



ENVIRONMENTAL SCIENCES

AT THE UNIVERSITY OF VIRGINIA

2012–13 ANNUAL REPORT

THE DEPARTMENT OF ENVIRONMENTAL SCIENCES

Established in 1969, the University of Virginia's Department of Environmental Sciences was one of the first departments in the nation to look at fundamental environmental processes from a multidisciplinary perspective and the first to offer undergraduate, master's, and doctoral degrees in environmental sciences. Today, the faculty includes winners of the prestigious Tyler and Hutchinson Awards as well as five professors who are among the most highly cited researchers in their fields.

Departmental field stations and facilities include the Anheuser-Busch Coastal Research Center in Oyster, Virginia, home of the National Science Foundation–sponsored Virginia Coast Reserve Long-Term Ecological Research program, the Virginia Forest Research Facility in Fluvanna County, and the Blandy Experimental Farm near Front Royal, Virginia.

From the Chair



PHOTOGRAPH BY TOM COGILL

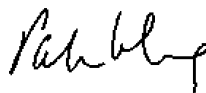
SOME UNIVERSITIES FOCUS ON RESEARCH. Others on teaching. At U.Va., they are closely interwoven. Members of the University faculty see education as a natural expression of their enthusiasm for research. At the same time, they view their research activities as an opportunity for hands-on education of students. So it is appropriate that this reciprocal relationship is at the heart of the strategic plan that the University developed this year.

The complementary relationship between research and education is as characteristic of the department as it is of the University—which is why we are using the five strategic plan pillars to organize this report. I can say without exaggeration that we number among our faculty some of the world's most eminent environmental scientists, yet as a group we are distinguished by our commitment to education.

This commitment is quite broad. It includes, as you might expect, our undergraduate and graduate students, but, as this report demonstrates, it also includes students from other departments and other schools at the University, as well as teachers in primary and secondary schools, in Virginia and around the globe.

Regardless of the circumstance, our goal is the same: to help our students grasp the complexity of the environment in which we live and to give them a sense of the discipline and creativity required for scientific discovery.

It is through this work that we hope to train the next generation of environmental scientists and equip future citizens and leaders to make wise decisions as they confront the environmental challenges of the twenty-first century.



Patricia Wiberg, Chair

PILLAR 1:

Extend and Strengthen the University's Distinctive Residential Culture

Jefferson's advance as an educator was to have students live side by side with professors chosen for their character as well as their intellectual leadership. In our department, we take this educational vision to heart, helping our students grow and mature as scholars and as individuals.

ENCOURAGING STUDENT SELF-GOVERNANCE

For as long as she can remember, Melissa Reardon has been interested in the environment. While in high school, she started an environmental club but found the permissions required to organize activities outside school to be daunting.

As a result, when she arrived at U.Va. she was relieved to find a group ready made for her interests, the Environmental Sciences Organization (ESO). "It helped me feel plugged into the department from my first month on Grounds," she says. Today, she is its president.

ESO serves a number of functions. As Reardon's own experience shows, it helps new students quickly feel at home in the department. The club sponsors regular outings—whether it's hiking in the Shenandoah National Park or kayaking on the James River—that make it easier for students to form friendships. It organizes an annual Research Fair, which helps students get to know faculty members and graduate students. And it provides a ready source of academic advice and study partners.

In addition, ESO offers an opportunity for students to get involved in protecting the environment. In addition to cleaning a

stretch of Meadow Creek in Charlottesville and participating in a science fair for elementary school students, the club organizes its own alternative spring break trip. Last year, club members traveled to Memphis to join a Mississippi River clean-up, while the previous year they drove to North Carolina to plant trees in the Sandhills.

The students themselves organize these activities. The skills they learn in the process underscore the advantages of the University's tradition of student self-governance. Among other lessons that Reardon says she and her cabinet have absorbed is that delegation is a key attribute of leadership and that flexibility is essential when working with a diverse group of volunteers.

Reardon believes that her experience with ESO and these insights will prove valuable in the future. Reardon herself envisions a career in environmental consulting. "Thanks to my efforts with ESO, I'll approach my first job knowing what it's like to work together on a project with a team of people and meet deadlines," she says.

Melissa Reardon (left), the president of the Environmental Sciences Organization, kayaking on the James River with the club.



PHOTOGRAPH COURTESY OF MELISSA REARDON



Professor Mike Pace works closely with doctoral candidate David Seekell to help him develop the skills he needs for a successful career.

PHOTOGRAPH BY STEPHANIE GROSS

MENTORING GRADUATE STUDENTS

Quite naturally, Environmental Sciences Professor Mike Pace's approach to training graduate students is shaped by his own understanding of what's required to be a successful researcher. At the same time, he feels it is essential to work with his students collaboratively. "I try to be sensitive to what they want and where they see their careers going," he says.

One of the first lessons he conveys is the amount of careful thought necessary before starting a research project. During their first year, Pace engages students in an extended discussion, reviewing the research activities under way in his lab and helping them home in on a problem that interests them. He then guides them as they refine the problem into a scientific question that is possible to answer. "Once you have the question clearly in mind, it's easier to go after it," he says. "This is a fundamental scientific skill."

