UNIVERSITY OF VIRGINIA
ENVIRONMENTAL SCIENCES
291 McCormick Road
P.O. Box 400123
Charlottesville, VA 22904-4123

Nonprofit
Organization
U.S. Postage PAID
Permit No. 164
Charlottesville, VA
22904-4123

ENVIRONMENTAL SCIENCES
AT THE UNIVERSITY OF VIRGINIA

SCIENCE FOR THE PUBLIC GOOD

2024–25

Year in Review

FSC
www.fsc.org
MIX
From responsible sources
FSC® C000000

ANDREW D. CORSO

The Department of Environmental Sciences

ESTABLISHED IN 1969, the University of Virginia's Department of Environmental Sciences was one of the first to look at fundamental environmental processes from a multidisciplinary perspective and the first in the nation 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 several 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 nearby Fluvanna County, and the Blandy Experimental Farm near Front Royal, Virginia.

PUBLISHER AND WRITER: Charlie Feigenoff DESIGN: Roseberries EDITING: Rosalind Hingeley PHOTOGRAPHY: Tom Cogill unless noted otherwise.

Pictured on the cover: A research group sets out at the Virginia Coast Reserve Long-Term Ecological Research site. PHOTO BY AMELIE BERGER

FROM THE CHAIR

As someone immersed in the day-to-day operations of the department, I know from experience how easy it is to overlook what an exceptional group of scientists we've assembled. Scott Doney's election to the National Academy of Sciences this year, joining Jim Galloway, underscores this point. Of the eight members of the academy at the University, two are in our department.

This level of distinction is not limited to senior faculty. This year, two associate professors were singled out for recognition. Sally Pusede earned a Presidential Early Career Award for Scientists and Engineers from the Biden administration and Kevin Grise garnered an Award for Excellence in Teaching from UVA's Jefferson Scholars Foundation. Following in their footsteps is a group of exceptional young faculty. We have been fortunate in being able to hire five assistant professors in the last three years—and they are already making their mark.

Members of the department have been conducting research that contributes to the public good. To cite just one instance, Environmental Sciences faculty members are participating in Virginia's two National Science Foundation's Coastline and People projects, one focused on the rural Eastern Shore (headed by Karen McGlathery) and the other anchored in Norfolk. Together, they attracted $10 million in funding. Faculty members work with local communities to conduct research that will help policymakers make informed decisions in response to climate change.

Perhaps the department project that best epitomizes the excellence of our research and its value to the public is the Long-Term Ecological Research program that we administer at our Coastal Research Center. Thanks to the quality of this effort, the National Science Foundation has continually funded the project since 1987 and this year renewed our grant for the eighth time.

In short, I am honored to chair a dynamic and vigorous department at the forefront of environmental research whose faculty is committed to serving the public.

Matt Reidenbach
Chair

TEN YEARS
OF DEPARTMENT LEADERSHIP

Between them, recently retired Professors **Patricia Wiberg** and **Michael Pace** served as department chairs for a decade, Wiberg from 2009 to 2014 and Pace from 2014 to 2019. Wiberg led the department during the post-recession hiring freeze and budget cuts. "The University and College did their best, but the reality was that we had to live close to the bone," she says. With the economy recovering, Pace had the opportunity to make up for lost time. While Wiberg was limited to a single hire, Kevin Grise, Pace recruited a new generation of scientists—Sally Pusede, Xi Yang, Ajay Limaye, Max Castorani, and Lauren Miller—while adding strength at the senior level, successfully recruiting Lawrence Band and Scott Doney.

Regardless of circumstances, both made it a priority to create a congenial department where everyone felt valued and supported. "I was extremely interested in the culture of the department, sustaining a warm collegial atmosphere as well as a strong research and teaching mission," Pace says.

TRACKING SEDIMENT

Wiberg and Pace took different routes to the University. Wiberg arrived at the beginning of her career in 1990. A coastal oceanographer, she studies interactions between the hydrodynamic environment and the sediment below with a focus on how disturbances such as storms, sea-level rise, and warming water temperatures affect coastal areas. She concentrated initially on the continental shelves, thanks to a series of collaborative, multi-investigator awards she received from the Office of Naval Research, but within months of her arrival she began conducting research at the Virginia Coast Reserve Long-Term Ecological Research (VCR-LTER) program. Except for Research Associate Professor John Porter, Wiberg has been active there longer than anyone else in the department.

For Wiberg, the ideal project combines observations and computer modeling, leveraging the complementary strengths of each. Observations help refine models, while models suggest avenues for further observation. Wiberg combined both techniques, for instance, to highlight the importance of storm surges in providing salt marshes the sediment they need to keep pace with rising waters. "Marshes need sediment to accrete at a rate that is comparable to sea-level rise," she says. "In shallow lagoonal systems such as Virginia's coastal bays, normal tides alone are not sufficient." Work like this has earned Wiberg a series of honors. She is a fellow of the American Geophysical Union as well as of the American Association for the Advancement of Science (AAAS).

MARGOT BJORING

Patricia Wiberg

Michael Pace

Both made it a priority to create a congenial department where everyone felt valued and supported.

FOCUSING ON THE FOOD WEB

Pace had been a scientist at the Cary Institute of Ecosystem Studies for more than 20 years when he joined UVA. An independent nonprofit, Cary focuses exclusively on ecology. "I was thinking about what I wanted to do for the last phase of my career," Pace says. "Moving to UVA gave me the opportunity to move to an interdisciplinary setting. And having graduated from UVA, the opportunity to work with students in a familiar residential setting was appealing."

After arriving, Pace continued to conduct experiments on a paired-lake system in Michigan's Upper Peninsula along with colleagues from the University of Wisconsin. Although similar in size and origins, the lakes are independent, making it possible for researchers to test hypotheses by manipulating conditions in one lake and using the other as a control. For instance, by introducing new aggressive fish to one lake, Pace was able to isolate the warning signs of an impending state change in its food web.

At the same time, Pace became increasingly involved in coastal research at the VCR-LTER, partnering with scientists from several disciplines on its pioneering seagrass restoration project. Among other discoveries, he has demonstrated that seagrass at the center of a meadow recovers more quickly from disturbances than seagrass at its edges.

Pace capped his career in 2025 by being presented with the A. C. Redfield Lifetime Achievement Award from the Association for the Sciences of Limnology and Oceanography (ASLO). He previously won its G. Evelyn Hutchinson Award and is also a fellow of the AAAS.

KEEPING THEIR HANDS IN

Although Pace and Wiberg are enjoying the freedom that retirement brings—Wiberg is looking forward to an extended trip to New Zealand and Australia, and Pace has intensified his bike riding—they are both continuing to pursue their research. "I like to say that I'm being my own postdoc," Wiberg says. "I finally have the time to tackle projects I've been thinking about doing for quite some time." ■

A FOCUS ON FIRE

"Going forward, I would like to explore how this delayed mortality affects the global forests and land carbon cycle."

Wildfires are growing dramatically in size. In 2024, wildfires in the United States destroyed almost 9 million acres, an area roughly the size of Massachusetts. This was more than three times the area destroyed in 2023. And thanks to an expanding wildland-urban interface, they have become more deadly and destructive than in the past. Together, the 2018 Camp Fire in Northern California, the 2023 Lahaina Fire in Maui, and the 2025 Palisades and Eaton Fires in Los Angeles destroyed more than 37,000 homes, commercial buildings, and other structures and killed 218 people.

Predicting where those fires are going to break out across the contiguous United States (CONUS) is not easy—but it is a challenge that Assistant Professor **Huilin Huang** is taking on. Physics-based fire models, which describe fire ignition and spread using physical equations, work well for fires that are little affected by human activities. However, they perform poorly in regions where fires, weather, and humans interact in complex ways.

To address this failing, Huang and her colleagues at Pacific Northwest National Laboratory have integrated into the Department of Energy's physics-based Earth System Model a machine learning–based model with specific advances in predicting fires ignited by transmission line outages and agricultural activities. "We have found that integrating the machine learning model significantly improves burned-area predictions over the CONUS, both spatially and temporally," Huang says. The framework could also be adapted to predict fire-induced power outages.

YE LIU

Huilin Huang

DELAYED DAMAGE

Standing deadwood is an obvious consequence of wildfires, but Huang is also interested in tracking long-term impacts on forest ecosystems, particularly delayed tree mortality. In a recently published paper, she revealed that a high proportion of trees that initially survived fires in the Pacific Northwest are more susceptible to drought, hot weather, and insect attacks, conditions exacerbated by climate change. "Going forward, I would like to explore how this delayed mortality affects the global forests and land carbon cycle," she says.

Now at Virginia, Huang is ready to expand her wildfire work to East Coast locations like Georgia and North Carolina, where prescribed burning is widely used to maintain forest health and reduce the risk of extreme wildfires. She is continuing to work with colleagues in the Northwest and is interested in expanding her work to examine the impact of fire aerosols on health and agricultural productivity. "I've found that people at UVA are very open to collaboration," she says. ■

RECOGNIZED AS ONE OF THE NATION'S MOST ACCOMPLISHED SCIENTISTS

EVAN KUTSKO

"Scientists can't be effective unless they can communicate their science clearly and concisely to policymakers, to business leaders, and to the general public."

Election to the National Academy of Sciences (NAS) is considered one of the highest honors a scientist can receive. After a rigorous nominating, vetting, and balloting process, the NAS elects no more than 120 new members annually from among thousands of potential candidates. This year, **Scott Doney** became the second member of the department to be elected to the NAS, joining Jim Galloway. The department is now the only one at the University with two NAS members, a quarter of the University's members.

