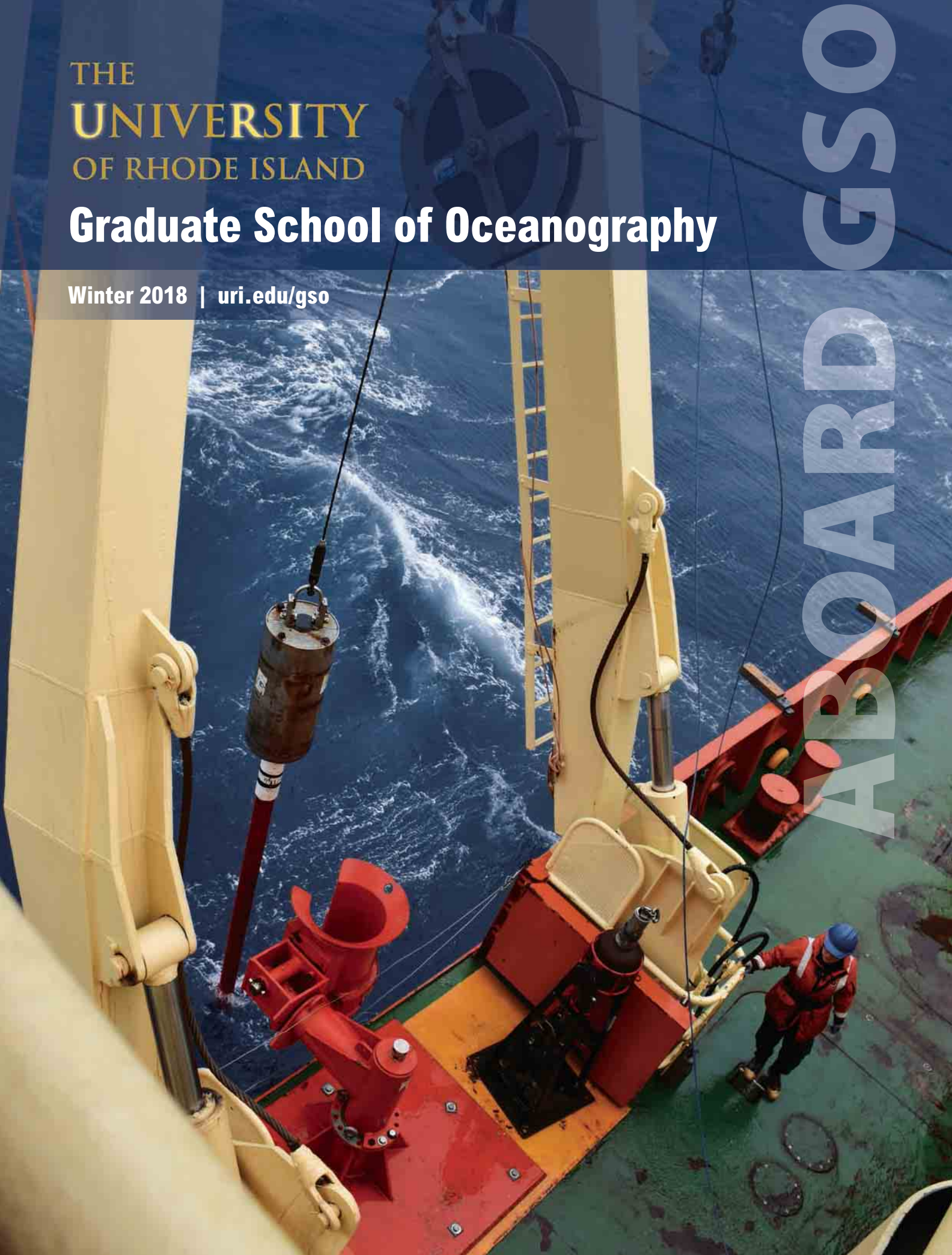


THE  
UNIVERSITY  
OF RHODE ISLAND

# Graduate School of Oceanography

Winter 2018 | [uri.edu/gso](http://uri.edu/gso)

ABOARD GSO





On the cover, a gravity corer is lowered through the A-frame of the R/V *Nathaniel B. Palmer* to collect Southern Ocean sediment as U.S. Antarctic Program marine technician Joee Patterson looks on.

