreased due to market conditions in FY 2009 as reflected in the financial pages of this report.

I especially want to thank our energetic volunteer leadership for all that they do: Carroll Owens, Jr., President of the VIMS Foundation, has worked with a dedicated board overseeing the Foundation in these challenging times. Bob Roper, the new Chair of the VIMS Council, contributed to the VIMS Strategic Plan and led an effort to align the Council’s working committees with it. Maurice “Mo” Lynch, alumnus and emeritus professor, has led an effort to increase alumni support of the Annual Fund, which is more critical to VIMS than ever. Tammy Bacot chaired the 2009 VIMS Art Auction. She and her committee hosted a great evening that brought in funds to support our students.

During the 2010-2011 fiscal year we will look ahead to celebrate the 10th Anniversary of the VIMS Foundation, and as state funding declines, we hope we can count on our friends and donors to continue their vital support.

Thank you all!

From L to R: Eastern Shore Sculptor William Turner, William and Mary President Taylor Reveley, and VIMS Foundation President Carroll Owens at the VIMS Art Auction.

From L to R: VIMS Council Chair Bob Roper with former Virginia Governor A. Linwood Holton and VIMS Dean and Director John Wells during Holton’s book signing ceremony at VIMS. Governor Holton served from 1970-1974 and has been a member of the VIMS Council since 2001.
Science for Society

*These selected news stories highlight the many ways in which VIMS researchers use financial support from state, federal, and private sources to provide knowledge and solutions to the challenges facing our marine resources.*

**Researchers create interactive map of Bay grasses**

VIMS researchers have created an interactive map that allows web users to see the coverage of underwater grasses in Chesapeake Bay and its tributaries.

The tool, created using Google Maps® by researchers in the Submerged Aquatic Vegetation (SAV) program at VIMS, is designed to help resource managers, scientists, and citizens better track and visualize bay-grass restoration efforts. It is available on-line at web.vims.edu/bio/sav/maps.

Underwater grasses serve vital functions in coastal ecosystems. They shelter young striped bass, blue crabs, and other key species; improve water clarity; oxygenate the water; reduce erosion; and provide food for waterfowl.

Professor Robert “JJ” Orth, head of the SAV program at VIMS, says access to the new map is much faster than previous offerings. In addition, the map displays charts showing the coverage of underwater grasses in particular areas from 1970 until present.

**“Ghost Pot” program benefits Bay and watermen**

Researchers with the Center for Coastal Resources Management at VIMS head up Virginia’s one-of-a-kind program to remove derelict crab traps from Chesapeake Bay.

The program, funded by federal blue crab disaster relief funds through the Virginia Marine Resources Commission, is yielding data that will improve future efforts to recover these “ghost pots” and further reduce their inadvertent trapping of Bay wildlife.

The program paid out-of-work crab dredgers to use side-imaging sonar to detect and retrieve abandoned crab pots and other marine debris from the bay floor. Watermen were paid a daily rate for their efforts and compensated for their fuel costs.

“The watermen were a pleasure to work with and showed a real eagerness to help clean up the Bay,” said VIMS project leader Dr. Kirk Havens.

To date, the program has recovered more than 8,600 crab pots, along with 61 abandoned nets and other debris.

Many of the pots had been derelict for several years, continuing to trap and kill crabs, fish, eels, turtles, and other wildlife. Each functional crab pot can capture and kill about 50 crabs a year.

About 20% of crab pots are lost due to storms or boat propellers that accidentally cut the pots free from their buoys.

**Biosensors promise new era in marine research**

VIMS researchers Steve Kaattari and Mike Unger are tapping the immune system’s power—and the latest advances in electronic instruments—to address pressing issues in marine science.

The pair combines specially designed antibodies with digital instruments to create “biosensors” that hold promise for detecting and tracking oil spills, monitoring harmful algal blooms, identifying toxins,
and other, perhaps yet unrecognized, applications—all in real time.

Kaattari says the team is “developing antibody-based sensors with the idea of placing them on different platforms to sense the introduction and dispersal of aquatic contaminants.” Platforms include marine buoys, robotic submarines, and in the near future, a device small enough to clip on a researcher’s belt.

Making these measurements using traditional technology is both time-consuming and expensive, says Unger: “Today, for every hour I spend collecting samples, I have to spend another 100 hours in the lab. There are multiple steps; it can literally take weeks to get one data point—at up to $1,000 per sample.”

With biosensors, Unger says “We’re looking at a new era, where there’s a possibility of achieving fast, cheap environmental data.”

Survey supports blue crab management actions

The 2008-2009 winter blue crab dredge survey showed that significantly more crabs overwintered in Chesapeake Bay than during the previous year, indicating that coordinated management actions in 2008 by Maryland, Virginia, and the Potomac River Fisheries Commission were effective at increasing the abundance of spawning-age females.

The Bay-wide winter dredge survey is an annual cooperative effort between VIMS and the Maryland Department of Natural Resources.

The observed increase, from 280 million crabs in 2007-2008 to just over 400 million in 2008-2009, was due primarily to a doubling in the number of adult female crabs. The abundance of adult male crabs increased by approximately 50%.

The abundance of young-of-the-year crabs did not change measurably from the previous year, and remains below the 18-year survey average. These crabs will become vulnerable to the fisheries late in the 2009 season and represent the 2010 spawning potential.

Professor Rom Lipcius, who directs the VIMS component of the survey, says “The increase in crab abundance was clearly due to the recent management actions. Now, we have to ensure that these females survive to spawn this summer, and that their offspring produce a healthy spawning stock in coming years.”

Diaz contributes to Google Earth

The newest version of Google Earth contains data on marine “dead zones” contributed by VIMS Professor Robert Diaz.

Research by Diaz and Swedish collaborator Rutger Rosenberg shows that the number of dead zones—areas of seafloor with too little oxygen for most marine life—has increased by a third between 1995 and 2007.

The pair says that dead zones are now “the key stressor on marine ecosystems” and “rank with over-fishing, habitat loss, and harmful algal blooms as global environmental problems.”

Users can access Diaz’s dead zone data within Google Earth by opening the “Layers” pane and navigating to Ocean/State of the Ocean/Dead Zones.

Each dead-zone location in Google Earth includes data on the nature of the dead zone (periodic, seasonal, or persistent), its size, the date it was first observed, its impact on fisheries, its impact on deep-water ecosystems, and a reference.
Researchers unite fish families
Research by an international team of scientists including Assistant Professor Tracey Sutton of VIMS has resolved a long-standing biological puzzle by showing that a group of deep-sea fishes previously classified into three separate families are actually the larvae, males, and females of a single family—the whalefishes.

To put the team’s discovery into perspective, consider that cats, dogs, and walruses also represent three biological families. It’s as if the researchers discovered that dogs are really male walruses, and that kittens aren’t cats but a walrus’s juvenile form.

Their findings represent “the most extreme example of metamorphoses and sexual dimorphism ever documented in vertebrates.” Sutton attributes the long-standing confusion over the classification of these fishes to their rarity and to the difficulties of deep-sea sampling. Because the adult forms of these fishes typically live between 3,000 and 12,000 feet below the surface, they are rarely sampled. The few that are netted are typically in poor condition by the time they are brought aboard a research vessel.