Although his work has taken him to locations around the world, Doney spends less time in the field than he does behind his computer applying his skills in numerical modeling and data analytics to regional- and global-scale questions. At heart, Doney is a synthesizer with an appetite for combining disparate and often complex systems into models designed to replicate the complexity of real-world systems. "Using models and data analysis for me is a means to represent big systems in ways that allow us to make predictions about how they are going to evolve over time," he says.

COMPLEX QUESTIONS REQUIRE DIVERSE TEAMS

Doney joined the department in 2017 as the inaugural Joe D. and Helen J. Kington Professor in Environmental Change, after serving for 15 years as a scientist at the Woods Hole Oceanographic Institution. One of the factors that led him to UVA was the University's openness to collaboration. Since he arrived, he has been working with Andres Clarens, a civil and environmental engineer, and William Shobe, director emeritus of the Center for Economic and Policy Studies at UVA's Weldon Cooper Center for Public Service, exploring ways to sequester carbon dioxide from the atmosphere. "We are using an integrated assessment model to compare different options," Doney says. "Andres and Bill focus on determining if the methods we look at are technically and economically feasible, while I use my natural science expertise to understand how they will fit into the carbon cycle."

Doney has a long history of collaboration. He is a co-principal investigator at the Palmer Station Antarctica Long-Term Ecological Research site, and he has done extensive research on the Southern Ocean. The West Antarctic Peninsula, where Palmer Station is located, is a fast-warming region with declining sea ice, leading to shifts in the ecosystem, including phytoplankton blooms, nutrient drawdown, impacts on fauna, and phenological changes. Doney has been investigating seasonal cycles in sea-ice formation and how they affect mixing in the water column. He has used data generated by autonomous sensors in the winter as well as by expeditions during the summer research season. The model he and his colleagues developed was successful enough that they were able to add a plankton model, which allowed them to assess how plankton growth has been affected by changes in the sea ice. "We are trying to figure out where this system is headed, physically, chemically, and biologically," he says.

One reason Doney finds election to the NAS so humbling is his awareness that his work depends on collaboration. "Election to NAS doesn't represent me as much as all the people I have worked with," he says. "That includes the people who mentored me, my peers, and my research team over the years."

UNDERSTANDING POLICYMAKING

Doney has taken time out from his research to devote himself to professional and public service, joining scores of committees and working groups for federal agencies. He was, for instance, on the original science team for NASA's Orbiting Carbon Observatory, which launched successfully in 2014. "I like working on big problems, and they typically require sophisticated infrastructure," he says. "If I want to pursue them, I have to step up."

Doney has also testified before Congress and spent a year and a half working at the White House Office of Science and Technology Policy as assistant director for ocean climate science and policy. He was co-chair of the Ocean Climate Action Plan workgroup and the Ocean Justice Strategy workgroup, among other responsibilities. "I'm interested in environmental science because it is directly relevant to societal decisions," he says. "But scientists can't be effective unless they can communicate their science clearly and concisely to policymakers, to business leaders, and to the general public. That means I have to understand more about how policy is made." ■

NAOMI MANAHAN

ON THE SAME **WAVELENGTH**

For his doctorate at Columbia, **Darren McKee** traveled to the Long-Term Ecological Research (LTER) site at Palmer Station, Antarctica. He studied the physical constraints that determine how warm currents well up from the deep ocean as they reach the continental shelf surrounding the West Antarctic Peninsula. "The deep waters that flow around the Antarctic continent have a lot of heat that can melt glaciers that terminate over the ocean and thus contribute to sea-level rise," he says. "Understanding the processes involved and how they might change as the climate warms is important."

While there, McKee had the opportunity to meet Scott Doney, the LTER's co-principal investigator. "I realized that I wanted to transition to more interdisciplinary work, in particular thinking about how small-scale currents can influence ocean biology in the sun-lit surface layer," he says. Having admired Doney's ability to tackle interdisciplinary problems as well as the breadth of his expertise, McKee approached him. After they explored common interests, Doney agreed to bring McKee on as a postdoc.

"Being nudged not to stray too far off course was really valuable."

While working with Doney, McKee participated in three main projects, all examining the way ocean currents influence the growth and accumulation of phytoplankton, which provides the foundation for the food web. They used remote sensing data from satellites as well as data collected by autonomous ocean-profiling floats to track patches of chlorophyll, which serves as a proxy for phytoplankton.

As an advisor, Doney encouraged McKee to work independently while keeping him on track. "As I was switching from physical to more interdisciplinary oceanography, being nudged not to stray too far off course was really valuable," McKee says. In addition to helping McKee refine and sharpen his scientific writing skills, Doney encouraged him to pursue opportunities that would raise his visibility in the scientific community, such as joining a group that works on the profiling floats he used. "Scott didn't push any particular professional path," McKee says. "He listened to my interests, offered his thoughts on my goals, and helped me work toward them."

McKee is a currently back at Columbia as a lecturer in discipline, developing his teaching skills. At the same time, he is continuing his research, building on questions he explored while at UVA. ■

THE NSF RENEWS THE DEPARTMENT'S VCR-LTER GRANT FOR THE EIGHTH TIME

The Department of Environmental Sciences has administered the Virginia Coast Reserve Long-Term Ecological Research project (VCR LTER) since its inception in 1987. It is one of 26 sites in the LTER Network established by the National Science Foundation (NSF) in 1980 to support sustained ecological investigation across Earth's major ecosystems—from mountains to sea, tropics to poles.

After a rigorous competitive process, NSF renewed the department's grant in May for the eighth time, providing $7.6 million over six years to fund ecological research in coastal Virginia by scientists at UVA and seven partner universities. The renewal reflects VCR LTER's pioneering discoveries, datasets, research community, and vision. Associate Professor **Max Castorani**—one of three principal investigators—will assume direction of the program in 2026 from Professor **Karen McGlathery**, who has led VCR LTER since 2004. The pair are joined in running the project by Professor **Matthew Reidenbach**.

The LTER Program is unique in supporting investigations of how ecosystems work over decades.

CREATING A FIRM FOUNDATION FOR ECOLOGICAL SCIENCE

NSF founded the LTER Program with the recognition that site-based research over long time periods is essential to unraveling ecological patterns and processes, which often involve long-lived species, delayed effects, and rare but consequential events. "Most studies in ecology are short—a few years at most," Castorani says. "The LTER Program is unique in supporting investigations of how ecosystems work over decades. Its long-term experiments and time series are unprecedented, and contribute to scientific discovery and applications to solve our most difficult environmental challenges."

VCR LTER epitomizes the scale at which these efforts are conducted. The VCR is framed by 14 barrier islands along the Atlantic coast of Virginia's Eastern Shore. With most land protected by The Nature Conservancy and public agencies, it is the longest stretch of coastal wilderness remaining on the East Coast. Because it is undeveloped and protected, this interconnected expanse of maritime forests, intertidal marshes, shallow lagoons, and barrier islands is ideal for long-term research on how climate drives ecological change.

VCR LTER stands out for providing the fundamental scientific knowledge that can be translated to environmental policy and practice. For instance, in 2001 a partnership of researchers and conservation practitioners restored seagrass meadows that once blanketed the lagoons. As the effort expanded to become the largest restoration of its kind, the project attracted faculty and students from many fields to study why recovery succeeded, how well the meadow removed carbon and nitrogen from the water, and how quickly fish and shellfish returned. Having this long-term project in place also made it possible to explore the ramifications of unexpected events. In 2015, when a marine heatwave decimated parts of the seagrass meadows, UVA scientists were ready. "Without the long-term research that had been conducted, we wouldn't have been able to capitalize so effectively on studying the impacts of heatwaves, which are now a central focus of our project," McGlathery says. "Sometimes, the best discoveries are surprises."

For the new grant, the team will continue its work on how storms, sea-level rise, and warming cause ecosystems to reach a tipping point and change from one ecological state to another—such as conversion of forests to marshland due to saltwater intrusion. It also takes a broader view of state change across the coastal landscape. At this regional scale, one idea researchers will explore is ecological compensation, a rebalancing of changes across ecosystems. For instance, as barrier islands move landward and overrun marshes, these areas lose carbon stored as peat. Will seagrass expansion in other parts of the lagoon compensate for this loss?

A JEWEL OF THE DEPARTMENT

The department has benefited from its long association with the VCR LTER, helping attract talented faculty and students and spark collaboration across fields. The site generates a broad range of research questions and provides a platform for interdisciplinary research and student training. "The LTER is a key part of what sets our graduate program apart," Castorani says. "Students can take advantage of the datasets, intellectual capital, and collaborations across the LTER network and with external partnerships we've built over the years. This broadens their perspective on how their research can translate into policy, practice, and public engagement. Working at VCR LTER has helped our students launch successful and fulfilling careers." ■

BUILDING ON GENERATIONS OF **RESEARCH**

With a prestigious National Science Foundation Graduate Research Fellowship, **Lauren Brideau** is studying how coastal ecosystems at the Virginia Coast Reserve Long-Term Ecological Research site (VCR LTER) are changing over time and how the restoration of seagrass leads to the recovery of fish and shellfish. Associate Professor Max Castorani is her advisor.

A primary driver of change across Virginia's coastal barrier landscape is island movement, Brideau says. "These low-lying systems are extremely dynamic. They are constantly shaped by wind and waves." Using datasets compiled from Landsat satellites, she has traced 40 years of barrier island ecosystem change. Her fellowship has also given her the time to conduct high-resolution drone surveys of Cobb Island, which has lost approximately half of its beach area over the last 40 years.