Doctoral candidate David Seekell found his question in a long-term project that Pace is conducting on ecosystem change. Pace is part of a group of scientists trying to determine the early

signs of a shift before an ecosystem reaches a tipping point. They are using two paired lakes in Wisconsin to conduct their experiment, inducing a regime change in one by changing its fish community and using the other as a control.

Borrowing a statistical test from economics, Seekell is developing easily understood thresholds that environmental managers might use to anticipate an impending regime change. He has found, at least in this case, that the rate at which indicators vary, rather than the amount of variation, is a predictor of a shift.

Another skill that Pace emphasizes with his graduate students is good writing, which he calls "essential but often underappreciated." Seekell is particularly grateful for the guidance. "Mike worked closely with me on my first paper, and it must have been agonizing for him," he says. "But thanks to the time he put in, I can produce them faster and more fluidly. Succeeding as a researcher means being able to communicate your findings. Mike's given me the tools to do so."



Laura McGowan, a teacher at Occohannock Elementary School in Northampton County, painting in the salt marsh as part of an Art and Ecology Professional Development Workshop.

PHOTOGRAPH COURTESY OF ART SCHWARZSCHILD

PILLAR 2:

Strengthen the University's Capacity to Advance Knowledge and Serve the Public through Research, Scholarship, Creative Arts, and Innovation

Thomas Jefferson could have built yet another ivory tower. Instead, he created what he called his **Academical Village**, which is both open to the public and serves the public. Through interactions with those outside the academic environment, the department hopes to foster an informed citizenry that appreciates the role that science can play in addressing the environmental challenges we face.

AN ARTISTIC PERSPECTIVE ON ECOLOGY

Travelers to the Eastern Shore are inevitably struck by the beauty of a landscape that is defined by its intersection with the water, a landscape characterized by constant motion and change. The scientists who visit the department's Anheuser-Busch Coastal Research Center use the tools of their profession—box and arrow diagrams and mathematical simulation modeling, for instance—to better understand the natural systems that produce such beauty.

Artists take a more visceral approach and use different instruments—paintbrushes and drawing pencils—to explore and record the natural world. In an effort to bring these two visions together, the Virginia Coast Reserve Long-Term Ecological Research program offers the Art and Ecology Professional Development Workshop for public school teachers.

“Art and science are often viewed as unrelated or even conflicting disciplines,” notes Art Schwarzschild, the center’s site director and the founder of the program. “As these workshops demonstrate, they are both similar and complementary.”

These two-day programs combine lectures and discussions about the environmental processes shaping the Eastern Shore with instruction on plein air, or outdoor, painting or observational drawing. Schwarzschild and Linda Blum, a research associate

professor in the department, focus on the science. Alice McEnerney Cook, a teacher and artist, provides insight into artistic techniques through lectures and one-on-one instruction.

In addition to sharpening the skills of the participants, Schwarzschild has another goal for the workshop. He sees the paintings and drawings the participants create as the ideal vehicle for increasing public awareness of coastal habitats and the valuable ecosystem services they provide. The artwork and essays created during the workshops are used to create exhibitions that have traveled around the state.

One measure of the workshop’s success is that participating artists feel that it has enhanced their appreciation of the world. “Learning the science of the place you are painting makes it more meaningful,” says Laura McGowan, an art teacher at Occohannock Elementary School in Northampton County.

Scientists are also changed by the experience. Schwarzschild, who categorizes his own attempts at plein air painting as “both frustrating and exhilarating,” says that interacting with art teachers attending the workshops has given him the opportunity to see salt marshes through their eyes. “It will forever alter the way I describe these fragile yet resilient landscapes,” he says.

KEEPING SCIENCE TEACHERS CURRENT

By the time discoveries in the geosciences appear in primary and secondary school textbooks, they are no longer so new. Professor Steve Macko joined the Committee on Education of the European Geosciences Union (EGU) to help shorten the time between discovery and classroom discussion. Since 2003, the committee has organized an annual three-day Geosciences Information for Teachers (GIFT) workshop, featuring talks by leading earth scientists.

“Our goal is not simply to familiarize teachers with the most current science,” Macko says. “We also want them to share in the excitement we feel as researchers, a feeling that we hope they convey to students in their schools.”

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The topic of the workshops varies from year to year. The 2013 workshop focused on natural hazards, with presentations about the intersection of the built environment with such natural phenomena as earthquakes, volcanic eruptions, and tsunamis. This most recent program attracted eighty teachers from across Europe, as well as China, Japan, and the United States. Since the workshop’s inception, well over a thousand teachers worldwide have attended them.