Specimens of larvae are more common, as these migrate into shallower waters to feed, but they differ so markedly from their adult forms that scientists had never previously recognized their family kinship.

Study shows bacterial disease can kill striped bass
A study led by VIMS researchers is the first to demonstrate that striped bass in Chesapeake Bay are succumbing to mycobacteriosis. This chronic bacterial disease, first detected in Bay stripers in 1997, now infects more than half of all striped bass in Bay waters.

The study was conducted by David Gauthier, Rob Latour, Chris Bonzek, Jim Gartland, and Wolfgang Vogelbein, as well as Erin Burge of Coastal Carolina University and Dennis Heisey of the U.S. Geological Survey.

Observation of mortality among wild fish is typically limited to acute fish-kill events of schooling species such as menhaden, when large numbers of dead fish float to the surface or wash ashore.

Detection of mortality from chronic infections is more difficult, as fish are likely to die in small numbers through time across a wide area. “Due to the chronic nature of mycobacteriosis in striped bass, the mortality is cryptic,” says Gauthier. “That makes it difficult to measure.”

Knowing whether mycobacteriosis kills Bay stripers is of concern to fisheries managers and anglers all along the Eastern seaboard. Striped bass are one of the region’s most economically and ecologically important finfish, and Chesapeake Bay is the main breeding and nursery ground for this species on the Atlantic coast.

During the study, the researchers fed data from a three-year Bay survey of mycobacteriosis into a state-of-the-art demographic model developed by Heisey. “That’s what sets our study apart,” says Vogelbein. “We were able to provide our model with field data showing the prevalence of infection in different age classes through time.”
Service to Virginia and the Nation

Carol Brill serves as President of the Mid-Atlantic Marine Education Association, and as Virginia regional co-coordinator for the National Ocean Science Bowl.

Deborah Bronk is co-chairing the Energy and Environment Committee for the Council of Scientific Society Presidents. The committee provides advice on current issues facing the nation with respect to energy and the environment. She is also a member of the U.S. National Committee for the Intergovernmental Oceanographic Commission of UNESCO, which supports U.S. participation at the United Nations with respect to ocean issues.

Elizabeth Canuel provided seminars to various groups interested in the potential use of algae as a source of biofuels, including the Virginia Coastal Energy Research Consortium, Hampton Roads Research Partnership, and the Virginia Economic Developers Association.

During 2008, staff with the Center for Coastal Resources Management at VIMS (CCRM) responded to 2,063 information requests, provided 73 site visits and field consultations, hosted or attended 198 meetings, and published 578 advisory notes.

Bob Diaz served on the Steering Committee for the Integrated Coastal Research Initiative, part of UNESCO’s Intergovernmental Oceanographic Commission.

Carl Friedrichs serves on the steering committees of the Chesapeake Bay Observing System and the Chesapeake Community Modeling Program. The programs aim to advance environmental observations and models in support of management efforts in the region.

Marjy Friedrichs served on the W&M review panel for high-performance computing and a monitoring review workshop for the Chesapeake Bay Program’s Scientific and Technical Advisory Committee.

Carl Hershner served on the Chesapeake Bay Program Scientific and Technical Advisory Committee.

Steve Kuehl served as steering committee member of the NSF-MARGINS initiative and hosted an international workshop for the MARGINS Source-to-Sink Program.

Tom Murray was appointed to serve on the U.S. Department of Agriculture’s Tidewater Resource Conservation & Development Council.

Tom Murray and Michael Oesterling continue to serve on the Virginia Aquaculture Advisory Board’s Technical Committee. The pair also released their fourth annual survey of clam and oyster aquaculture in Virginia, which documents continuing growth in both industries.

Michael Oesterling serves as the Virginia representative on the Technical Committee for Research for the U.S. Department of Agriculture’s Southern Regional Aquaculture Center.

Tracey Sutton served on a panel to evaluate the ecology of northwest Atlantic seamounts and submitted activity and catch reports to the National Marine Fisheries Service. The catch report is used to set management criteria and quotas for large coastal sharks.

The large crane rising above Gloucester Point was used to construct a new concrete pier (in background) for VIMS, and is now being used to remove the Oyster and Ferry piers from VIMS’ York River shoreline (Ferry Pier in foreground). The old piers had suffered severe damage during Hurricane Isabel and Tropical Storm Ernesto.
Awards and Recognition

**Faculty**

**Debbie Bronk** was chosen to serve a 2-year term on the working group charged with deciding the nation’s strategy for carbon-cycle research. Research to understand the in and outs of the global carbon cycle is a key part of the nation’s ability to predict, monitor, and respond to climate change and global warming.

**Emmett Duffy, Elizabeth Canuel, and Kim Reece** were among the first class of W&M faculty to receive the new Plumeri awards for excellence in research from the College, endowed by the generosity of alum Joseph Plumeri.

**Bill DuPaul** received the William Q. Wick Award for Visionary Career Leadership by the assembly of Sea Grant Extension Program Leaders.

**John Graves** was named to the Department of Commerce’s Marine Fisheries Advisory Committee, the nation’s top advisory body for management of fisheries in U.S. waters. Graves was selected for his expert knowledge of fisheries genetics, as well as his extensive experience in fisheries management and policy-making.

**John Hoenig** was honored with the University of Rhode Island’s Alumnus Distinguished Achievement Award.

**Professor emeritus Maurice Lynch** was appointed to the Hampton Roads Sanitation District Commission by Governor Timothy M. Kaine.

**Postdoctoral associate Yuehan Lu** received a Mellon Postdoctoral Fellowship.

**Roger Mann and Gene Burreson** received the Honored Life Member Award from the National Shellfisheries Association, the association’s highest honor.

**Mark Patterson** received the 2008 Lockheed Martin Award for Ocean Science and Engineering from the Marine Technology Society. The award is given annually for “the highest degree of technical accomplishment in the field of marine science, engineering, or technology.” Patterson was recognized for his development of autonomous underwater vehicles (AUV).

**Mark Patterson and Roger Mann** were finalists in the 2008 Wilcox and Savage Innovation Award, Hampton Roads Technology Council, for their work on a patent for developing a system and methods for identifying and quantifying sonar targets in water.
Deborah Steinberg and Jim Bauer were recognized by Thomson Reuters’ Essential Science IndicatorsSM for scholarly contributions to a “research front” in the “Biological Effects of Ocean Chemistry.” A research front is defined as a cluster of highly cited scientific papers in areas of emerging interest.

Dennis Taylor was awarded one of the 2008 President’s Awards for Service to the Community for his work with students in the local community on such projects as the biodiesel fuel plant and the Public Commons Project. Taylor also helps lead the College’s Committee on Sustainability.

Vicki Clark received the 2008 President’s Award from the Virginia chapter of the American Culinary Federation for seafood education programs and support.

Carolyn Ridgway Cook was re-elected to the Executive Board of the American Council on Education’s Office of Women in Higher Education.