Brideau has found rapid habitat loss on Cobb Island, with island shrubs and grasses, intertidal marshes, and nearby underwater seagrasses buried by sand or drowned in deep water. But the situation varies across the region. "We are trying to understand how the entire landscape is evolving and what such rapid change means for the ecosystems it supports," she says.

MEASURING SEAGRASS HABITAT SERVICES

Despite some ecosystem loss from island movement, large-scale seagrass restoration across the lagoons over the last 25 years provides important habitat for young fish and invertebrates. Brideau and Castorani wanted to find out how much seagrass is needed to produce meaningful gains in habitat provisioning. Using a four-year dataset on seagrass biodiversity—collected by over 40 undergraduate students in Castorani's lab—she found that even modest levels of seagrass density support abundant animal communities.

"These projects help us understand how coastal landscapes are changing and at the same time provide insight on the value of seagrass and the importance of restoration" says Brideau. The projects also give her a sense of continuity: "One of the things I like about this work is that I am building on research started decades ago." ■

SOPHIA HOFFMAN

Conducting fish sampling at the LTER. Left to right: Max Castorani, Kinsey Tedford, Lauren Brideau, Ethan Kadiyala, and Maowei Liang.

SOPHIA HOFFMAN

Luke Groff

PAYING IT **FORWARD**

When **Luke Groff** was a child in rural Pennsylvania, he loved spending time wandering in the woods around his house, but he never thought about college or pursuing a career in environmental science. "I could name very few people I knew who had a degree, and I didn't really have a clear understanding of what college could mean," he says.

A fortuitous series of encounters changed his trajectory. In high school, he encountered the Pennsylvania College Advising Corps, a college preparatory program hosted by Franklin and Marshall College. When he arrived at Franklin and Marshall, he was taken under the wing of a mentor who took him to the Canadian Rockies for two field seasons and encouraged him to conduct a graduate-level research project for his honor's thesis.

Now a PhD candidate at UVA, Groff is working with Research Professor Peter Berg and Professor Karen McGlathery to determine how life in the sediment contributes to the amount of carbon that seagrass meadows store. He also secured a Virginia Sea Grant Graduate Research Fellowship to work with students at Eastern Shore Community College (ESCC). "I decided that I would like to create experiences for rural students that are like the ones that got me to where I am," he says.

ESCC recently added a capstone project to its graduation requirements—and Groff is studying whether mentored science capstones differ in their outcomes from a course- or job-based capstone. He and his ESCC collaborators are surveying between 80 and 90 students and interviewing 10 to 15 of them. Groff himself has mentored two at the LTER. "The initial group of mentored students reported increased confidence that they could thrive doing research," he said. "They were excited about their ability to contribute to the world of science in ways they care about and to trust their own excitement and curiosity when selecting a career." ■

DAN ADDISON

LAYING THE FOUNDATION FOR ENVIRONMENTAL JUSTICE

In 2021, Associate Professor **Sally Pusede** received an Early Career (CAREER) Award from the National Science Foundation (NSF) to find ways to use space-based sensing to understand air pollution at the neighborhood level and to show the potential of these techniques to inform policymaking. "Satellites are critical when working on the scale of neighborhoods because they collect data in places where there otherwise might be no record," she says.

It was on the strength of this work that the NSF nominated Pusede for a Presidential Early Career Award for Scientists and Engineers (PECASE). This is the highest honor given by the U.S. government to early-career scientists and engineers. The Biden administration confirmed her selection in January 2025.

LOOKING AT THE DATA THROUGH DIFFERENT LENSES

Working with graduate student Angelique Demetillo, now a postdoc at NASA, Pusede developed ways to use satellite data to distinguish different levels of a pollutant called nitrogen dioxide among neighborhoods. "The satellite sensor measures pollution in the entire column of air between it and the surface," she explains. "We need to distinguish the portion of pollution that's at the surface. We also need to determine how much information is lost because the satellite sensor is much like camera that can only take low-resolution pictures. Are we really seeing pollution differ from one neighborhood to another?" One way they did this was to compare the satellite data with data collected by low-flying aircraft using the same sensor.

They then applied these data to environmental justice issues, describing neighborhood-level disparities that affected low-income neighborhoods with nonwhite and Hispanic populations. These areas experienced significantly more nitrogen dioxide pollution than high-income areas with mostly white residents.

Pusede soon realized that she could determine neighborhood variability without resorting to the mathematical super-resolution techniques she had been using to process the satellite data. The drawback of these techniques is that while they enhanced the spatial detail of the satellite data, they lost information on how nitrogen dioxide pollution varied over time.

Teaming up with undergraduate Isabella Dressel, now a graduate student at MIT, Pusede looked at daily satellite observations, which resemble pixilated low-resolution pictures. This analytical advance meant that Pusede and Dressel could analyse the way pollution varied between neighborhoods and over time. They used this information to understand how inequalities affect other air pollution issues and to identify specific sources of emissions that cause disparities. For instance, they attributed nitrogen dioxide differences from weekdays to weekends in low-income neighborhoods to changes in diesel truck traffic.

Pusede and her colleagues published a paper stating that a 62% reduction in diesel emissions would decrease inequalities in nitrogen dioxide pollution when measured by race, ethnicity, or income by 37%. "When the Biden administration proposed new rules on diesel truck pollution, our work was widely cited in support of reducing emissions by 60%," she says. ■

RECOGNIZED FOR TEACHING EXCELLENCE

"It's really satisfying for me to see the students get excited about the material and have that 'aha' moment."

When Associate Professor **Kevin Grise**, an atmospheric scientist, arrived at the University in 2014, he knew that he would need to focus on teaching. "While in graduate school, I gave talks on my research and served as a teaching assistant, but I had little formal classroom experience," he recalls. Grise took advantage of the University's programs for younger faculty, compared notes with colleagues around the University, pored over student feedback, and gradually gained the skills necessary to have a real impact.

His diligence paid off. Ten years later, Grise was one of three faculty members selected by the Jefferson Scholars Foundation for its Award for Excellence in Teaching. "I was really surprised to be singled out," he says. "It was quite an honor."

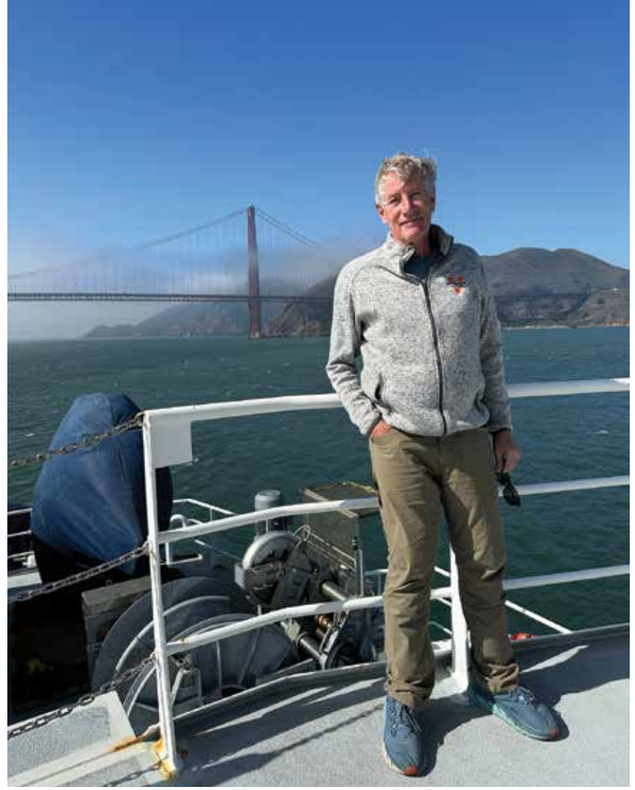
SYSTEMATICALLY DEVELOPING HIS SKILLS

Grise credits the University for dedicating resources to improve teaching. He was in the first cohort of the Ignite Program, which is offered by the University's Center for Teaching Excellence (CTE). "One of the things they taught us is not to sit in front of the class and lecture," he says. "Although I still do some lecturing, I've found ways to integrate interactive, hands-on activities that students find valuable." Grise also participated in the Advance Fellows program which brought together STEM faculty to discuss teaching strategies.

But Grise also learned through trial and error. Like many starting professors, Grise made the mistake of making his courses too difficult. "The tendency is to teach as though your graduate advisor is in the classroom rather than students who have never seen the material before," he says. Similarly, he underestimated the importance of practice problems, which he soon realized are critical for getting students up to speed.

Grise admits that he often overprepares, even after 10 years of teaching. In the award citation, Grise was praised for "preparing his materials months in advance to give himself the opportunity to think deeply about the organization of his courses and refine his approach." But these efforts are worth it for him. "It's really satisfying for me to see the students get excited about the material and have that 'aha' moment when things begin to fall into place," he says. ■

PETER BERG



PETER BERG

UNLOCKING DISCOVERY

Before Research Professor **Peter Berg** adapted eddy covariance for aquatic environments, this technique had been used exclusively to measure the exchange of gases between land surfaces and the atmosphere.Thanks to Berg's ingenuity and persistance, there is now a way for scientists to monitor such underwater processes as photosynthesis and respiration under natural environmental conditions. Aquatic eddy covariance is fueling discovery in a range of ecosystems, including lush seagrass meadows, coral reefs, and the deep ocean floor.