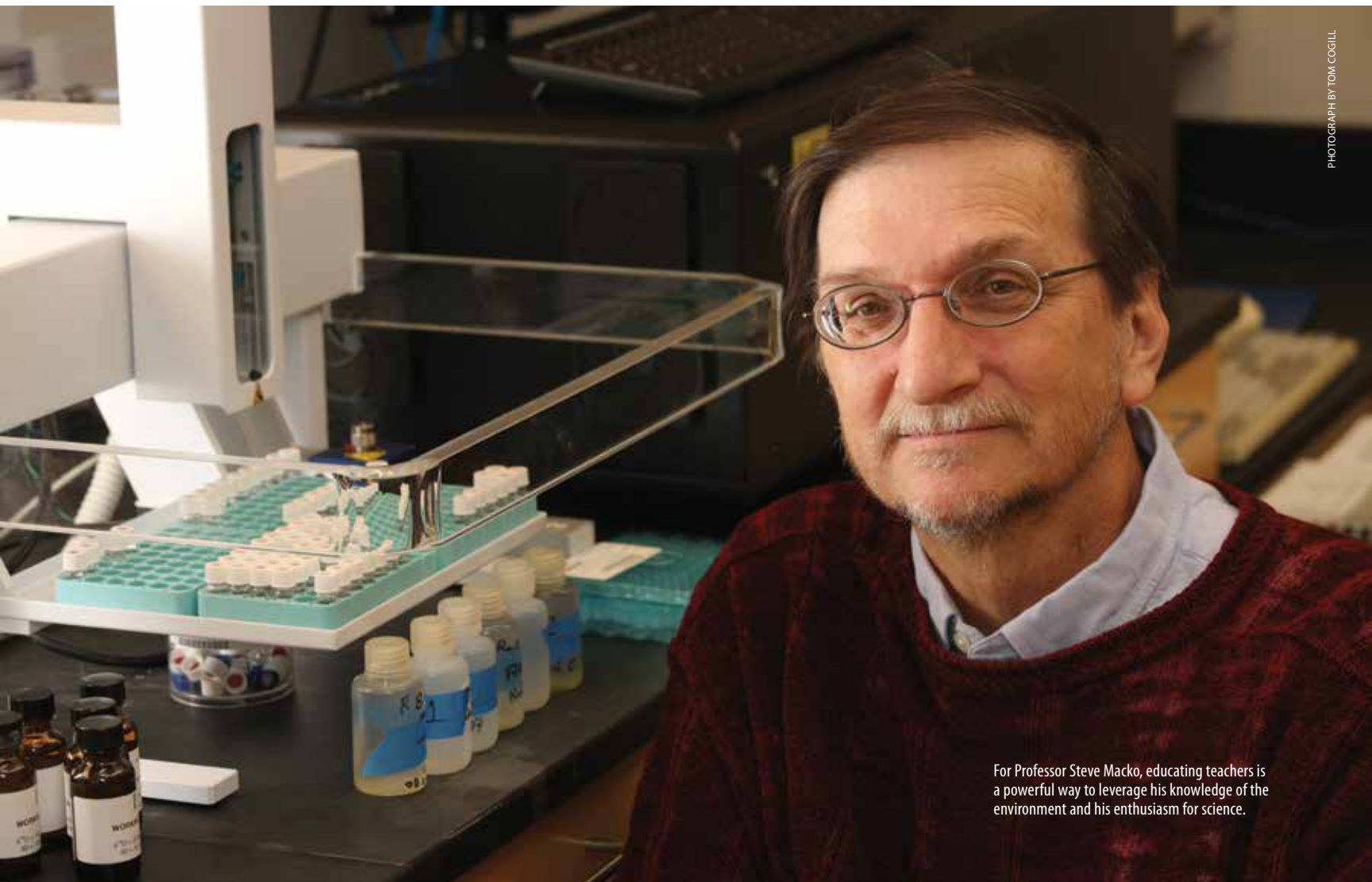
“The EGU considers GIFT an important element in its strategy of preparing the next generation of scientists and informed citizens,” Macko says. This year, Günter Bloeschl, the president of the organization, welcomed the participants. And the program is scheduled so participants have the opportunity to attend the EGU annual general assembly.

Macko is committed to the program because he sees education and outreach as a natural expansion of his science. “Researchers have a responsibility to stimulate others, especially students, to ask questions and seek answers,” he says. He views working with some of the best teachers in the world as an effective way to leverage his information and enthusiasm.

“The GIFT program operates at the interface between cutting-edge science and cutting-edge teaching,” Macko says. “It is through the work of these teachers that the public will better understand the role of science in helping society address pressing environmental problems.”

If You’re Interested

The topic for GIFT 2014 is “Our Changing Planet.” The workshops will feature discussions of the soon-to-be-released findings contained in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. A link to applications can be found at <http://www.egu.eu/outreach/gift/>.



PHOTOGRAPH BY TOM COGILL

For Professor Steve Macko, educating teachers is a powerful way to leverage his knowledge of the environment and his enthusiasm for science.



PHOTOGRAPH BY TOM COGILL

Thanks to a partnership between the University and the National Fish and Wildlife Foundation, graduate student Atticus Stovall has gained a greater appreciation for the challenges facing professional conservationists.

PILLAR 3:

Provide Educational Experiences That Deliver New Levels of Student Engagement

The University's strategic plan calls for innovations in education that encourage students to internalize knowledge and make it their own. In our department, one of the ways we do this is by creating opportunities for students to conduct their own research.