Ilse Kaattari served on the volunteer Interim Executive Committee for W&M Professional Faculty for two years, and was elected in 2008 to a 2-year term on the first, 21-member Professionals and Professional Faculty Assembly.

Jennifer Latour was elected to the W&M Professionals and Professional Faculty Assembly.

Lisa Lawrence, Chris Petrone and Vicki Clark were recognized for providing the Bridge ocean-resource website. The U.S. Program Office of the Census of Marine Life honored the Bridge as the “Education Link of the Quarter.”

Phil Sadler was elected Chair of the Atlantic States Marine Fisheries Commission’s Striped Bass Tagging Subcommittee.

VIMS Service Awards

Freeman Volunteer of the Year
Jim Price
Facilities/Safety/Trades
Becky Kearns
Research/Advisory Service
Lee Larkin
Technical Support
Karen Hudson
Administrative Support
Diane Perry
Dean’s Prize for the Advancement of Women in Marine Science
Deborah Bronk
Outstanding Teaching Award
Robert Diaz
School of Marine Science

Graduate students in the School of Marine Science at VIMS have an unparalleled opportunity to conduct research that matters, with many pursuing research and policy avenues that bring them in close contact with industry and management agencies at the state, regional, and international levels. Here are some highlights of student accomplishments in 2008-2009. A full list of theses and dissertations for 2008-2009 is available at www.vims.edu/library.

External Student Awards

**Samantha Bickel** received a Student Travel Award from the American Society of Limnology and Oceanography (ASLO) and a Reves Center International Travel Grant to present her research at the 2009 ASLO Ocean Sciences meeting in Nice, France.

**Kate Brodie** received the Best Student Paper award for her poster at the 2008 Fall Meeting of the American Geophysical Union (AGU).

**Rachael Blake** commenced a competitive Fellowship from the National Estuarine Research Reserve System.

**Andre Buchheister** and **Justine Woodward** received Reves Center International Travel grants to present their research at the American Fisheries Society meeting in Ottawa, Canada.

**Karen Capossela** received the Best Student Presentation award at the 2009 Tidewater Chapter Meeting of the American Fisheries Society.

**Juliette Giordano** received the Best Student Oral Presentation Award at the 2009 Spring meeting of the Atlantic Estuarine Research Society in Ocean City, MD.

**Amber Hardison** received a Reves Center International Travel Grant to present her research at the Ocean Sciences Meeting in Nice, France.

**Kristina Hill** received a Thurlow Nelson Award, Honorable Mention, for her outstanding oral presentation at the National Shellfisheries Association annual meeting.

**J. Paul Rinehimer** received the 2nd place Student Modeler Award in the “Community Surface Dynamics Modeling System” for his Master’s research.

**Noelle Relles** was awarded a Reves Center International Travel Grant, and a Minority Student Travel Grant from the American Society of Limnology and Oceanography to present her research at the ASLO Ocean Sciences Meeting in Nice, France.

**Sarah Schillawski** was awarded a 3-year fellowship from the National Estuarine Research Reserve System and a Garden Club of America Coastal Wetlands Scholarship for summer fieldwork.

**Matt Smith** was awarded a Reves Center International Travel Grant to present his research results at the annual meeting of the American Fisheries Society in Toronto.

**Kersey Sturdivant** received the Best Student Poster award at the ASLO Ocean Sciences Meeting in Nice, France. He also received a doctoral fellowship from the NOAA Graduate Science Program.

**Andrew Wozniak** took part in the fourth annual Graduate Student Research Forum, hosted by the Virginia Council of Graduate Schools.

**Mark Henderson** and **Patrick Lynch** were awarded NOAA/Sea Grant population dynamics fellowships.

**VIMS Student Awards**

These awards are supported by endowments in the VIMS Foundation.

- **Kelley Watson Fellowship**
- **Kristina Hill**
- **Zeigler Student Achievement Award**
- **Charles “Chip” Cotton**
- **William J. Hargis Jr. Fellowship**
- **Matthew Whalen**
- **Matthew Fontaine Maury Student Fellowship**
- **Heidi Geisz**

2008-2009 incoming students
**Best Student Papers**

**Master’s**


**Ph.D.**


**Student Research Highlights**

**Antibody helps detect pollutants**

Ph.D. student Candace Spier has tapped the power of the mammalian immune system to detect organic pollutants at extremely low concentrations in water. Her work holds promise for near real-time monitoring of oil pollution in any body of water worldwide.

Spier and colleagues made the breakthrough by exposing mice to molecules that closely resemble “polycyclic aromatic hydrocarbons.” PAHs are widespread organic pollutants that form during the burning and processing of fossil fuels. Exposure of mice to these PAH look-alikes leads their immune system to develop antibodies that can recognize real PAHs, at concentrations below one part per billion. Spier says the process works “like a human vaccine.” The team’s next step is to incorporate the antibodies into electronic “biosensors” that can be deployed to monitor pollutants in real-world settings.

**Dusky sharks vulnerable to fishing**

Research by Ph.D. student Jason Romine and colleagues shows that dusky sharks are highly vulnerable to fishing pressure, and that stringent regulatory measures will be required to recover collapsed populations of this coastal shark.

Dusky sharks, which can grow to 14 feet and 800 pounds, are highly valued by commercial fisheries for their meat, skin, and liver oil. The researchers studied the factors that influence mortality of this shark when caught as bycatch in fisheries targeting other species. They found that mortality was greatest among small sharks during spring, and that prolonged time in a net also contributed to mortality.

Their life-history studies suggest a 3-year reproductive cycle for the species, with a 2-year gestation period and a 1-year resting period. The shark’s litters contain only 3-12 pups. “Dead Zones” affecting bottom dwellers

A study of the York and Rappahannock rivers by Ph.D. student Chris Long shows that low-oxygen “dead zones” have begun to affect...
the bottom-dwelling communities that nurture higher levels of the Chesapeake Bay food web.

Long and advisor Rochelle Seitz recorded the health of the rivers’ bottom-dwelling communities before and after low-oxygen events during the summer of 2003 and 2004. They found a decrease in the “biomass” of clams, worms, and other invertebrates on and in bay-floor sediments after the low-oxygen bouts, and a shift toward opportunistic, “weedy” species.

A similar study conducted 20 years earlier in the York River found no effect on the bottom-dwelling community. The authors conclude that the observed increase in low-oxygen events during the last two decades has increased their deleterious effects on the York River’s bottom-dwelling community.

Doppler analysis helps forecast wave climates

Research by M.S. student Justin Vandever is providing mariners, search-and-rescue teams, engineers, and other stakeholders with a means to more accurately estimate the height, periodicity, and direction of waves in the coastal zone.

Assessing the “wave climate” of a particular shoreline or harbor is increasingly important in search-and-rescue missions and modeling studies, and is also essential for quantifying sediment transport, designing in-water and shoreline structures, and understanding how sediments interact with marine plants and animals.

For the study, Vandever and colleagues compared wave-height estimates in 10 coastal and estuarine environments around the U.S. and Canada using data from acoustic Doppler wave gauges. Their analysis marks the most comprehensive synthesis of such measurements ever accomplished in coastal waters.