For his tireless work in refining and promoting this technology, the American Geophysical Union honored Berg by asking him to deliver the 2024 William S. and Carelyn Y. Reeburgh Lecture. Presented annually, the lecture recognizes a scientist who has made significant contributions to the fields of global biogeochemistry and marine geochemistry through novel measurements. In 2016, he was elected a fellow of the Association for the Sciences of Limnology and Oceanography for his achievements. "It has been gratifying to me to see aquatic eddy covariance being so widely adopted," Berg says. "Being named the Reeburgh lecturer validates its value."

> *"It has been gratifying to me to see aquatic eddy covariance being so widely adopted."*

OPENING OPPORTUNITIES FOR COLLABORATION

Berg is a mathematical modeler by training, specializing in transport processes like the leaching of nitrogen into groundwater. On a flight home from a stay at the Max Planck Institutes in Germany, where he worked closely with scientists employing eddy covariance on dry land, Berg had an epiphany. He realized that if eddy covariance could be adapted to aquatic environments, scientists would have a superior method to measure the exchange of gases between submerged ecosystems and the water column. Its fast sensors would produce measurements with the frequency needed to quantify the movement of water eddies and their changing concentration of substances like oxygen or carbon.

Berg returned to Germany to work with Max Planck colleagues to build the first aquatic eddy covariance system and has since spent his career refining the technique and training numerous scientists to use it. His expertise in the technique has led to the many varied collaborations that Berg has enjoyed. He has several upcoming projects investigating carbon cycling, one on the seabed beneath salmon farms in New Zealand and the other in the deep waters off the coast of California. "More and more people now understand that there is no other noninvasive technique that can give them the numbers they need," he says. ■

MAKING A DIFFERENCE FOR UNDERGRADUATES

As a graduate student and postdoctoral fellow at UVA, **Elise Heffernan** has always looked for opportunities to balance research and education. Under the direction of Professor Howie Epstein, she used remote sensing, large field datasets, and computer models to investigate the way the boreal forest in the Arctic is being affected by climate change. At the same time, she co-directed the department's undergraduate research mentoring program, helped advise students in the College's Distinguished Majors Program, and for several years served as a teaching assistant in the University's Writing Across the Curriculum program. "At the liberal arts college where I was an undergraduate, enrollment was small enough that faculty members could easily serve as mentors," she says. "At a much larger institution like UVA, it's up to graduate students to help play that role."

A fellowship from the Jefferson Scholars Foundation is enabling her to continue working with undergraduates while honing her teaching skills. She is using the opportunity to develop a seminar for the University's first-year Engagement program.

CREATING A MORE NUANCED VIEW OF ARCTIC CLIMATE CHANGE

The Arctic is warming nearly four times faster than the rest of the world—and Heffernan analyzed how vegetation is responding to this rapid warming. For her dissertation, Heffernan studied the transition zone between the boreal forest and Arctic tundra in Alaska and Northwest Canada. One of the important findings of her research is that precipitation and vapor pressure deficit, a measure of dryness, in the spring and fall are as important as summer temperature in determining whether the forest moves north.

PASSING ON HER ENTHUSIASM FOR THE PLANT WORLD

Heffernan works with undergraduates not simply to replicate her college experience, but also because she feels she has a responsibility, as a graduate student at a public University, to act as a mentor. "I feel I have an obligation to pass on knowledge as well as receive it," she says. She adapts her mentoring strategy to the individual student's goals. For instance, she invited students seeking a research experience to join her in analyzing Arctic data. For those who wanted to learn how to conduct literature reviews, she assigned weekly readings and discussion sessions. "UVA students are always so excited and enthusiastic about the material that it is really fun to work with them," she says.

Heffernan is also interested in helping students gain broadly applicable skills. Her participation in the Writing Across the Curriculum program inspired her to work with its director, Heidi Nobles, and computer scientist Briana Morrison to develop a Coding Across the Curriculum program.

With the University's Engagement program, Heffernan can combine her interest in education with her understanding of plants. As an educator, her challenge is to present this knowledge in an easily relatable context. Her solution: develop a course called Fact-Checking Food Science. "I've chosen edible plants as our avenue of discovery so that by the end of the class, students have a greater understanding of the history, culture, and science behind some of our most common foodstuffs," she says. "My goal is to have students start to take a closer look at plants in all their glory, nuance, and difference." ■

VAULTING INTO SCIENCE

The three years **Hanne Borstlap** spent as a child in Botswana set in motion a journey that has led her from her native Belgium to the United States and ultimately to graduate school at UVA. Borstlap's parents love the outdoors. When the European Space Agency sent Borstlap's father to Botswana to monitor remote sensing, they took time out to drive their camper van across southern Africa. "Traveling with my family and being immersed in nature was really formative for me," she says.

And while playing with local children, Borstlap discovered her talent for running, which led her to pursue track and field as a high school athlete back in Belgium. She ended up specializing in the pole vault. "I really love that pole vaulting is a complete sport, combining sprinting with gymnastics," she says. "You also have to be mentally tough. You have to master fear."

Although Borstlap was a stand-out junior athlete, she realized that she was not quite Olympic caliber. At the same time, she knew she was talented enough to vault for an American university—and was accepted at Princeton. "I thought I would try out the U.S. for a year and see how it went," she says. "I pretty quickly realized that Princeton is not the kind of place you stay for just a year."

Because Borstlap's interest in the natural world had intensified when she was in high school, majoring in civil and environmental engineering at Princeton was a natural choice—and she made the most of opportunities that came her way. Borstlap spent summer research internships at the Bermuda Institute of Ocean Sciences and the Scripps Institution of Oceanography. She also won an Outstanding Student Presentation Award from the American Geophysical Union.

MAPPING GROUNDWATER LEVELS AT THE EASTERN SHORE

At UVA, Borstlap is working with Professor Lawrence Band, one of the co-principal investigators on a National Science Foundation CoPe grant, which stands for Coastline and People Hubs for Research and Broadening Participation. Focused on the Eastern Shore, the CoPe project is creating a network of policymakers, community stakeholders, educators, and researchers to help Eastern Shore residents use science to make practical decisions about how they will respond to climate changes threatening their communities and their economy.

Borstlap focuses on shallow groundwater modeling. "Eastern Shore residents are contending with a variety of water issues," she says. "Depending on where you live, there's not enough water, too much water, water that's too salty, or water that's contaminated." With sea-level rise, groundwater levels are rising, threatening the septic systems that many residents rely on. These failing septic systems pose a public health risk, especially for marginalized communities relegated to low-lying land. Using an ecohydrological model, Borstlap is entering parameters for vegetation, soil type, and other variables that might affect the water table, creating a map of an Eastern Shore watershed that indicates areas at risk. "Such information could help communities document their need for funding to build sewers," she says.

> *"Part of being on a team is being able to communicate with people with different backgrounds. You don't have the option of not getting along with your teammates."*

Borstlap has found that some of the skills she developed as an athlete apply to her work on the Eastern Shore. "Part of being on a team is being able to communicate with people with different backgrounds," she says. "You don't have the option of not getting along with your teammates. On the Eastern Shore, we are working with people who often have a different understanding of the world—for instance, who may not believe in climate change. You must respect where they come from to begin to make a difference." ■

ALAMY

2024–25
AWARDS, ACTIVITIES, AND APPOINTMENTS

UNDERGRADUATE STUDENTS

The department recognizes fourth-year students who have done outstanding work in specific environmental sciences. This year, the Michael Garstang Atmospheric Science Award went to **Michael Nopper** and the Mahlon G. Kelly Prize in Ecology to **Caroline Speidel** and **Sophia Gibby**. The department presented its Hydrology Award to **Owen Himmel** and the Wilbur A. Nelson Award in geosciences to **Marion Donald**.

The departmental Interdisciplinary Award for the undergraduate major who has excelled in interdisciplinary environmental sciences research was presented to **Rachel Weghorst**.

Sara Kakatkar and **Samuel Wright** were selected to receive the Hart Family Award for Undergraduate Research in Environmental Sciences. It provides funds to assist full-time environmental sciences majors who are conducting a supervised research project.

Rebecca Wisnewski 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.

The Bloomer Scholarship, which provides $1,800 toward tuition, is given to an outstanding undergraduate environmental sciences major with a focus on geology. This year's winner was **Becca Adams**.

Audrey Yin received 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.

To be chosen for the College's Distinguished Majors program, students must achieve an overall GPA of 3.4 or above. This year, the department selected **Maggie Cox**, **Sophia Gibby**, **Alexander Laplace**, **Aleyna Loughran-Pierce**, **Jonathan Luu**, **Anna Makover**, **Hannah Russell**, **Owen Shaffer**, **Caroline Speidel**, **Megan Vander Wiele**, **Rachel Weghorst**, and **Maya Weiss** as distinguished majors.

GRADUATE STUDENTS

Rong Li was the winner of the Environmental Sciences Student Excellence Award, the department's premier award. Dr. F. Gordon Tice established the award in 1992 to foster environmental research and scholarship; 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.

Mirella Shaban received the department's Environmental Sciences Organization Award, which is given to a member of the department who has been particularly helpful to undergraduate majors.

The department offers a series of awards honoring exceptional graduate students in individual environmental sciences. **Lauren Brideau** earned the Hank Shugart Award in Ecology, **Heather Christensen** the George Hornberger Award in Hydrology, **Jun-Jie Chang** the Graduate Award in Atmospheric Sciences, and **Vidushi Sharma** the Arthur A. Pegau Award in Geoscience. **Robin Truong** received the Ellison-Edmundson Award in Interdisciplinary Studies.