COMING FACE TO FACE WITH CONSERVATION PROFESSIONALS

Two years ago, the University joined forces with the National Fish and Wildlife Foundation (NFWF) to offer an advanced course on biodiversity conservation science and policy. This marked the beginning of a productive collaboration for both organizations that includes summer internship and fellowship programs. Graduate student Atticus Stovall is one of its beneficiaries.

A nonprofit organization chartered by Congress, NFWF tackles conservation issues, develops guidelines and specifies outcomes, and provides grants to public- and private-sector organizations to achieve these goals. It turned to the University to help provide the scientific guidance it needs to direct its funding effectively. For its part, the University saw the collaboration as an opportunity to align its research agenda with national needs and to expose students to strategies being used to preserve biodiversity.

Stovall signed up for Science and Policy of Biodiversity Conservation, a seminar offered jointly by the School of Law and the department, when he was an undergraduate. Instructors divide the students into multidisciplinary teams, each assigned to make recommendations about an ongoing NFWF project. Foundation staff involved in these initiatives come to Charlottesville and

introduce students to their work. "During the seminar, students get exposure to the challenges conservation professionals face," says Professor Hank Shugart, one of the faculty members for the course.

Stovall studied the foundation's bobwhite quail restoration project. Formerly abundant throughout the Southeast, the bobwhite quail are endangered by the introduction of cool-season grasses, which have transformed their habitat. Stovall and his team proposed targeting farmers to spearhead warm-season-grass restoration. "We felt this approach could have more impact because farmers are used to dealing with landscapes at large scales," he says.

NFWF also selected Stovall, now a graduate student, for a paid internship. He helped the foundation develop a GIS-based model that prioritizes funding opportunities for longleaf pine restoration sites in North Carolina. As part of his analysis, he attended a conference in southwest Georgia that brought together the top stakeholders in the project. "That might have been the most definitive moment in my career thus far," he says. "It helped me understand that to develop a coherent, efficient approach to solving a problem, you need to bring everyone involved together."



PHOTOGRAPH BY TOM COGILL

Professor Stephan De Wekker turned the development of an unmanned aerial vehicle for atmospheric observations into a student project. From left to right, environmental sciences graduate student Stephanie Phelps, Rahul Mukherji, De Wekker, and Nikita Dodbele. Mukherji and Dodbele are fourth-year engineering students.

REMOTE-CONTROLLED ATMOSPHERIC OBSERVATIONS

Our lives unfold in the atmospheric boundary layer, the portion of the atmosphere directly influenced by the Earth’s surface. It’s a dynamic zone. The cool breeze coming down off a mountain on a summer evening and the snow accumulating downwind from a lake in winter are all the result of boundary layer processes.

Their assignment: build a hexacopter from scratch and equip it with sensors.

Associate Professor Stephan De Wekker focuses on the way terrain and vegetation shape these processes. Currently, one of his principal research tools is a tethered helium balloon, which he equips with sensors to register changes in such variables as temperature and humidity as well as wind speed and direction. But as De Wekker points out, helium balloons have their drawbacks. They are time-consuming to set up and sometimes difficult to control. De Wekker learned that Doug Chestnut, a Web programmer in the University Library, had been using remote-controlled, multirotor vehicles for aerial photography. He decided that these devices could be adapted for atmospheric profiling.

At the same time, De Wekker sensed an educational opportunity. “I thought the process of adaptation would be interesting to engineering students,” he says. “I sent out an announcement describing our goals and asking for an assistant who would be paid a nominal salary.” Their assignment: build a hexacopter from scratch and equip it with sensors. De Wekker received so many volunteers that he ended up hiring four students.

“At the end of the summer, the students had built their first flying prototype and had conducted an assessment of the available sensors,” De Wekker says. “They also worked on systems that would enable the copter to communicate real-time data to ground stations.”

As word of De Wekker’s project got out, he was approached by Greg Lewin, a lecturer in the Department of Systems Engineering, and representatives of the Mitre Corporation, who were interested in integrating the hexacopter development project into the Engineering School’s Capstone program. “The next step will be to create a copter capable of autonomous, scheduled flight,” De Wekker says. “You could put it someplace, and it could take a series of observations on its own. That would be great.”

PILLAR 4:

Assemble and Support a Distinguished Faculty

A distinguished faculty is the starting point for a virtuous cycle that leads to better undergraduate and graduate students, higher research funding, and more engaged and committed alumni. The department is well placed in this regard. Our faculty includes winners of the prestigious Tyler and Hutchinson Awards as well as five professors who are among the most highly cited researchers in their fields.



PHOTOGRAPH COURTESY MATT REIDENBACH

Associate Professor Matt Reidenbach applies engineering concepts to coral reef ecology.

THE FUTURE OF CORAL REEFS

Associate Professor Matt Reidenbach brings the sensibility of a trained engineer to his investigations of coral reefs, employing such traditional engineering concepts as fluid dynamics and heat and mass transfer to illuminate reef ecology. Understanding their role is particularly critical in light of climate-driven changes in reef environments, including rising sea levels, increasing water temperatures, and growing ocean acidity. “The underlying question we are trying to address is how the changes we foresee in the physical environment will affect the health of our reefs,” Reidenbach says.