Their results provide equations that allow coastal interests to use computer models to predict maximum wave heights within 10% of actual values, even when long-term observations of the surface wave field are unavailable.

Geisz in Antarctic Treaty meeting

Ph.D. student Heidi Geisz was among a handful of graduate students nationwide selected to participate in the Antarctic Treaty Consultative Meeting in Baltimore in April.

The meeting, the 32nd-annual gathering of signatories to the international treaty governing the southern continent, marked the 50th anniversary of the Treaty’s signing and the conclusion of the International Polar Year. The Antarctic Treaty is a unique international agreement to reserve Antarctica for the pursuit of peace and science.

Geisz served as a “rapporteur,” generating the official record of proceedings during the 11-day event. The meeting was attended by nearly 400 diplomats, Antarctic program managers and logistics experts, and polar scientists from 47 countries.

Geisz’s research focuses on the accumulation of persistent organic pollutants in Antarctic seabirds. Her studies are part of the NSF-funded Long-Term Ecological Research (LTER) program at the U.S. Palmer Station on the Antarctic Peninsula, where average annual winter temperatures have increased by 10° F during the last 50 years, five times the global average warming.

Geisz says “It was exciting to see how much proactive attention climate change research and information received at the meeting.” Treaty delegates agreed that continued long-term monitoring is imperative continent-wide, and began discussions on establishing a marine protected area in the Ross Sea dedicated to climate-change research.

Green Team wins sustainability grant

Staff and students at VIMS earned two competitive grants from the W&M Committee on Sustainability to improve energy efficiency on the Gloucester Point campus.

One project will provide $18,000 to upgrade fluorescent lighting in the Hargis Library. Replacement of existing fixtures with enhanced energy-efficient fixtures will reduce energy consumption and help reduce the Institute’s carbon footprint.

The other project, proposed by VIMS graduate student Heidi Geisz on behalf of the VIMS “Green Team,” will use $3,000 to purchase and install motion sensors and motion-sensor-controlled lights to significantly reduce energy use in low-traffic areas.

The sustainability projects, funded through the student “Green Fee,” are part of the ongoing effort to advance the College’s Sustainability Policy announced by William & Mary President Taylor Reveley in the Spring of 2008.
Grants and Contracts

VIMS researchers were awarded $17 million by federal, state and private entities during fiscal year 2008-2009. In addition to supporting critical research and oversight activities within the Commonwealth, these grants and contracts provided opportunities to enhance educational programs and conduct cutting-edge research nationally and internationally. A few highlights include:

**EPA = Environmental Protection Agency; NOAA = National Oceanic and Atmospheric Administration, NSF = National Science Foundation.**

**Mike Newman** Mercury trophic transfer model: South River floodplain, $163,896, E.I. DuPont Nemours, Inc.

**Kirk Havens, Donna Bilkovic, Carl Herschner** On-going development of nontidal wetland inventory and monitoring strategy in Virginia, $385,699, EPA

**Kirk Havens, Donna Bilkovic** Derelict blue crab trap and marine debris location and removal in shallow water, $1,243,416, NOAA

**Rochelle Seitz** Predicting impacts of stressors at the land-water interface, $538,126, NOAA

**Walker Smith, Kam Tang** Experimental and environmental investigations of giant colonies of Phaeocystis globosa in Chinese waters, $461,284, NSF

**Kam Tang, Iris Anderson** New GK-12: Partnership between educators and researchers for enhancing classroom teaching (PERFECT), $2,736,518, NSF

**Stephen Kaattari** The mechanics and optimization of immunological memory in salmonid fishes, $375,000, US Department of Agriculture

**Robert Diaz** Workshop on environmental research needs in support of potential Virginia offshore oil and gas activities, $150,525, US Dept. of the Interior Minerals Management Service

**Jim Perry** Assessment of woody vegetation for replacement of ecological functions in created forested wetlands of the piedmont province of Virginia, $844,041, Wetland Studies and Solutions, Inc.

**Courtney Harris** Collaborative research: formation, reworking and accumulation of sedimentary deposits, Waipaoa River Shelf, New Zealand, $164,023, NSF

**Robert Orth, Scott Marion, Ken Moore, Mark Luckenbach** Marine ecosystem restoration (native oysters, seagrass, and bay scallops) in the Coastal Bays of Virginia, $502,148, NOAA

**Mike Vecchione, Tracey Sutton** Patterns and processes of the ecosystems of the northern Mid-Atlantic (MAR-ECO), $600,000, Sloan Foundation

**Ken Moore** Monitoring estuarine condition at Colonial National Historical Park, George Washington Birthplace National Monument, and Assateague Island National Seashore, NE Coastal and Barrier Network, 2008 and 2009, $104,134, US Department of the Interior National Park Service

**Rob Latour, Chris Bonzek** Data collection and analysis in support of single and multispecies stock assessments in Chesapeake Bay: the Chesapeake Bay Multispecies Monitoring and Assessment Program (ChesMMAP), $500,815, US Department of the Interior Fish and Wildlife Service
Outreach

Marine Science Day on May 30th brought a record crowd of more than 2,000 visitors to the VIMS campus for hands-on exhibits showcasing research in Chesapeake Bay and around the world. The Children’s Pavilion, York River seining, laboratory tours, and the Parade of Marine Life engaged participants young and old.

**After Hours Lectures**

**Closed to Swimming? Human Health and the Chesapeake** (June 25, 2009) VIMS professor Howard Kator described harmful marine bacteria and the risks they pose to Bay enthusiasts.

**Underwater Robots: A Revolution in Oceanography** (April 30, 2009) VIMS associate professor Mark Patterson offered a multimedia exploration of submarine robots and their potential for exploring Chesapeake Bay and the global ocean.

**Ghost pots in the Bay** (October 30, 2008) Dr. Kirk Havens of VIMS’ Center for Coastal Resources Management described how continued fishing by “ghost” crab pots impacts Chesapeake Bay.

**Blue Crab Blues** (March 26, 2009) VIMS researcher Jacques van Montfrans described the life of blue crabs in the Bay, as well as current management issues surrounding the blue crab fishery in Virginia and Maryland.

**Not your grandfather’s Chesapeake** (February 26, 2009) VIMS assistant professor Eric Hilton explored how human activities and climate change promote the invasion of non-native species in Chesapeake Bay.

**State of the Oyster 2009** (January 29, 2009) VIMS professor Mark Luckenbach described the current status of oyster restoration efforts in Chesapeake Bay.

**Can algae fuel our cars?** (September 25, 2008) VIMS Professor Liz Canuel described her collaborative efforts to turn the kinds of algae that are choking Chesapeake Bay into a renewable fuel that might one day power our cars.

**Corn ethanol and Chesapeake Bay: Unforeseen consequences** (August 28, 2008) Virginia Tech Professor Jim Pease explored the potential economic and environmental consequences of large-scale ethanol production for the Chesapeake Bay watershed.

**Species of Special Concern**

During this five-week course, hosted by Christopher Newport University’s Lifelong Learning Society, VIMS researchers explored the natural history and conservation status of some of Chesapeake Bay’s ecologically, commercially, and recreationally important species, including blue crabs, menhaden, oysters, striped bass, and seagrass.