The Exploratory Research Awards, based on merit, were initiated to help selected students conduct preliminary research leading to the development of a thesis or dissertation proposal. The recipients this year were **Elsie Liu**, **Willow Lovecky**, and **Kimberly Union**.

This year, **Lauren Brideau**, **Lucas Groff**, **Kelsey O'Donnell**, and **Henry Yeung** won Moore Research Awards. Based on merit, this award was initiated to help sponsor the dissertation and thesis work of environmental sciences graduate students.

Robert Joseph and **Sayali Kulkarni** won the Graduate Student Mentor Award.

Elise Heffernan won the Graduate Student Association Award, which recognizes members of the department who have been particularly helpful to the graduate student body.

Robert Joseph was this year's recipient of the Trout Unlimited Award. Established by the Thomas Jefferson Chapter of Trout Unlimited, this award is presented for "significant contributions to research concerning cold-water fisheries or related ecosystems."

Michael Cornish was 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.

Henry Yeung was awarded first place at the 2025 Research Computing Exhibition.

Emma Dawson received the Jay Zieman Research Publication Award, named after the late Jay Zieman, former chair of the department.

FACULTY AWARDS, ACTIVITIES, AND APPOINTMENTS

Lawrence Band, the Ernest H. Ern Professor of Environmental Sciences, is a member of the National Academies' committee reviewing approaches for managing pollutant loads in highway stormwater runoff and was awarded a fellowship for a sabbatical visit to the IGB Leibniz-Institute for Freshwater Ecology and Inland Fisheries in Berlin. He serves on the Editorial Board of *Hydrological Processes*. At UVA, Band is a member of the Promotion and Tenure Committee of the School of Data Science.

Peter Berg was selected by the American Geophysical Union to give its prestigious William S. and Carelyn Y. Reeburgh Lecture. He was honored for pioneering the use of eddy covariance in aquatic environments.

Meghan Blumstein won the *American Journal of Botany* Synthesis Prize for Early Career Researchers. She reviewed proposals for the National Science Foundation and articles for professional journals. She serves on the department's Graduate Prize Committee.

David Carr is director of the department's Blandy Experimental Farm. He reviews grant proposals for the University's 4-VA Program and serves on the General Faculty Promotion and Review Committee for the College and Graduate School of Arts and Sciences.

Max Castorani is a co-lead principal investigator for the Virginia Coast Reserve Long-Term Ecological Research site and a member of its Executive and DEI Steering Committees. He was also a member of the Scientific Advisory Committee for the Gulf Ecosystem Initiative, a partnership between the National Center for Ecological Analysis and Synthesis and the NOAA RESTORE Science Program. He reviewed proposals for the National Science Foundation, articles for professional journals, and files for external promotion and tenure. He joined the Editorial Board of *Ecology* and served on the Editorial Board of *Ecosphere*. At the University, Castorani was appointed a college fellow by the College and Graduate School of Arts and Sciences.

Frederick Cheng is chair of the American Geophysical Union Hydrology Section's Water Quality Technical Committee and a member of the Virginia Department of Environmental Quality's Water Quality Academic Advisory Committee. He is an AI guide for the University's Center for Teaching Excellence and serves the department as a member of its Seminar and Graduate Academic Review Committees.

Robert Davis, director of undergraduate programs, was identified by Research.com as a top researcher in environmental sciences. Among other activities this year, he reviewed manuscripts for a number of scholarly journals and chaired the Assembly Group of the University's Final Exercise Processions Committee. He was also an at-large faculty representative to the Raven Society, a member of its Selection Committee, and a reviewer for its Pete Cone Memorial Scholarship.

Stephan De Wekker was the editor of the *Journal of Applied Meteorology and Climatology* as well as an associate editor of *Atmosphere*. De Wekker reviewed grant proposals for the National Science Foundation and the German Science Foundation, wrote numerous journal reviews, and was an external reviewer for a promotion and tenure decision. He represented UVA at the University Corporation for Atmospheric Research and chaired the department's Graduate Admissions Committee.

Scott Doney, the Joe D. and Helen J. Kington Professor in Environmental Change, was elected to the National Academy of Science. He is a Web of Science Clarivate Analytics Highly Cited Researcher in Cross-Field Research and received a Leader Award from Research.com as a top environmental scientist in the United States. For the High Level Panel for a Sustainable Ocean Economy, he co-chaired an international expert group assembling a paper on marine carbon dioxide removal. Doney reviewed manuscripts for a series of scholarly journals, grant proposals for the National Science Foundation and the Swiss National Science Foundation, reports and programs for the National Academies, proposals for federal agencies, and promotion, tenure, and award decisions for other universities. He received the Climate and Health Teaching Award from the Virginia Clinicians for Climate Action. At the University he is the STEM advisor to the provost and has participated in the *HOOS in STEM* podcast and a *UVA Today* Q&A. He served on the department's Graduate Student Admissions Committee and its Chaired Professor Committee.

Howard E. Epstein, the Sidman P. Poole Professor of Environmental Sciences, was a co-lead of the Arctic Observing Working Group, an initiative of the National Science Foundation's Navigating the New Arctic program, and an institutional representative to the Arctic Research Consortium. He was also an associate editor of *Arctic, Antarctic, and Alpine Research* and a conference award judge for the American Geophysical Union.

At the University, Epstein was codirector of the College Science Scholars program and the Program for Environmental and Biological Conservation as well as a member of the EXPAND Fellowship Steering Committee, the Global Sustainability Advisory Committee (part of the Public Service Pathways program), and the Steering Committee on Integrative and Adaptive Life Sciences for the College and Graduate School of Arts and Sciences' Strategic Research Initiatives.

Kevin Grise was a member of the United States Climate Variability and Predictability (U.S. CLIVAR) Program Process Study and Model Improvement Panel and was a member of the organizing committee for the U.S. CLIVAR workshop on Confronting Earth System Model Trends and Observations. In addition, he was selected as one of two leaders for The World Climate Research Programme's Atmospheric Processes and Their Role in Climate Dynamical Variability activity. He is an editor of *Atmospheric Chemistry and Physics*. He served as a reviewer for numerous journal articles as well as for National Science Foundation proposals.

At the University, Grise was named an Advance Fellow in the College and Graduate School of Arts and Sciences faculty-led STEM Student Success Initiative and was a member of the Mead Endowment's Honored Faculty cohort for 2024–25. He represented UVA at the University Corporation for Atmospheric Research. He also served on the department's Graduate Academic Review Committee.

Kyle Haynes, the associate director of Blandy Experimental Farm, was on the editorial boards of *Ecography* and *Oecologia*. He also served on the Technical Committee for the USDA Forest Service's National Slow the Spread Program.

Manuel Lerdau was selected to serve on the U.S. EPA Clean Air Special Advisory Committee (which was later dissolved). He continues to serve on Cville Tulips, a UVA-supported program for recently arrived Afghan women and children, and is the plant scientist for the Green Heart Project, which builds garden-based experimental learning projects and supports school garden programs.

Ajay Limaye served on the Earth and Planetary Surface Processes Section of the American Geophysical Union's Annual Meeting Program Committee and as a judge for the section's Outstanding Student Presentation Award. He reviewed proposals for the National Science Foundation and the National Aeronautics and Space Administration and manuscripts for a variety of professional journals. He served as chair of the department's H.G. Goodell Endowment Committee and as its faculty postdoc liaison. He also was a member of the Steering Committee for the Department of Astronomy's Interconnected Universe Initiative.

Stephen A. Macko was editor-in-chief of *Nitrogen* and section editor-in-chief of *Geosciences* (*Biogeosciences*). He served on the European Geosciences Union Committee on Education and helped organize a number of its Building International Capacity in Earth Sciences Education activities through its Geoscience Information For Teachers (GIFT) Workshops. At the University, Macko was a member of the Faculty Senate and was the M.A. Program coordinator for the department.

Antonios Mamalakis is a handling editor of *Artificial Intelligence for the Earth Systems* and *Stochastic Environmental Research and Risk Assessment*. He received the Best Paper Award in the health and environment category at the Systems and Information Engineering Design Symposium, sponsored by the Institute of Electrical and Electronics Engineers.

Karen J. McGlathery, the Sherrell J. Aston Professor of Environmental Sciences, was the lead principal investigator of the Virginia Coast Reserve Long-Term Ecological Research (LTER) program and director of UVA's Environmental Institute. She sat on the LTER National Science Council and the Board of Advisors of Ocean Us (Liechtenstein) and CoastClim (Finland). She is also the principal investigator for the National Science Foundation's Coastlines and People grant on Virginia's Eastern Shore and serves on the Governor's Coastal Resilience Technical Advisory Committee and its subcommittees on Project Evaluation and Best Practices for Research (as vice chair).

McGlathery serves the University in a number of capacities. In addition to directing the Environmental Institute, she was codirector of the University's Coastal Futures Conservatory Environmental Humanities Consortium. She also served on the Global Sustainability Advisory Committee, part of the Public Service Pathways program, and the Advisory Committee for the UVA Research Data Enclave. She was appointed by the provost to lead the Environmental Grand Challenges Faculty Hiring Coordinating Committee and is a member of the UVA Futures Initiative, a pan-University task force to advise the president and provost about future challenges and opportunities in higher education. This year, she won the Elizabeth Zintl Leadership Award from the Maxine Platzer Lynn Women's Center at UVA.