Coral reefs will start to bleach and die off as ambient temperatures rise. Working with undergraduate Angang Li, Reidenbach has used computer simulations to study Panama’s Bocas del Toro reef system. Their investigations show that coral growing in shallow areas and in areas with poor water circulation will feel the effects of rising temperatures first. “The flow environment really affects their sensitivity to warming,” he says.

Reidenbach also applies engineering principles to understanding the consequences of rising sea levels on sediment transport along beaches. His study of reefs off the Hawaiian island of Molokai suggests that as waters rise and reefs lose their capacity as breakwaters, there will be corresponding changes in sediment erosion and accretion along shorelines.

His analysis is complicated by coral die-off. By coupling his observations with ecology models, Reidenbach hopes to determine the effects of coral degradation on sediment budgets. Coral produce calcium carbonate, an important source of sand. As reefs die off, there will initially be more sand available for beaches, but when they are completely gone, this source of sand will ultimately disappear. “We’re trying to tie the physical models to the ecological models so we can become better at predicting these future scenarios,” he says. “If you build a hotel on a nice sandy beach, you’re going to want to know if that beach will be there in twenty years.”



Paolo D'Odorico is conducting pioneering research to determine the limits of global trade in evening out disparities in water resources.

WORLD WIDE WATER

Paolo D'Odorico's career illustrates both the inherently interdisciplinary nature of the environmental sciences and the growing breadth of his interests as a researcher. The Ernest H. Ern Professor of Environmental Sciences, D'Odorico is a hydrologist focusing on arid and semi-arid regions as well as wetlands, often in conjunction with atmospheric scientists, geologists, and ecologists. In fact, he is considered a pioneer in a subspecialty called ecohydrology. And while he continues to devote himself to these projects, D'Odorico has also begun to consider water issues more broadly. An emerging theme in his work is societal reliance on water resources and the globalization of these resources associated with the trade of food commodities.

“There have always been technological advances that enabled farmers to feed more people.”

Thanks to the range of his interests, the University named D'Odorico as one of the first two recipients of the its Distinguished Research Career Award. This new award is now the University's most prestigious—and certainly its largest—grant for research, totaling \$150,000 over three years.

D'Odorico will use these funds to continue his investigations into how water limitations could constrain food production and slow global population growth. “The idea that the availability of natural resources could restrict population growth is an old one,” he says. “But there have always been technological advances that enabled farmers to feed more people.” The latest innovation that D'Odorico cites is the growth of global trade, which allows people in countries where water is in short supply to import food produced in countries where water is more abundant.

Because food production accounts for nearly 80 percent of freshwater use, water shortages can easily disrupt this trade. In times of drought, water-rich countries lack surplus food for export. In response, water-poor countries have been trying to guarantee their food supplies by acquiring productive land in water-rich countries.

With the system stretched so thin, these efforts will eventually come up against a limit. D'Odorico's goal is to develop a general model that would help identify that point. “Most people think the water crisis is about a thirsty humanity,” D'Odorico says. “Ultimately, it is about a hungry humanity.”

PILLAR 5:

Steward the University's Resources to Promote Academic Excellence and Affordable Access

For an educational institution, wise stewardship means devoting its resources efficiently to create opportunity for learning and discovery. One way the department does this is by providing fellowships for graduate research, where relatively small sums can make a big difference. Creating these opportunities, however, requires sound management. For this, the department relies on the skill and judgment of its committed staff.

MAKING THE COMPLICATED SEEM EASY

When David Hondula, now a postdoctoral fellow at Arizona State University, submitted his dissertation this year, he made a point of acknowledging the department's staff. "They have made the administrative aspects of graduate school as streamlined as possible," he wrote. He thanked them "for making the complicated seem easy and the last minute seem like a long one."

In conveying his appreciation, Hondula simply expressed the high regard that is widely shared throughout the department. "I am grateful every day for the excellent staff we have in Environmental Sciences," says Professor Patricia Wiberg, the department chair. "We depend on their knowledge and dedication to keep the department running."

One reason that the department staff is so strong is its work ethic. Henry White, senior fiscal technician, is constantly looking for ways to learn more—about his job and those of his colleagues—so he can carry out his responsibilities more effectively. But White doesn't limit himself to managing the

department's sponsored research funding. Before the department moved to New Clark Hall, he helped pack up boxes and clean out offices so the construction could continue in Old Clark.

As assistant to the department chair, Cindy Allen supports the department's academic mission. As she says, "I don't make decisions; I help make decisions happen." She welcomes the diverse challenges of the job—and she especially relishes the opportunity to see a project to conclusion. "It's really satisfying when you put a lot of effort into a project and it comes out well," she says.

Longevity is another reason for the staff's effectiveness. White, Allen, and Gerald Williamson, the machine shop supervisor, have all been with the department for more than ten years. They stay, White and Allen say, because they feel supported. Allen notes that Associate Chair Dave Smith makes sure that "we all have what we need to do our job and he trusts us to do it well." And White cites the staff's close and cordial relationship with faculty as another reason. "They respect and value what we do," he says.