**Public Tours**

Guided tours gave 366 adults and older children a behind-the-scenes look at VIMS, including a visit to the Visitor’s Center and Aquarium, a research laboratory, and the Teaching Marsh.

**VIMS faculty and staff presented 19 invited talks to nearly 400 citizens and students at community organizations, schools, clubs, businesses, and other venues throughout Hampton Roads and the Northern Neck.**

**Mini-Schools**

**Global Warming in The Bay**

During this three-week course, hosted by the Christopher Wren Association at W&M, VIMS researchers explored the causes and consequences of global change in Chesapeake Bay.

**Ghost pots in the Bay**

Dr. Kirk Havens of VIMS’ Center for Coastal Resources Management described how continued fishing by “ghost” crab pots impacts Chesapeake Bay.

**Blue Crab Blues**

VIMS researcher Jacques van Montfrans described the life of blue crabs in the Bay, as well as current management issues surrounding the blue crab fishery in Virginia and Maryland.

**Not your grandfather’s Chesapeake**

VIMS assistant professor Eric Hilton explored how human activities and climate change promote the invasion of non-native species in Chesapeake Bay.

**State of the Oyster 2009**

VIMS professor Mark Luckenbach described the current status of oyster restoration efforts in Chesapeake Bay.

**Can algae fuel our cars?**

VIMS Professor Liz Canuel described her collaborative efforts to turn the kinds of algae that are choking Chesapeake Bay into a renewable fuel that might one day power our cars.

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Why animals don’t wear clothes (June 16, 2009) Dan Summers from the Virginia Living Museum explored the adaptations that Chesapeake Bay animals use to protect themselves and keep warm.

Climate change and the Bay (April 21, 2009) David Jasinski, co-founder of Be the Bay, discussed how pollution, development, and climate change affect Chesapeake Bay.

Mollusks (March 17, 2009) Malacologist Hannah McLean used her personal shell collection to help describe the many different kinds of mollusks.

Shorebirds (February 17, 2009) Dr. Adam Duerr of the W&M Center for Conservation Biology discussed the importance of shore birds to Chesapeake Bay.

Estuaries—where rivers meet the sea (January 20, 2009) CBNERR Education Coordinator Sarah McGuire used kids’ activities and hands-on experiments to explore estuaries.

The Mad Lab returns! (October 21, 2008) Audience members took a spooky look at deep-sea animals that live and glow in the dark.
Publications

VIMS researchers published hundreds of journal articles, technical reports, and other scientific communications in 2008 and 2009. Here’s a statistical snapshot of the 230 journal articles published by VIMS faculty, staff, and students between January 2008 and September 2009. A full list of VIMS-authored journal articles is available at vims.edu/library. Statistics were generated using software tools provided by Thompson ScientificSM.

Top 10 Journals

<table>
<thead>
<tr>
<th>Position</th>
<th>Journal Title</th>
<th># Articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Journal of Shellfish Research</td>
<td>39</td>
</tr>
<tr>
<td>2.</td>
<td>Journal of Coastal Research</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>Estuaries and Coasts</td>
<td>9</td>
</tr>
<tr>
<td>4.</td>
<td>Marine Ecology-Progress Series</td>
<td>8</td>
</tr>
<tr>
<td>6.</td>
<td>Marine Biology</td>
<td>7</td>
</tr>
<tr>
<td>8.</td>
<td>Diseases of Aquatic Organisms</td>
<td>6</td>
</tr>
<tr>
<td>10.</td>
<td>Environmental Science &amp; Technology</td>
<td>5</td>
</tr>
</tbody>
</table>

Top 10 Keywords

1. species
2. change
3. model
4. rate
5. fish
6. population
7. time
8. bay
9. range
10. river

VIMS scientists collaborate and publish with colleagues from around the world. Lower pie chart shows top 10 countries of co-authors for papers with international collaborators during 2008-2009. Nearly half of all papers with VIMS authors include international collaborators. Data according to the Web of Science.©
Blackwood’s love of Chesapeake Bay provides a legacy for VIMS

Longtime VIMS Council member Matthew T. (Tim) Blackwood left a generous unrestricted bequest of $108,000 to the VIMS Foundation. The Blackwood Unrestricted Endowment Fund will provide the Foundation’s Board of Directors and the Dean and Director of VIMS with flexibility to support a variety of institutional needs that are critical to a scientific enterprise.

Tim was born in New York City in 1928 and lived most of his youth in Centreville, Maryland. A graduate of Culver Military Academy and Cornell University, he served 4 years of active duty and 12 years in the USMC Reserves. Tim worked at Johnson & Higgins for 31 years, in Philadelphia and Richmond. He was a dedicated volunteer and board member for a number of causes. After he moved to Deltaville in 1994, VIMS was fortunate enough to have him join the VIMS Council.

An avid sailor, Tim always had a twinkle in his eye and offered quiet but astute guidance as a member of the VIMS Council. He was a generous supporter of the building of the Kauffman Aquaculture Center and of student research at the VIMS Eastern Shore Laboratory. Tim’s love of the Bay will endure through his legacy of support of future students and education and research at VIMS from the Blackwood Endowment.

Giving Highlights

Private giving and the VIMS Foundation advance education and research

All state institutions of higher education, including VIMS and the College of William and Mary, face major challenges as state funding decreases as a proportion of the total budget. Even though VIMS remains highly successful in competing for federally sponsored research support, we still require gifts and endowments to fill critical needs such as student fellowships and acquisition of up-to-date scientific equipment.

Today less than 1% of the VIMS budget comes from private support, as compared to several comparable research institutions that have established endowments of several hundred million dollars. We created the VIMS Foundation to help assure a successful future, and are glad to report that its support of the Institute continues to increase.

VIMS receives gifts directly as well as through its Foundation. Total private giving for VIMS and the VIMS Foundation in FY2009 amounted to 440 gifts totaling $1,409,539. Of this, $606,529 came to the VIMS Foundation. In addition, the VIMS Art Auction netted more than $30,000 to support student research. New endowments have made it possible for the VIMS Foundation to support as many as 12 students in the current academic year.

The total assets of the VIMS Foundation were $6,678,562 as of June 30, 2009, down from $7,758,212 on June 30, 2008, due to market conditions. Most importantly, endowments and expendable gifts have allowed the Foundation to increase its assistance to VIMS from $277,000 in 2008 to $634,000 in 2009. The VIMS Foundation’s endowed funds are invested with the William and Mary Investment Trust or WAMIT. See WAMIT investment report on page 25.

We deeply appreciate the commitments of so many friends, foundations, and corporations in FY 2009 and recognize them in the listings that follow. We can also report that a growing number of people are including the VIMS Foundation in their estate plans, a good sign for the future of the VIMS Foundation and the role it can play in supporting VIMS’ work to restore and manage Chesapeake Bay and our marine resources. An investment in our students and faculty is an investment in the quality of our environment as these are the people who will identify and help solve our environmental challenges.