Above, GSO's Rebecca Robinson demonstrates the technique for slabbing the surface sediment cores for the science team. From left: Roger Kelly (URI-GSO), Colin Jones (URI-GSO), Janice Jones and Mark Brzezinski (University of California, Santa Barbara), Rebecca Robinson (URI-GSO).



# WINTER 2018

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PHOTOS: FRONT, BACK, AND INSIDE FRONT COVERS, MARLO GARNSWORTHY



R/V Endeavor at the GSO dock.

# The East Coast Oceanographic Consortium

*Message from Dean Bruce Corliss*

Since its founding in 1961, the Graduate School of Oceanography has been a ship operator, with research vessels playing a critical role in our educational and research programs. The R/V *Trident* came to GSO with Dean John Knauss in 1962, was retired in 1976, and was replaced with the R/V *Endeavor*. As *Endeavor* completes her 41st year and over a million nautical miles of research cruises, we look to 2021 for her retirement from the University-National Oceanographic Laboratory System (UNOLS) fleet. NSF plans to build three new vessels called Regional Class Research Vessels (RCRVs), with one for the West Coast (to replace the *Oceanus*), East Coast (to replace the *Endeavor*), and Gulf of Mexico. In the FY17 federal budget, appropriations were included for the first vessel and, at this writing, funds are included in the FY18 budget for a second vessel that will be voted on in early 2018. We are hoping that NSF will release a request for proposals shortly thereafter for operators of the new vessels.

In anticipation of this, we are creating a consortium of institutions, the East Coast Oceanographic Consortium, to operate the *Endeavor* over the next five years and to submit a proposal to operate the East Coast RCRV. GSO will continue to be the primary operator of the *Endeavor* and new RCRV, but consortium members will purchase ship time for their scientists and students and participate in various oversight committees. In addition to ship operations, an objective of the consortium will be to enhance and promote research and education among the consortium members. The consortium members at the moment are the Woods Hole Oceanographic Institution (WHOI) and the University of New Hampshire,

with discussions ongoing with several other institutions about possible membership. We see a number of advantages to creating the consortium, including more interinstitutional collaboration, use of WHOI's dock facility, and funding of consortium days to support institutional research and education. As an added benefit, the consortium will keep the new RCRV active by scheduling more institutional days at sea each year. We look forward to building strong collaborations within the consortium and enhancing our ship operations.

We hosted a GSO Open House on October 14 and were fortunate to have the *Endeavor* home at the GSO dock for ship tours throughout the day. It was a very successful event with over 3,000 visitors and 400 ship tours with a broad and expanded array of displays at the dock and on the Knauss Quad, as well as tours of the Rock and Core Laboratory, Aquarium Facility, and the Inner Space Center. This open house is part of our expanded effort to reach out to the Rhode Island community to let folks know about the important work being carried out at GSO.

If you are ever in the area, please visit GSO and the Narragansett Bay Campus. We'd like to see you! ☺

# SNOWBIRDS Cruise

*A Southern Ocean field test of diatom nutrient proxies*

BY REBECCA ROBINSON

In late January 2017, my lab group from GSO and our colleagues from the University of California Santa Barbara (UCSB) flew to McMurdo Station, Antarctica, to meet the National Science Foundation's (NSF) research ice breaker *R/V Nathaniel B. Palmer* for a six-week research expedition, nicknamed SNOWBIRDS, that would carry us across the entire Southern Ocean back to New Zealand.

SNOWBIRDS stands for Silicon and Nitrogen Observed in the Water-column Biologic Isotope Records During Sedimentation.

I was the chief scientist in a group of 11 geochemists and biologists, looking to improve geological reconstructions of the surface nitrogen (N) and silicon (Si) nutrient cycling in the Southern Ocean. These reconstructions are based on measurements of the N and Si isotopic composition of fossil diatoms. Because N and Si are essential nutrients for diatoms—the most important primary producer in the Southern Ocean and dominant fossil type in Southern Ocean sediment—their isotope records provide key constraints on the role of ocean biology and ocean circulation in regulating atmospheric carbon dioxide (CO<sub>2</sub>) in the past. The isotopic composition of N and Si in diatoms reflects the relative degree of nutrient consumption in the surface ocean during photosynthesis, a balance between the supply of nutrients from upwelling and mixing and demand from biological processes. Greater relative consumption of N and Si indicates greater carbon uptake as well. The consumption of these two nutrients is relatively similar when major nutrient supply varies due to changes in physical processes; however, diatoms use N and Si in different proportions depending upon the availability of iron, a limiting micronutrient. Measuring N and Si isotopes together



The megacorer returns to the deck and the science team begins evaluating sediment recovery at 65°S.

allows for the exploration of the biophysical processes driving glacial-interglacial CO<sub>2</sub> change. These proxies have not yet been validated in the field, and the work that has been done in the laboratory—with cultures—presents as many questions as answers.