Gerald Williamson, Cindy Allen, and Henry White have all served the department for more than a decade.

PHOTOGRAPH BY TOM COGILL

SUPPORTING MORE-PRODUCTIVE GRADUATE RESEARCH

For a graduate student there is nothing more important—or more nerve-racking—than working on a master’s thesis or doctoral dissertation. After years of classroom study, students approach these projects as a first opportunity to make an independent contribution to scientific knowledge.

The department strives to provide these apprentice researchers with the support they need. In addition to guidance from faculty advisors, the department offers grants to help students conduct the preliminary research and to complete their projects. Each year, students compete for Exploratory Research Awards and more substantial Moore Research Awards.

Heather Sullivan’s Exploratory Research Award will enable her to use stable isotopes to determine residence times of plastic debris in surface ocean waters. “Large quantities of plastic find their way into our oceans each year” she says. “The environmental consequences are vast, ranging from entanglement of marine fauna to the widespread distribution of toxic compounds produced as plastic degrades.”

Sullivan is experimenting with using isotope analysis of degrading plastic as a geochronometer, giving researchers a sense

of the approximate time that the plastic has been in the ocean. Working with Professor Steve Macko, she is comparing plastic degradation in freshwater and marine environments. “It happens remarkably quickly in saltwater,” she says.

Alia Al-Haj received a Moore Research Award to develop data that help guide the eelgrass restoration project currently under way in Hog Island Bay, part of the Virginia Coast Reserve. Until the hurricane of 1933 completed the work of a wasting disease, the bottom of Hog Island Bay had been covered by eelgrass. Researchers at the department’s Long-Term Ecological Research program and the Virginia Institute of Marine Science are reseeded the bay, giving them an opportunity to assess the ecosystem-level effects of a rapid return to its original state.

Working with Professor Karen McGlathery, Al-Haj is determining how the maximum and minimum depths for eelgrass change depending on the light environment in the water column and its temperature. She used her Moore Research Award to purchase sensors she needed to conduct her experiments. “Support from the department was really important,” she says. “It enabled me to create a model that could be applied to the restoration.”

Heather Sullivan and Alia Al-Haj are among the eleven graduate students who received departmental research awards this year.



Awards, Appointments, and Publications

UNDERGRADUATE STUDENTS

The department recognizes fourth-year students who have done outstanding work in each of the environmental sciences. This year, the Mahlon G. Kelly Prize in ecology went to **Bernice L. O'Brien**, and the Michael Garstang Atmospheric Sciences Award went to **Holly J. Rich**. **Angang Li** won the Hydrology Award, and **John M. Wilks** received the Wilbur A. Nelson Award in geosciences.

The Departmental Interdisciplinary Award for the undergraduate major who has excelled in interdisciplinary environmental sciences research was presented to **Hilary C. Wayland**. She was also this year's winner of the Joseph K. Roberts Award, given to a student who presents the most meritorious research paper at a national meeting. In addition, Ms. Wayland received the Wallace-Poole Prize, awarded each year to the graduating student majoring in environmental sciences who has at least a 3.8 GPA and who is judged the most outstanding student in the class. Finally, the department recognized her for making the best undergraduate student poster at the 29th annual Environmental Sciences Student Research Symposium.

Participating in the College's Distinguished Majors Program, designed for highly qualified students with an overall GPA of 3.4 or above, the department selected **Arachaporn Anutaliya**, **Meredith E. Nelson**, **Clark E. O'Bannon**, **Nancy J. Peterson**, **John P. Rippe**, and **Hilary C. Wayland** as distinguished majors.

Matthew F. Mann was this year's recipient of the Richard Scott Mitchell Scholarship, which provides \$1,800 to a rising fourth-year student who is focusing on geoscience and has completed Fundamentals of Geology and two other advanced courses in geoscience, preferably including mineralogy or petrology.

The Bloomer Scholarship provides an \$1,800 award to an outstanding undergraduate environmental sciences major with a focus on geology. This year's winner was **Catherine A. Pearson**.

The Raven Society, the most prestigious honorary society at U.Va., inducted **Staige E. Davis** and **Melissa E. Reardon**. The department also recognized Ms. Davis for making the best undergraduate student presentation at the 29th annual Environmental Sciences Student Research Symposium.

GRADUATE STUDENTS

David M. Hondula was the winner of the Maury Environmental Sciences Prize, the department's premier award, established by Dr. F. Gordon Tice in 1992. It recognizes and honors outstanding undergraduate or graduate students for their contributions to environmental sciences, their ability to communicate their findings, and their efforts to promote a better understanding of the environment. Mr. Hondula was also the recipient of the 2012–13 Frank Finger Graduate Teaching Fellowship Award. Awarded annually to a teaching assistant in the College and Graduate School of Arts & Sciences, this fellowship recognizes stimulating and organized classroom teaching. In addition, he received the department's Fred Holmsley Moore Teaching Award, bestowed on a graduate teaching assistant distinguished by the ability to instill excitement, wonder, and confidence in students. An endowment set up by Fred H. Moore funds this award, along with matching donations from Mobil Oil Company. He also won the Graduate Student Research Publication Award for a manuscript accepted by a peer-reviewed journal as first and corresponding author.