To mark the 10th anniversary of the VIMS Foundation in 2010-2011, we hope to significantly increase the VIMS Foundation endowments for student support. For information on how you can help, please call the VIMS Development and VIMS Foundation Office at 804-684-7107 or 7099.
Nunnally pledge supports Latour

A $250,000 pledge from the Moses D. Nunnally Charitable Trust is supporting Dr. Rob Latour as the Moses D. Nunnally Term Professor at VIMS.

Latour, a leader in the field of ecosystem-based management, heads up two VIMS programs with this theme: the Chesapeake Bay Multispecies Monitoring and Assessment Program (ChesMMAP) and the Fisheries Ecosystem Modeling and Assessment Project (FEMAP).

Both programs move beyond traditional single-species management approaches to analyze the interactions between and among species and their environment. Multispecies research includes studies of predator-prey interactions; fish age, sex, and maturity; seasonal variations in species distributions; and water-quality effects.

State and federal agencies use program results to craft sustainable management plans for commercial and recreational fishes in Chesapeake Bay and along the Atlantic seaboard.

Fetch LLC gift helps advance robotic subs

Fetch LLC’s generous donation of several autonomous underwater vehicles (AUVs), numerous pieces of related equipment, and a U.S. patent for operational software will further enhance VIMS’ groundbreaking advances in the field of marine robotics.

The gift, to the Autonomous Systems Laboratory (ASL) at VIMS, will allow Dr. Mark Patterson and students to continue developing and deploying the next generation of AUVs. To date, the ASL team has conducted AUV research in Chesapeake Bay, the Florida Keys, Antarctica, and Iceland. The robotic subs provide unprecedented opportunities to go where ships and divers can not and to observe changes in the ocean as they occur.

Gift supports aquaculture interns

A $90,000 gift from an anonymous private donor through the non-profit Philanthropic Collaborative has allowed VIMS to begin training the skilled workers needed to advance Chesapeake Bay’s rapidly growing oyster-farming industry.

Professor Stan Allen, Director of the Aquaculture Genetics and Breeding Technology Center at VIMS, used the gift to initiate a long-held vision—the Oyster Aquaculture Training program, or OAT.

The program will provide oyster farmers with workers who are skilled in all aspects of the trade, from hatchery production to grow-out. Allen says the goal “is to provide Virginia’s expanding aquaculture industry with trained technicians using a pool of local, interested people.”

First-year trainees were Elisabeth Bloom of Hayes, Ben Clark of West Point, Tommy Camp of Williamsburg, and Lisa Domalewski of Virginia Beach. The group includes two college biology majors, a “life-long naturalist,” and a recent high-school graduate.

A 2008 survey by the Sea Grant Marine Advisory Program at VIMS shows a steady growth of oyster aquaculture in Virginia as watermen shift from the traditional planting of “shell on bottom” to farming using cages, racks, and floats. The number of farmed oysters nearly tripled between 2005 and 2006, and growers predicted a 33% increase during the most recent growing season.

The trainees agree that the breadth of the program is one of its key strengths. Clark, who comes from a family of commercial anglers, says “it’s eye-opening to see what goes on from start to finish.”
DuPlantier gift contributes to student research in Antarctica

A gift from Adrian G. DuPlantier, Jr. and First Advantage Federal Credit Union supported student research at the Palmer Long-term Ecological Research site in Antarctica. The gift allowed W&M junior Miram Gleiber and VIMS Master’s student Glaucia Fragoso to conduct research in the waters off the Antarctic peninsula with Professor Deborah Steinberg.

Olsson, NewMarket, and Norfolk Southern support purchase of mass spectrometers

The Elis Olsson Memorial Foundation has pledged $50,000 towards the acquisition of additional mass spectrometry equipment at VIMS. The gift will contribute to the purchase of a new gas chromatograph mass spectrometer.

The Norfolk Southern Foundation has also made an additional pledge to help with this new instrument. The instrument will be added to the mass spectrometry facility at VIMS, which was initiated through the purchase of an elemental analysis isotope ratio mass spectrometer (EA-IRMS) that the Foundation funded over the last few years with a $150,000 pledge.

The high-tech instruments, which allow for measurement of stable isotopes in environmental samples, will serve the programs of professors Rebecca Dickhut and Elizabeth Canuel.

Master’s student Christina Pondell will use the EA-IRMS to help determine how land-use changes and dams affect the transport of organic carbon to the coastal ocean, research that will ultimately help provide a better understanding of the global carbon cycle.

Ph.D. student Heidi Geisz will use the device to analyze carbon and nitrogen isotopes in Antarctic seabirds. The ratio of these elements in seabird eggs and tissues throws light on the birds’ dietary preferences and migratory patterns, and helps assess the “biomagnification” of any contaminants in their tissues.

Just after the end of the fiscal year, NewMarket Corporation joined the group of mass spectrometry funders by making a gift of $50,000, which, combined with other resources, allowed the final purchase of a $400,000 machine—an inductively coupled plasma mass spectrometer. This machine will be critical for new professor Dr. Aaron Beck to establish a cutting-edge, trace-metal research program at VIMS.

Acquisition of scientific instrumentation is one of VIMS’ most critical ongoing needs.
Eastern Shore Lab hosts interns

Thanks to gifts from friends of VIMS on the Eastern Shore, the VIMS Eastern Shore Lab was able to hire five local undergraduates for summer internships. The competition for the positions was stiff. Students participated fully in research at the lab including studies of oysters, scallops, and clams in the ESL’s Shellfish Research Hatchery. Others studied sea ducks, clam aquaculture, oyster restoration, and the ecology of invasive species.

While attending various colleges, the participating students all hail from Eastern Shore communities: Will Hart of the College of William and Mary hails from Bloxom; Kelly Hinman of the University of Maryland, Eastern Shore hails from Willis Wharf; Zack Mallette of Old Dominion University hails from Locustville; Paige Smith of Randolph-Macon College hails from Harborton; and Trisha Wagner from the University of West Florida hails from Cheriton.

Hart, who studied the foraging ecology of surf scoters and long-tailed ducks, said the internship piqued his interest in marine science. “I learned through hands-on experience how important marine research is to issues in Chesapeake Bay,” says Hart. “I’m grateful that I was lucky enough to receive the opportunity to work at the Eastern Shore Lab, it was an experience that I’ll never forget. The skills that I acquired this summer are irreplaceable, and ones that every scientist needs.”

ESL Director Mark Luckenbach says the interns were “an excellent group that each day brought enthusiasm, a willingness to work hard, and an interest in learning.”

He adds “On behalf of the students, we thank the Young, Johnsen, Bosworth, Amory, Lalor, and Kellam families and Cynthia Bailey for the generous gifts that made it possible for us to hire these promising young students.”

(Bottom row, L to R): Will Hart; Zack Mallette.
(Top row, L to R) Trisha Wagner; Paige Smith; and Kelly Hinman.
Summer camps engage kids

In the words of one youngster: “This was the best camp in the history of camps.” He was referring to Chesapeake Bay Explorers, one of five week-long summer camps made possible by a gift from a private donor to VIMS.