Lauren Miller served as review editor of the cryospheric sciences section of *Frontiers of Earth Science* and reviewed numerous articles for other journals. She was secretary of the American Geophysical Union's Cryospheric Science Section and a member of the National Academies Polar Research Board. Miller also served as a member of the Louis Stokes Alliances for Minority Participation (LSAMP) Virginia-North Carolina Alliance Governing Board. At the University, she served on the Native and Indigenous Relations Community Steering Committee and the Indigenous Studies Working Group of the Democracy Initiative. She was faculty advisor for the UVA chapter of Epsilon Eta, the UVA representative for environmental sciences curriculum development for Transfer Virginia, and a STEM mentor for the Interdisciplinary PhD in Indigenous Studies. She also served as the department's director of diversity, equity, and inclusion and as a member of its Undergraduate Academic Review Committee.

Charity Nyelele was a member of the Ecosystem Services Partnership and a fellow on a thematic assessment performed by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services of the interlinkages among biodiversity, water, food, and health. She was also a research member of the Central Arizona-Phoenix Long-Term Ecological Research program and a contributing author to the United States Sixth National Climate Assessment. Nyelele served the department as a member of its Graduate Admissions, Undergraduate Academic Review and Department Seminar Committees.

BETH SIMMONS

Michael Pace, the W. W. Corcoran Professor of Natural History, was presented with the A. C. Redfield Lifetime Achievement Award from the Association for the Sciences of Limnology and Oceanography. He also won the Chair's Award, which recognizes an individual who has performed extraordinary service to the department.

John Porter served on the Units Working Group of the Environmental Data Initiative.

Sally Pusede received a Presidential Early Career Award for Scientists and Engineers from the Biden administration. She served on the Editorial Advisory Board of *Environmental Science & Technology—Air* and reviewed papers and proposals for the National Science Foundation. She was also a lead discussant and panelist for the EPA 03 Integrated Science Assessment for Ozone and Related Photochemical Oxidants. At the University, she was a member of the Steering Committee for Strategic Planning on Research, Scholarship, and Creative Activity.

Matthew Reidenbach chairs the Department of Environmental Sciences and was a co-principal investigator on the Virginia Coast Reserve Long-Term Ecological Research site. He served as a reviewer for proposals for the National Science Foundation, manuscripts for scholarly journals, and external promotion and tenure cases.

Justin Richardson helped organize BIOGEOMON 2024 and led a workshop. He also participated in the National Academy of Sciences' U.S. National Committee for Soil Sciences, convened a session at the Soil Science Society of America's annual meeting, and served as an associate editor of *Biogeochemistry*. For the department, he was a member of the Graduate Academic Review and the H.G. Goodell Endowment Committees.

T'ai Roulston was a subject editor of *Ecosphere*.

Todd Scanlon is the associate chair of the department and headed the committee for the American Geophysical Union Hydrologic Sciences Early Career Award. At the University, he served as a member of the College and Graduate School of Arts and Sciences Promotion and Tenure Committee and was a Selection Committee member of the Rising Scholars Postdoctoral Fellows program. He was appointed an Advance Fellow by the College and Graduate School of Arts and Sciences.

Kathleen Schiro advises the Environmental Sciences Organization and chairs the department's Award Committee.

Xi Yang served on the Third Decadal Carbon Cycle Science Plan Team. At the University, he served on Seed Grant Review Committees of the College and Graduate School of Arts and Sciences and the Environmental Institute. He is the department's DEI Committee chair.

PUBLISHED PEER-REVIEWED PAPERS, BOOK CHAPTERS, AND BOOKS BY FACULTY, STAFF, AND GRADUATE STUDENTS FOR **SUMMER 2024—SPRING 2025**

Armstrong, A., Alcaraz-Segura, D., Raynolds, M., & Epstein, H. (2024). Ecosystem functional types of the circumpolar Arctic tundra based on the seasonal dynamics of vegetation productivity. *Environmental Research: Ecology, 3*(2), 025003. e10.1088/2752-664X/ad4beb

Attard, K., Singh, R. K., Gattuso, J. P., Filbee-Dexter, K., Krause-Jensen, D., **Berg. P.**, ... & Ardyna, M. (2024). Seafloor primary production in a changing Arctic Ocean. *Proceedings of the National Academy of Sciences, 121*(11), e2303366121.

Berger, A. C., **Berg, P.**, **McGlathery, K. J.**, Aoki, L. R., & Kerns, K. (2024). Eelgrass meadow response to heat stress. II. Impacts of ocean warming and marine heatwaves measured by novel metrics. *Marine Ecology Progress Series*, 736, 47–62.

Berger, A. C., & **Berg, P.** (2024). Eelgrass meadow response to heat stress. I. Temperature threshold for ecosystem production derived from in situ aquatic eddy covariance measurements. *Marine Ecology Progress Series, 736*, 35–46.

Berner, L. T., Orndahl, K. M., Rose, M., Tamstorf, M., Arndal, M. F., **Epstein, H.**, Alexander, H. D., ... & Goetz, S. J. (2024). The Arctic plant aboveground biomass synthesis dataset. *Scientific data, 11*(1), 305.

Blumstein, M. (2024). The drivers of intraspecific trait variation and their implications for future tree productivity and survival. *American Journal of Botany, 111*(4), e16312.

Blumstein, M., Webster, S., Hopkins, R., Basler, D., & Des Marais, D. L. (2022). Genomics highlight an underestimation of the urban heat island effect on red oak phenology. *bioRxiv*, 2022–08.

Brahmey, E. I., **McGlathery, K. J.**, & **Doney, S. C.** (2024). Quantifying seasonal to multi-decadal signals in coastal water quality using high-and low-frequency time series data. *Cambridge Prisms: Coastal Futures, 2*, e8.

Brideau, L.E., Kerns, K., **McGlathery, K. J.**, & **Castorani, M.C.N.** 2024. Sediment grain size in the Virginia coastal bays, 2022 ver 1. Environmental Data Initiative. 10.6073/pasta/bd19ea469eda5ddf07865293afc62860

Buck, A. J., Zarrella-Smith, K. A., Jordaan, A., & **Richardson, J. B.** (2024). Ecotoxicology of Trace Elements in European Oyster (*Ostrea edulis*), Seawater, and Sediments across Boston Harbor, Massachusetts, USA. *Bulletin of Environmental Contamination and Toxicology, 112*(1), 20.

Carruthers, T. J., **McGlathery, K. J.**, **Jones, S. B.**, Terrell, M. K., Scheibly, J. F., ... & Waycott, M. (2024). Identifying and filling critical knowledge gaps can optimize financial viability of blue carbon projects in tidal wetlands. *Frontiers in Environmental Science, 12*, 1421850.

Carvalho, L. M., Duine, G. J., Clements, C., **De Wekker, S. F.**, Fernando, H. J., Fitzjarrald, D. R., ... & Vömel, H. (2024). The Sundowner winds experiment (SWEX) in Santa Barbara, California: Advancing understanding and predictability of downslope windstorms in coastal environments. *Bulletin of the American Meteorological Society, 105*(3), E532-E558.

Chung, M. G., Guo, H., **Nyelele, C.**, Egoh, B. N., Goulden, M. L., Keske, C. M., & Bales, R. C. (2024). Valuation of forest-management and wildfire disturbance on water and carbon fluxes in mountain headwaters. *Ecohydrology, 17*(3), e2642.

Cocciardi, J. M., Hoffman, A. M., Alvarado-Serrano, D. F., Anderson, J., **Blumstein, M.**, Boehm, E. L., ... & Avolio, M. L. (2024). The value of long-term ecological research for evolutionary insights. *Nature Ecology & Evolution, 8*(9), 1584–1592.

Davis, R. E., Himmel, O., Sims, P. K., & Fuhrmann, C. M. (2025). Mortality and diurnal temperature range in Virginia. *International Journal of Biometeorology, 69*(4), 725–738.

Dawson, E., & **Schiro, K. A.** (2025). Tropical High Cloud Feedback Relationships to Climate Sensitivity. *Journal of Climate, 38*(2), 583–596.

Delesantro, J. M., Duncan, J. M., Riveros-Iregui, D., Whitmore, K. M., & **Band, L. E.** (2024). High frequency monitoring and nitrate sourcing reveals baseflow and stormflow controls on total dissolved nitrogen and carbon export along a rural-urban gradient. *Water Resources Research, 60*(10), e2023WR036750.

Doney, S. C., Mitchell, K. A., Henson, S. A., Cavan, E., DeVries, T., Gruber, N., ... & Primeau, F. W. (2024). Observational and numerical modeling constraints on the global ocean biological carbon pump. *Global Biogeochemical Cycles, 38*(7), e2024GB008156.

Dressel, I. M., Zhang, S., **Demetillo, M. A. G.**, Yu, S., Fields, K., Judd, L. M., ... & Pusede, S. E. (2024). Neighborhood-Level Nitrogen Dioxide Inequalities Contribute to Surface Ozone Variability in Houston, Texas. *ACS Es&t Air, 1*(9), 973–988.

Dueser, R. D., **Porter, J. H.**, & Moncrief, N. D. (2025). The continuing search for a better mouse trap: Two tests of a practical, low-cost camera trap for detecting and observing small mammals. *PloS one, 20*(1), e0309252.