Established by the Thomas Jefferson Chapter of Trout Unlimited, the Trout Unlimited Award is for "significant contributions to research concerning cold-water fisheries or related ecosystems." This year's recipient was **Andrew L. Robison**, for his research on long-term trends in stream water temperature and acidity as part of the Shenandoah Watershed Study.

The department offers a series of awards honoring outstanding graduate students in each specialty of environmental sciences. This year, **Alia N. Al-Haj** earned the Graduate Award in Ecology, **Kyle F. Davis** won the Graduate Award in Hydrology, **Alexander M. Morgan** won the Arthur A. Pegau Award in geoscience, and **Stephanie P. Phelps** won the Michael Garstang Graduate Award in Atmospheric Sciences. **Michael V. Saha** received the Ellison-Edmundson Award for Interdisciplinary Studies.

Rosemary L. Malfi received the Thomas Jefferson Conservation Award, which supports basic research related to the conservation of the earth's resources.

Amy E. Grady was honored for making the best graduate student poster at the 29th annual Environmental Sciences Student Research Symposium. **Rosemary L. Malfi** made the best graduate student presentation.

This year, **Alia N. Al-Haj**, **Anne E. Dunkel**, **Jonathan A. Walter**, **Grace M. Wilkinson**, and **Gerald R. Woodworth** won Moore Research Awards. Based on merit, these awards were initiated to help sponsor the dissertation and thesis work of environmental sciences graduate students. **Stephanie Cruz Maysonet**, **Melissa S. Duvall**, **Kyle A. Emery**, **Allison M. Leach**, **Elizabeth A. Murphy**, and **Heather M. Sullivan** received Exploratory Research Awards, meant to support preliminary research leading to a thesis or dissertation proposal.

Allison M. Leach and Professor **James Galloway** were honored by the editors of *Environmental Development* for producing the best research paper of 2012.

Three graduate students won awards at the 13th Annual Robert J. Huskey Graduate Student Research Exhibition, which showcases outstanding graduate research in the College and Graduate School of Arts & Sciences. **Rosemary L. Malfi** was the oral presentation winner in the biological and biomedical sciences, **Andrew L. Robison** was the poster session winner in the physical science and mathematics category, and **Heather M. Sullivan** was the poster session winner in the physical science and mathematics division.

STAFF

Cynthia B. Allen received the Graduate Student Association Award, which recognizes members of the department who, through their efforts, have been particularly helpful to the graduate student body. She also won the Environmental Sciences Organization Award, given to a member of the department who has been particularly helpful to undergraduate majors.

Elizabeth A. McFadden received the Chair's Award, which recognizes an individual who has performed extraordinary service to the department.

FACULTY

We are proud to have five faculty members—**Jack Cosby**, **James Galloway**, **Michael Pace**, **William Ruddiman**, and **Hank Shugart**—designated highly cited researchers by the Institute for Scientific Information. Highly cited researchers compose less than one-half of 1 percent of all publishing scientists.

Linda Blum is secretary of the Coastal and Estuarine Research Federation. She serves on the National Research Council's U.S. Army Corps of Engineers Water Resources Science, Engineering, and Planning Committee. At the University, she is a member of the Arts & Sciences Faculty Rules Committee.

Robert Davis is an invited contributor to the Intergovernmental Panel on Climate Change. He was inducted into the Raven Society in spring 2013. The Raven Society is the University's most prestigious honorary society. Professor Davis is also a Jefferson Scholars Program adviser.

Stephan De Wekker is associate editor of the *Journal of Applied Meteorology and Applied Climatology*.

Paolo D'Odorico, the Ernest H. Ern Professor of Environmental Sciences, was selected as one of two inaugural winners of the University's Distinguished Research Career Award, which recognizes U.Va.'s most promising and creative new full professors. He also received the department's Maury-Tice Prize for research excellence. Professor D'Odorico serves as editor of *Geophysical Research Letters* and as a member of the Provost's Promotion and Tenure Committee at the University.

Howard E. Epstein is associate editor of *Plant Ecology and Ecosphere*. At the University, he is a faculty advising fellow and serves on both the Study Abroad Committee and the Committee on Budget and Personnel Policy for the College and Graduate School of Arts & Sciences. He also codirects the College Science Scholars program, serves as a mentor for the Excellence in Diversity Fellows Program and is a member of the Vice President for Research's Internal Review Committee.

James N. Galloway, the Sidman P. Poole Professor of Environmental Sciences, is a trustee of the Marine Biological Laboratory at Woods Hole, Massachusetts, and continues to serve as a member of the Board of Trustees of the Bermuda Biological Station and the International Nitrogen Initiative Steering Committee. He is also a lead author of the Intergovernmental Panel on Climate Change's Working Group 1 and a coordinating lead author of the U.S. National Climate Assessment. The editors of *Environmental Development* cited Professor Galloway and graduate student Allison M. Leach for producing the best research paper of 2012.

Bruce Hayden is chair of the national Long Term Ecological Research Climate Committee. He is associate editor of the *Journal of Climate Research*.