The gift will also fund summer camps at VIMS during the next four summers. The camps, led by Education Coordinator Sarah McGuire of the Chesapeake Bay National Estuarine Research Reserve at VIMS, provided fun, hands-on experiences in the field and lab to 89 elementary and middle school students from in and around Gloucester County.

Campers got wet and muddy at sites around the Bay, from the VIMS Teaching Marsh to the Goodwin Islands and the barrier islands of the Eastern Shore.

Wetland Waders—these rising 1st and 2nd graders dip-netted, seined, and produced a play about salt marshes. Bay Savers, rising 3rd and 4th graders, learned about Chesapeake Bay habitats and stewardship. They made picture frames from recycled materials, painted rain barrels, and planned waste-free lunches. Bay Techies, rising 5th and 6th graders, applied technology to study the Bay. They used GPS units to find an ecocache, built observing buoys and robotic subs, and produced a video about their adventures. Chesapeake Bay Investigators, rising 7th and 8th graders, explored a variety of habitats in the Bay watershed and investigated Bay issues such as fish-kill events and invasive species. Chesapeake Bay Explorers, rising 7th and 8th graders, enjoyed a weeklong overnight trip to the VIMS Eastern Shore Laboratory. The youngest group to ever participate in an ESL program, the students hiked, canoed, boated, trawled, dredged, seined, dissected, and more.

“[Our daughter] had a great time and wants to come back next year—always a great sign!”—Cyndi Masterstaff

“The best part was the trip to Goodwin Island. The canoe trip was something I will never forget. I think this was a good program and should continue for other students.”—Yasmene Kimble
Fellowships and awards for students in the School of Marine Science at VIMS recognize and reward qualities that lead to success in graduate school and subsequent careers—including commitment, initiative, scholarship, and interdisciplinary research. This year we are glad to announce the Holland and Roper fellowships, which were offered for the first time.

**Barbara and Harry Hager Fellowship**
Matthew Whalen, M.S. Student
Faculty Advisor Emmett Duffy
*Identifying the role of mesoherbivory in seagrass systems*

**Beazley Fellowship**
Alison Deary, M.S. Student
Faculty Advisor Eric Hilton
*Habitat differentiation, development of feeding apparatus, and sensory development during the ontogeny of larval sciaenids in Chesapeake Bay*

**Edward M. Holland Fellowship**
Lori Sutter, Ph.D. Student
Faculty Advisor Jim Perry
*Vegetative community nutrient uptake along the York River salinity gradient: Implications of rising sea level*

**Ferguson Enterprises Fellowship**
Christina Pondell, M.S. Student
Faculty Advisor Elizabeth Canuel
*The effects of changes in land-use and climate on organic carbon accumulation in reservoirs*

**Hunter B. Andrews, Jr., Fellowships**
Kristene Parsons, Ph.D. Student
Faculty Advisor Tracey Sutton
*Shark assemblage structure and biogeographic distribution in Chesapeake Bay and coastal Virginia*

**Kathryn Sobocinski, Ph.D. Student**
Faculty Advisors Rob Latour & Emmett Duffy
*Connecting productivity in eelgrass beds to fishes in Chesapeake Bay*

**Wenda Ribeiro, Ph.D. Student**
Faculty Advisor Kimberly Reece
*Detection and identification of adenovirus in local estuarine waters receiving waste water effluent and in shellfish tissue harvested from these waters.*

**Zeigler Fellowship**
Funded by Charles Natale
Ryan Schloesser, Ph.D. Student
Faculty Advisor Mary Fabrizio
*Changes in the distribution and abundance of non-indigenous species in Chesapeake Bay based on trawl surveys*
**Juliette B. and Carroll W. Owens, Sr. Fellowship**
Erin Jenkins, M.S. Student
Faculty Advisor Jeffrey Shields
*Parasite biology in local crustacean populations*

**SunTrust Fellowship**
Emily Jayne, M.S. Student
Faculty Advisors Rebecca Dickhut and Elizabeth Canuel
*Development of methodology for quantifying air-sea fluxes of volatile organic carbon*

**Kathleen and Robert Roper Fellowship**
Julia Moriarty, M.S. Student
Faculty Advisor Courtney Harris
*Sediment transport and deposition on the Waipaoa River continental shelf, New Zealand*

**Virginia Institute of Marine Science Council Fellowship**
Andre Buchheister, Ph.D. Candidate
Faculty Advisor Robert Latour
*Food web dynamics and community structure of demersal fishes in Chesapeake Bay*

The new Vessels Operation and Field-Support Center at VIMS (rear of photo) is a two-story, 10,000 square-foot building that will replace facilities that were severely damaged during Hurricane Isabel.
## VIMS Foundation Financials

### Statement of Financial Position June 30, 2009

**Assets**

**Current Assets**
- Cash and cash equivalents: $703,705
- Pledges receivable: $256,684
  
  **Total Current Assets**: $960,389

**Investments**: $5,522,090

**Other Assets**
- Pledges receivable: $196,083

**TOTAL ASSETS**: $6,678,562

**Liabilities and Net Assets**

**Accounts payable**: $-

**Net Assets**
- Unrestricted, as restated: $260,472
- Temporarily restricted, as restated: $2,118,572
- Permanently restricted: $4,299,518
  
  **Total Net Assets**: $6,678,562

**TOTAL LIABILITIES AND NET ASSETS**: $6,678,562

### Statement of Activities for the Year Ended June 30, 2009

#### Revenue, Gains, and Other Support

<table>
<thead>
<tr>
<th>Description</th>
<th>Unrestricted</th>
<th>Temporarily Restricted</th>
<th>Permanently Restricted</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributions</td>
<td>$293,656</td>
<td>$261,095</td>
<td>$51,778</td>
<td>$606,529</td>
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<tr>
<td>Net Investment Income (Loss)</td>
<td>$(379,518)</td>
<td>$(644,282)</td>
<td>-</td>
<td>$(1,023,800)</td>
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<tr>
<td>Net assets released from restrictions</td>
<td>$480,540</td>
<td>$(480,540)</td>
<td>-</td>
<td>-</td>
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</table>

**Total Revenue, Gains, and Other Support**: $394,678

<table>
<thead>
<tr>
<th>Expense</th>
<th>Unrestricted</th>
<th>Temporarily Restricted</th>
<th>Permanently Restricted</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting and Legal</td>
<td>$13,215</td>
<td>-</td>
<td>-</td>
<td>$13,215</td>
</tr>
<tr>
<td>Bank Fees</td>
<td>$6,916</td>
<td>-</td>
<td>-</td>
<td>$6,916</td>
</tr>
<tr>
<td>Grants and Support</td>
<td>$634,018</td>
<td>-</td>
<td>-</td>
<td>$634,018</td>
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<tr>
<td>Taxes and Licenses</td>
<td>$2,399</td>
<td>-</td>
<td>-</td>
<td>$2,399</td>
</tr>
<tr>
<td>Insurance</td>
<td>$4,658</td>
<td>-</td>
<td>-</td>
<td>$4,658</td>
</tr>
</tbody>
</table>

**Total Expenses**: $661,206

**Change in Net Assets**
- $260,472

**Net Assets, Beginning of Year**: $527,000

**NET ASSETS, END OF YEAR**: $260,472
William and Mary Investment Trust (WAMIT)

Investment Performance

The College of William & Mary Foundation administers about two-thirds of the endowed assets held university-wide through the William & Mary Investment Trust (WAMIT). Created in 2004, WAMIT allows endowed funds held by College-related foundations to be pooled for investment purposes. The foundations associated with the schools of Marine Science, Business, and Law are all members of WAMIT along with the William & Mary Foundation. Overseen by the William & Mary Foundation’s Investments Committee, WAMIT employs a long-term investment approach and incorporates many diversifying strategies that work to lower the funds’ risk profile, especially during turbulent times in the national and global markets. The five-year rate of return for WAMIT’s portfolio was 4.7 percent (annualized) through June 30, 2009. In the long run, the objective is to achieve real growth of 2 percent in the Foundation’s general pool so that the purchasing power of each endowed fund is retained for future generations.