Duine, G. J., **De Wekker, S. F.**, & Knievel, J. C. (2024). The Influence of Terrain Smoothing on Simulated Convective Boundary-Layer Depths in Mountainous Terrain. *Atmosphere, 15*(2), 145. 10.3390/atmos15020145

Epstein, H., Burtner, M., Ghaly, A., Halvorson-Taylor, M. A., Jenkins, W., **McGlathery, K.**, ... & Schaeffer, K. R. (2024). Multidisciplinary Reflections on an Active Layer/Permafrost Core in Boreal Alaska. *ARCTIC, 77*(3), 297–306.

Fields, K. P., Miller, T. K., Wood, A., Kirts, L., Jones, M., & **Pusede, S. E.** (2024). Practicing Repair: Advancing Community-Based Solutions on Coal Dust Pollution in Hampton Roads, Virginia, Through a Practitioner-in-Residence Program. *Environmental Justice*. 10.1089/env.2023.0046

Frost, G. V., Bhatt, U. S., **Epstein, H. E.**, Forbes, S. J., Phoenix, G. K., Neigh, C. S. R., ... & Walker, D. A. (2024). Arctic Report Card 2024: Tundra Greenness.

Frost, G. V., Macander, M. J., Bhatt, U. S., Berner, L. T., Bjerke, J. W., **Epstein, H. E.**, ... & Yang, D. (2024). Tundra greenness: in "State of the Climate in 2023". *Bulletin of the American Meteorological Society, 104*(9, Special Supplement), S305-S308. 10.1175/BAMS-D-24-0101.1

Goulet-Scott, B. E., Farnitano, M. C., Brown, A. L., Hale, C. O., **Blumstein, M.**, & Hopkins, R. (2024). A multidimensional selective landscape drives adaptive divergence between and within closely related Phlox species. *Nature Communications, 15*(1), 4661.

Granville, K., Baird, C., Carlson, C., & **Berg, P.** (2024). At the Intersection of Science and Education: The Process of Scientists and Educators Co-developing Authentic Learning Experiences for K–16 Students. *Limnology and Oceanography Bulletin, 33*(2), 45–51.

Grise, K. M., & Tselioudis, G. (2024). Understanding the relationship between cloud controlling factors and the ISCCP weather states. *Journal of Climate, 37*(20), 5387–5403.

Gross, C. P., **McGlathery, K. J.**, Duffy, J. E., Hovel, K. A., Reynolds, P. L., Boström, C., Boyer, K. E., ... & Stachowicz, J. J. (2024). A Latitudinal Cline in the Taxonomic Structure of Eelgrass Epifaunal Communities is Associated with Plant Genetic Diversity. *Global Ecology and Biogeography, 33*(12), e13918.

Guan, Y., McKinley, G. A., Fay, A. R., **Doney, S. C.**, & Keppel-Aleks, G. (2024). Ocean-driven interannual variability in atmospheric CO2 quantified using OCO-2 observations and atmospheric transport simulations. *Frontiers in Marine Science, 11*, 1272415.

Hamilton, S. N., Tinker, M. T., Jackson, J., Tomoleoni, J. A., **Castorani, M. C. N.**, Yee, J. L., ... & Hughes, B. B. (2024). Modeling coupled dynamics of an empirical predator-prey system to predict top predator recovery. *Biological Conservation, 294*, 110623.

Hanley, M. L., Vukicevich, E., Rice, A. M., & **Richardson, J. B.** (2024). Uptake of toxic and nutrient elements by foraged edible and medicinal mushrooms (sporocarps) throughout Connecticut River Valley, New England, USA. *Environmental Science and Pollution Research, 31*(4), 5526–5539.

Harmáčková, Z. V., Rounsevell, M. D. A., Selomane, O., Awuku-Sowah, E. M., Budiharta, S., Coll, M., Hales, S., Jung, M.,Kumar, P., Leclère, D., Metaxas, A., Meirelles Oliveira, B., **Nyelele, C.**, Owuor, M. A., Popp, A., Rashleigh, B., Thomas, S. M.,Tsuchiya, K., Villamor, G., and Yue, T. X. (2024). Chapter 3: Future interactions across the nexus. In: Thematic Assessment Report on the Interlinkages among Biodiversity, Water, Food and Health of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Harrison, P. A., McElwee, P. D., and van Huysen, T. L. (eds.). IPBES secretariat, Bonn, Germany.

Hauri, C., Pagès, R., Hedstrom, K., **Doney, S. C.**, Dupont, S., Ferriss, B., & Stuecker, M. F. (2024). More than marine heatwaves: a new regime of heat, acidity, and low oxygen compound extreme events in the Gulf of Alaska. *AGU Advances, 5*(1), e2023AV001039.

Heffernan, E., **Epstein, H.**, McQuinn, T. D., Rogers, B. M., Virkkala, A. M., Lutz, D., & **Armstrong, A.** (2024). Comparing assumptions and applications of dynamic vegetation models used in the Arctic-Boreal zone of Alaska and Canada. *Environmental Research Letters, 19*(9), 093003.

Javadi, P., O'Rourke, P., Fuhrman, J., McJeon, H., **Doney, S. C.**, Shobe, W., & Clarens, A. F. (2024). The impact of regional resources and technology availability on carbon dioxide removal potential in the United States. *Environmental Research: Energy, 1*(4), 045007.

Ji, F., Li, F., Hao, D., Shiklomanov, A. N., **Yang, X.**, Townsend, P. A., ... & Chen, M. (2024). Unveiling the transferability of PLSR models for leaf trait estimation: lessons from a comprehensive analysis with a novel global dataset. *New Phytologist, 243*(1), 111–131.

Lai, S. Y., Liu, H. Y., Foreman, B. Z., & **Limaye, A. B.** (2025). Response of submarine braided channels to varying inflow hydrographs: Geomorphic experiments and stratigraphic implications. *Sedimentology, 72*(1), 330–359. 10.1111/sed.13236.

Li, Y., & **Limaye, A. B.** (2024). Timescale of the morphodynamic feedback between planform geometry and lateral migration of meandering rivers. *Journal of Geophysical Research: Earth Surface, 129*(2), e2023JF007413.

Liang, M., Lamy, T., Reuman, D. C., Wang, S., Bell, T. W., Cavanaugh, K. C., & **Castorani, M. C.** (2024). A marine heatwave changes the stabilizing effects of biodiversity in kelp forests. *Ecology, 105*(5), e4288.

Lohrer, A. M., MacDonald, I. T., Bulmer, R. H., Douglas, E. J., Massuger, J., Rodil, I. F., ... & **Berg, P.** (2024). Implications of increased intertidal inundation on seagrass net primary production. *Estuarine, Coastal and Shelf Science, 298*, 108636.

Mamalakis, M., **Mamalakis, A.**, Agartz, I., Mørch-Johnsen, L. E., Murray, G. K., Suckling, J., & Lio, P. (2025). Solving the enigma: Enhancing faithfulness and comprehensibility in explanations of deep networks. *AI Open, 6*, 70–81.

Mantova, M., Johnson, D. M., Antebi, J., Beery, S., **Blumstein, M.**, Cohen, R., ... & Rissanen, K. (2024). Monitoring urban trees across the world: report from the Urban Trees Ecophysiology Network (UTEN) inaugural workshop. *New Phytologist, 242*(5).

Materia, S., García, L. P., van Straaten, C., O, S., **Mamalakis, A.**, Cavicchia, L., ... & Donat, M. (2024). Artificial intelligence for climate prediction of extremes: State of the art, challenges, and future perspectives. *Wiley Interdisciplinary Reviews: Climate Change, 15*(6), e914.

Medina, A., Mitchell, Z., Willhite, T., Hopwood, J. W., Pande, C., **De Wekker, S. F.**, ... & Koch, G. J. (2025). Evaluation of Doppler wind lidar for advanced air mobility. *Journal of Applied Remote Sensing, 19*(1), 014509-014509.

Meidan, D., Li, Q., Cuevas, C. A., **Doney, S. C.**, Fernandez, R. P., van Herpen, M. M., ... & Mahowald, N. M. (2024). Evaluating the potential of iron-based interventions in methane reduction and climate mitigation. *Environmental Research Letters, 19*(5), 054023.

Murphy, E. A., & **Reidenbach, M. A.** (2024). Pulsatile Ventilation Flow in Polychaete Alitta succinea Burrows. *Journal of Marine Science and Engineering, 12*(7), 1037.

O'Donnell, K. L., Bernhardt, E. S., **Yang, X.**, Emanuel, R. E., Ardón, M., **Lerdau, M. T.**, ... & Wright, J. P. (2024). Saltwater intrusion and sea level rise threatens US rural coastal landscapes and communities. *Anthropocene, 45*, 100427.

Paccini, L., & **Schiro, K. A.** (2025). Influence of soil moisture on the development of organized convective systems in South America. *Journal of Geophysical Research: Atmospheres, 130*(9), e2024JD042108.

Pane, M. M., & **Davis, R. E.** (2024). The association between short-term temperature variability and mortality in Virginia. *PLoS One, 19*(9), e0310545.