Janet S. Herman is president of the Karst Water Institute. She also serves as a councilor of the Geological Society of America and the International Association of GeoChemistry. At the University, Professor Herman is a member of the Faculty Senate and the Faculty Advisory Committee on Education Abroad in the office of the Vice President for International Programs.

Alan D. Howard serves as president of the Earth and Planetary Surface Processes Focus Group of the American Geophysical Union. He received a Lifetime Achievement Award at the annual Community Surface Dynamics Modeling System meeting.

William Keene has an Intergovernmental Personnel Act rotator position with the National Science Foundation as director of the atmospheric chemistry program. In addition, Professor Keene serves as the department's representative to the Faculty Senate and is a member of the General Faculty Council.

Deborah Lawrence is an adviser to the U.S. Agency for International Development on SilvaCarbon, the U.S. contribution to the GEO Forest Carbon task. She is also a trustee of the Virginia Chapter of The Nature Conservancy. Professor Lawrence is a member of the Faculty Senate and serves the College and Graduate School of Arts & Sciences as a member of the committee charged with hiring ten new faculty members under a grant from the Andrew W. Mellon Foundation. In addition, Professor Lawrence received a Nucleus grant from the University's Teaching Resource Center. The Nucleus program is designed to help faculty improve STEM education in introductory-level courses.

Manuel Lerdau was a 2012 climate science fellow of the American Association for the Advancement of Science. He serves as an associate editor of *Oecologia* and is a member of the academic board of the University's Morven Summer Institute.

Stephen A. Macko serves as an associate editor of *Amino Acids* and *Science of the Total Environment*. He is a member of the editorial board of *Environmental and Analytical Toxicology* and the education editorial board of *Eos, Transactions of the American Geophysical Union*. In addition, Professor Macko is a member of the Program Committee of the American Geophysical Union as well as the Committee on Education of the European Geoscience Union. He is a convener of the EGU's Geosciences Information for Teachers workshop.

Karen J. McGlathery serves as the lead principal investigator of the Virginia Coast Reserve Long Term Ecological Research (LTER) program. She sits on the national LTER Executive Council and the Science Council and is associate editor of *Ecosystems*. She is a member of the Research Council of the Office of the Vice President for Research.

Aaron L. Mills is a member of the Faculty Senate Steering Committee and the Assessment Advisory Committee.

Jennie Moody is a member of the Board on Oceans and Atmosphere of the Association of Public and Land-Grant Universities' Commission on Food, Environment and Renewable Resources. She is also the University of Virginia's representative to the University Corporation for Atmospheric Research.

Michael Pace is associate editor of *Ecosystems and Limnology and Oceanography e-Lectures*. He is a coorganizer of the 2015 annual meeting of the Association for the Sciences of Limnology and Oceanography, which will be held in Grenada, Spain. At the University, he is a member of the Dean's Promotion and Tenure Committee.

John Porter is a member of the national Long Term Ecological Research (LTER) Network Information System Advisory Committee.

G. Carleton Ray is a member of the Board of Trustees of the Bahamas National Trust and a longtime member of the editorial board of *Aquatic Conservation: Marine and Freshwater Ecosystems*.

Matthew Reidenbach is a fellow of the University's Brown College.

Todd Scanlon is an associate editor of *Water Resources Research*.

Herman H. Shugart, the W. W. Corcoran Professor of Environmental Sciences, is associate editor of *Research Letters in Ecology* and a member of the editorial boards of the *Eurasian Journal of Forest Research*, the *International Journal of Ecology*, and the *International Journal of Environmental Protection*. He serves on the Biological and Environmental Research Advisory Committee of the Office of Science in the U.S. Department of Energy and is a member of MEDEA, the special advisory committee to the Defense Intelligence Agency on the environment. In addition, Professor Shugart is a member of NASA's Advisory Council's Subcommittee on Earth Science and is the chief scientist for the Northern Eurasia Earth Science Partnership Initiative. At the University, he serves as a member of the Energy Sustainability Leadership Group and the Morven Advisory Committee. He is also a member of the Undergraduate Excellence Committee and the Board of Directors of the University of Virginia Press.

David E. Smith serves the University as a member of the Executive Leadership Network, the Facility Management Advisory Board, the Process Simplification Advisory Committee, and the Committee on Undergraduate Admissions.

Robert J. Swap was named 2012 Virginia Professor of the Year by the Carnegie Foundation for the Advancement of Teaching and the Council for the Advancement and Support of Education, known as CASE. The U.S. Professors of the Year program honors the most outstanding undergraduate instructors in the country.

Vivian Thomson is director of the U.Va. Panama Initiative as well as the Environmental Thought and Practice interdisciplinary major.

Patricia Wiberg is chair of the department. She serves as the steering committee chair of the National Science Foundation's Community Surface Dynamics Modeling System (CSDMS).

PEER-REVIEWED PAPERS, BOOK CHAPTERS, AND BOOKS (Summer 2012 through 2013)

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ENVIRONMENTAL SCIENCES
University of Virginia
291 McCormick Road
P.O. Box 400123
Charlottesville, VA 22904-4123



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