Robert Richter, a resident of Gloucester and a long-time collector of materials related to Matthew Fontaine Maury, presents Maury’s “Wind and Current Charts,” published in 1854, to VIMS Dean & Director John Wells. The Hargis Library at VIMS has an outstanding collection of Maury materials, including his chart table, which was donated by his descendents. Maury is a native Virginian often referred to as the father of oceanography and the “Pathfinder of the Seas.”

INVESTMENT RESULTS

Fiscal year 2009, net of all fees

<table>
<thead>
<tr>
<th></th>
<th>1 YEAR</th>
<th>3 YEARS</th>
<th>5 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>The William &amp; Mary</td>
<td>-16.3%</td>
<td>-0.7%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Investment Trust (WAMIT)</td>
<td>-21.4%</td>
<td>-5.0%</td>
<td>0.7%</td>
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<tr>
<td>Blended Benchmark</td>
<td>5.1%</td>
<td>4.4%</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

Value Added

Policy Benchmark: 60% Russell 3000 Index, 20% MSCI World ex-US, 20% Barclays Capital Aggregate Bond Index

THE WILLIAM & MARY INVESTMENT TRUST: ASSET ALLOCATION OF POLICY PORTFOLIO

Fiscal year 2009

<table>
<thead>
<tr>
<th></th>
<th>POLICY</th>
<th>ACTUAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Equities</td>
<td>20%</td>
<td>18.4%</td>
</tr>
<tr>
<td>Foreign Equities</td>
<td>13%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Emerging Market Equities</td>
<td>7%</td>
<td>10.2%</td>
</tr>
<tr>
<td>Fixed Income</td>
<td>12%</td>
<td>13.0%</td>
</tr>
<tr>
<td>Special Situations</td>
<td>10%</td>
<td>13.2%</td>
</tr>
<tr>
<td>Absolute Return</td>
<td>20%</td>
<td>16.1%</td>
</tr>
<tr>
<td>Real Assets</td>
<td>10%</td>
<td>8.4%</td>
</tr>
<tr>
<td>Private Equity</td>
<td>8%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Cash</td>
<td>0%</td>
<td>7.9%</td>
</tr>
</tbody>
</table>
VIMS’ 2009 Art Show and Auction netted more than $30,000 to support student research during the 2009-2010 academic year. Auction proceeds have been particularly helpful in these economic times when several students have lost their funding support.

The auction featured the works of Eastern Shore sculptors William and David Turner, a father and son team known internationally for their wildlife sculptures in bronze.

During the gala event, participants bid on selected works by the Turners, as well as trips, jewelry, marine equipment, and other items from a diverse selection of leading artists. A highlight of the auction was a group of six river otters sculpted in bronze by the Turners.

William Turner says he greatly enjoyed his participation in this year’s event. “It’s good to know that our sculptures helped VIMS in its efforts to conserve and manage the Bay and its wildlife.”
Donors & Supporters

VIMS received gifts totaling $1,409,539 in fiscal year 2009 (July 1, 2008 – June 30, 2009). In addition, the VIMS Art Show and Auction raised more than $30,000 for student research. We sincerely thank all donors and recognize members of the Maury Society, who make leadership gifts of $1,000 or more, and VIMS Pathfinders, for their generous lifetime commitments to research, education, and advisory service in marine science.

Pathfinders

The Virginia Institute of Marine Science is proud to recognize the following individuals, corporations, and foundations that have generously supported its work with lifetime gifts of $100,000 or more.

$100,000 - $249,000
Anonymous
The Estate of Mr. Matthew T. Blackwood*
The Keith Campbell Foundation
Fetch, LLC/David Clifford
Massey Foundation

$10,000 - $49,999
Mr. and Mrs. R. Bruce Bradley
Mr. H. R. Dunlap
Mrs. Inge Gläsel
Garland and Agnes Taylor Gray Foundation

The Maury Society

Named for the “Pathfinder of the Seas” Matthew Fontaine Maury, the Maury Society recognizes donors who make an annual gift of $1,000 or more. This group of dedicated patrons helps VIMS to continue Maury’s tradition of scientific discovery.

$100,000 - $249,000
Anonymous
The Estate of Mr. Matthew T. Blackwood*
The Keith Campbell Foundation
Fetch, LLC/David Clifford
Massey Foundation

$10,000 - $49,999
Mr. and Mrs. R. Bruce Bradley
Mr. H. R. Dunlap
Mrs. Inge Gläsel
Garland and Agnes Taylor Gray Foundation

Nature Conservancy
Norfolk Southern Corporation
Moses D. Nunnally Charitable Trust

$10,000 - $49,999
Mr. and Mrs. R. Bruce Bradley
Mr. H. R. Dunlap
Mrs. Inge Gläsel
Garland and Agnes Taylor Gray Foundation

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This report includes donors whose gifts were received between July 1, 2008 and June 30, 2009. We apologize for any errors or omissions, and hope you bring them to our attention. Please report corrections to Lisa Phipps, Office of Development, Virginia Institute of Marine Science, P. O. Box 1346, Gloucester Point, VA 23062, (804) 684-7099, lcphip@vims.edu.
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- General Funds $19,769,965
- Non-general Funds
  - Tuition and Other Funds 1,774,991
  - Grants & Contracts 21,612,081
  - Private Funds 800,443
- Total Revenue $43,957,480*

**EXPENDITURES**
- Instruction $1,767,569
- Research and Advisory Services 9,534,004
- Public Service 9,962
- Academic Support 4,333,442
- Institutional Support 2,941,028
- Plant Operations 3,361,281
- Student Financial Assistance 318,054
- Sponsored Programs 21,612,081
- Total Expenditures** $43,877,420

**CAPITAL EXPENDITURES** $3,097,268

* Excluding VIMS Foundation.
** Total expenditures differ from total revenues because expenditures include gifts from prior years.
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VIMS produces the science behind saving Chesapeake Bay, managing our fisheries, understanding and protecting water quality in the Commonwealth, and much more. Marine science knows no boundaries, and our scientists are collaborating internationally on issues affecting the globe—from oyster disease to loss of submerged aquatic vegetation and growth of marine dead zones.

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Marine Science Day Open House - May 22, 2010

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