Panji, N. S., McGlynn, D. F., Barry, L. E., **Scanlon, T. M.**, **Lerdau, M. T.**, **Pusede, S. E.**, & Isaacman-VanWertz, G. (2024). Constraining Light Dependency in Modeled Emissions Through Comparison to Observed BVOC Concentrations in a Southeastern US Forest. *EGUsphere, 2024*, 1–19. 10.5194/acp-24-12495-2024

Papalexiou, S. M., Mascaro, G., Pendergrass, A. G., **Mamalakis, A.**, de Brito, M. M., **Schiro, K. A.**, ... & Madani, K. (2025, January). Sustainability nexus AID: storms. In *Sustainability Nexus Forum* (Vol. 33, No. 1, p. 1). Berlin/Heidelberg: Springer Berlin Heidelberg. s00550-024-00544-y

Pierrat, Z. A., Magney, T. S., Richardson, W. P., Runkle, B. R., Diehl, J. L., **Yang, X.**, ... & Cawse-Nicholson, K. (2025). Proximal remote sensing: an essential tool for bridging the gap between high-resolution ecosystem monitoring and global ecology. *New Phytologist, 246*(2), 419–436.

Porter, J. H., & **Dueser, R. D.** (2024). A low-cost small-mammal camera trap for research and education. *Bulletin of the Ecological Society of America, 105*(3), 1-8. 10.1002/bes2.2142

Porter, J. H., O'Brien, M., Frants, M., Earl, S., Martin, M., & Laney, C. M. (2025). Using a units ontology to annotate pre-existing metadata. *Scientific Data, 12*(1), 304.

Redding, O. T., **Castorani, M. C.**, & Lasala, J. (2024). The effects of dune plant roots on loggerhead turtle (*Caretta caretta*) nest success. *Ecology and evolution, 14*(4), e11207.

Resplandy, L., Hogikyan, A., Müller, J. D., Najjar, R. G., Bange, H. W., **Doney, S. C.**, ... & Regnier, P. (2024). A synthesis of global coastal ocean greenhouse gas fluxes. *Global Biogeochemical Cycles, 38*(1), e2023GB007803.

Rice, A. M., Perdrial, N., Treto, V., D'Amato, A. W., Smith, G. A., & **Richardson, J. B.** (2024). Influence of parent material mineralogy on forest soil nutrient release rates across a nutrient richness gradient. *Geoderma, 451*, 117081.

Richardson, J. B., **Truong, M. T.**, & Dobson, A. M. (2024). Throughfall and Litterfall Fluxes Reveal New Inputs and Foliar Cycling Maintain Pb, Cd, Cu, and Zn Pollution Legacy in Eastern US Temperate Forests. *Pollutants, 4*(4), 474–489.

Richter, D. D., Billings, S. A., Brantley, S. L., Gaillarder, J., **Richardson, J. B.**, Schlesinger, W. H., ... & Wolf, M. (2024). Earth sciences are the model sciences of the Anthropocene. *Perspectives of Earth and Space Scientists, 5*(1), e2024CN000237.

Riscassi, A. L., **Scanlon, T. M.**, & **Galloway, J. N.** (2024). Factors influencing seasonal chemistry patterns in Virginia mountain streams. *Biogeochemistry, 167*(10), 1175–1201.

Sabo, A. B., Cornish, M. R., **Castorani, M. C.**, & Zinnert, J. C. (2024). Drivers of dune formation control ecosystem function and response to disturbance in a barrier island system. *Scientific Reports, 14*(1), 11405.

Schofield, O., Cimino, M., **Doney, S.**, Friedlaender, A., Meredith, M., Moffat, C., ... & Steinberg, D. (2024). Antarctic pelagic ecosystems on a warming planet. *Trends in ecology & evolution, 39*(12), 1141–1153.

Shaw, T. A., Arblaster, J. M., Birner, T., **Grise, K. M.**, Domeisen, D. I. V., Garfinkel, C. I., ... & Karpechko, A. Y. (2024). Emerging climate change signals in atmospheric circulation. *AGU Advances, 5*(6), e2024AV001297.

Stephens, G. L., **Schiro, K. A.**, Hakuba, M. Z., Takahashi, H., Pilewskie, J. A., Andrews, T., ... & Wu, L. (2024). Tropical deep convection, cloud feedbacks and climate sensitivity. *Surveys in Geophysics, 45*(6), 1903–1931.

Tassone, S. J., **Epstein, H. E.**, **Armstrong, A. H.**, Bhatt, U. S., Frost, G. V., Heim, B., ... & Walker, D. A. (2024). Drivers of heterogeneity in tundra vegetation productivity on the Yamal Peninsula, Siberia, Russia. *Environmental Research: Ecology, 3*(1), 015003.

Tassone, S. J., Ewers Lewis, C. J., **McGlathery, K. J.**, & **Pace, M. L.** (2024). Seagrass ecosystem recovery: Experimental removal and synthesis of disturbance studies. *Limnology and Oceanography, 69*(7), 1593–1605. 10.1002/lno.12608

Teng, W., Yu, Q., Mischenko, I. C., Rice, A. M., & **Richardson, J. B.** (2024). Predicting Foliar Nutrient Concentrations across Geologic Materials and Tree Genera in the Northeastern United States Using Spectral Reflectance and Partial Least Squares Regression Models. *Journal of Remote Sensing, 4*, 0093.

Treat, C. C., Virkkala, A. M., Burke, E., **Armstrong, A.**, **Epstein, H. E.**, Chatterjee, A., Fisher, J. B., ... & Hugelius, G. (2024). Permafrost carbon: Progress on understanding stocks and fluxes across northern terrestrial ecosystems. *Journal of Geophysical Research: Biogeosciences, 129*(3), e2023JG007638.

Turrietta, E., & **Reidenbach, M. A.** (2024). Edge effects of a fragmented seagrass habitat on flow, bivalve recruitment, and sediment dynamics. *Marine Ecology Progress Series, 732*, 53–71.

Wang, Y., **Limaye, A. B.**, & Chadwick, A. J. (2024). Topography-based particle image velocimetry of braided channel initiation. *Water Resources Research, 60*(4), e2023WR035229.

Washington, B. N., Groffman, P. M., Duncan, J. M., **Band, L. E.**, & Miller, A. J. (2025). *Long-term changes in riparian connectivity and groundwater chemistry in an urban watershed* (Vol. 54, No. 1, pp. 257–274). 10.1002/jeq2.20654

Wu, G., Guan, K., Ainsworth, E. A., Martin, D. G., Kimm, H., & **Yang, X.** (2024). Solar-induced chlorophyll fluorescence captures the effects of elevated ozone on canopy structure and acceleration of senescence in soybean. *Journal of experimental botany, 75*(1), 350–363.

Wu, W., **Epstein, H.**, Xu, X., Li, X., Guo, H., & Li, J. (2024). *Radiative trigger thresholds of foliar photoprotective pigment regulation for global vegetation*. Innovation (IF 19.2). 5(4). 10.1016/j.xinn.2024.100649

Yi, K., Li, R., **Scanlon, T. M.**, **Lerdau, M. T.**, Berry, J. A., & **Yang, X.** (2024). Impact of atmospheric dryness on solar-induced chlorophyll fluorescence: Tower-based observations at a temperate forest. *Remote Sensing of Environment, 306*, 114106.

Yi, K., Novick, K. A., Zhang, Q., Wang, L., Hwang, T., **Yang, X.**, ... & Baldocchi, D. D. (2024). Responses of marginal and intrinsic water-use efficiency to changing aridity using FLUXNET observations. *Journal of Geophysical Research: Biogeosciences, 129*(6), e2023JG007875.

Zhang, Q., Tao, S., Jagger, P., **Band, L. E.**, Bilsborrow, R. E., Zhang, Z., ... & Song, C. (2024). Remittance from migrants reinforces forest recovery for China's reforestation policy. *Plos one, 19*(6), e0296751.

Zhang, Y., Cai, M., Xiao, X., **Yang, X.**, Migliavacca, M., Basara, J., ... & Deng, Y. (2024). Immediate and lagged vegetation responses to dry spells revealed by continuous solar-induced chlorophyll fluorescence observations in a tall-grass prairie. *Remote Sensing of Environment, 305*, 114080.

Zhang, R., **Band, L. E.**, Groffman, P. M., Lin, L., Suchy, A. K., Duncan, J. M., & Gold, A. J. (2024). Simulation of spatially distributed sources, transport, and transformation of nitrogen from fertilization and septic systems in a suburban watershed. *Hydrology and Earth System Sciences, 28*(20), 4599–4621. 10.5194/hess-28-4599-2024

Zhao, F., Ganti, V., & **Limaye, A. B.** (2024). Scour-depth variability controls channel-scale stratigraphy in experimental braided rivers. *Journal of Sedimentary Research, 94*(3), 302–312. 10.2110/jsr.2023.118

SOFIA HOFFMAN

ENVIRONMENTAL SCIENCES AT THE UNIVERSITY OF VIRGINIA

OUR MISSION

Our mission is to advance understanding of the environment through interdisciplinary scientific research, education, and service.

OUR VISION

We work at the forefront of research to discover, integrate, and communicate new knowledge and generate wisdom about environmental systems. We provide outstanding and innovative education and exceptional mentorship.
We pursue fundamental, transformative science that provides objective and impactful information for management, policymaking, and environmental justice.

OUR VALUES

Our mission and vision are supported by a commitment to a core set of values that guide what we do as a community of scholars:

- **Integrity:** Maintain the highest standards of scientific, academic, and professional ethics.
- **Diversity and Inclusivity:** Strengthen and foster a community that supports people from diverse backgrounds and empowers individuals for who they are.
- **Freedom of Inquiry:** Promote open exploration of science that is accepting of respectful, constructive criticism and unbound by external pressures.
- **Societal Impact:** Conduct science that makes a positive impact on the world.
- **Collegiality:** Facilitate collaboration, teamwork, and support for each other's success.
- **Community Engagement:** Respectfully and cooperatively engage with the communities where we live, study, and work.