So, we headed to the Southern Ocean, where these reconstructions are most critical for our understanding of glacial-interglacial climate change, to validate the proxies. During the research expedition, we sampled 14 individual sites, between 67°S and 54°S, all approximately along 170°W, crossing the marginal ice zone, the Antarctic Polar Frontal region, the Subantarctic, and finally into the Subtropics. We isolated diatoms along our transect for experimental work in the lab. At each station, we collected water, conductivity-temperature-depth (CTD) data, particles (using large-volume McLane pumps), and seafloor surface sediments (using a megacorer). This was a rigorous schedule for the research team, with a variety of instrument deployments at each station, and relatively short transits. Sediment coring was a novel experience for many of the participants, and the recovery of surface sediments in this difficult working environment quickly

became a thrill for even the most seasoned biologists of the group. The megacorer from URI's *R/V Endeavor*, borrowed as a spare, played a critical role in our success after we lost the ship's corer at the second station.

Most of the samples were packed up shipboard for analysis back in our labs at GSO and UCSB. Our first impressions, based on shipboard data and large-volume community growth experiments, are that we sampled a late summer population of phytoplankton, dominated by diatoms, and that those diatoms were present in the under-

lying sediment. In the lab, we will compare how nutrient uptake in the water is reflected in fresh particles as well as surface sediment. Continued laboratory growth experiments will be used to evaluate how individual species, as well as regional groups of diatoms, impact the sedimentary record. Understanding these relationships will help us to make quantitative estimates of past nutrient and CO<sub>2</sub> drawdowns. Ultimately, when applied to downcore records, this information will help determine the major controls on atmospheric CO<sub>2</sub> over time.

This work is funded by the National Science Foundation's Office of Polar Programs and Marine Geology and Geophysics programs. ©

*Rebecca Robinson is a URI professor of oceanography.*



## Understanding the Impact of Common Pollutants

BY ELIZABETH RAU

*URI receives \$8 million federal grant to establish research center on chemical pollutants in drinking water*

Nonstick cookware and firefighting foam are miles apart in purpose, but they have one disquieting characteristic in common. Both products are made with chemicals that could be contaminating drinking water and posing a human health hazard.

Fluorinated pollutants, or poly- and perfluorinated alkyl substances, have been used for more than 60 years in a variety of items; still, studies of the chemicals are limited and conflicted.

Now the University of Rhode Island is moving into the forefront of research institutions committed to revealing more about the pollutants. URI has received an \$8 million federal grant to research how these industrial compounds, also used in rain-proofing fabrics and food packaging, get into water supplies and harm humans, who are likely to come in contact with the chemicals daily.

The five-year grant from the National Institute of Environmental Health Sciences establishes URI as part of a national network of Superfund Research Program centers with Rainer Lohmann, a professor at the Graduate School of Oceanography and an expert in marine pollutants, as director. He will lead an interdisciplinary group of scientists and outreach specialists from URI, Harvard University and Silent Spring Institute to generate new insights into these pollutants and distribute information to communities.

Researchers will examine to what degree groundwater in towns near the Joint Base Cape Cod, Mass., military training site is contaminated with the chemicals, which were present in firefighting foam used during training exercises. Residents will be informed of the findings and, if necessary, steps will be taken to reduce exposure to the pollutants.

GSO professor Rainer Lohmann is director of the newly established NIH Superfund Research Center at URI. His research uses innovative sampling approaches to detect PFASs in the environment.

The chemicals have been linked to kidney and testicular cancers, thyroid disease, colitis, and suppression of the immune system—maladies that lend urgency to the study.

As one of the few national Superfund Research Program centers in the country, Lohmann says that the new URI-led center will “work closely with communities and scientists to share our knowledge and help inform people and agencies about this growing problem. These fluorinated contaminants are present in the blood of almost every adult in the United States.”

GSO Dean Bruce Corliss also praised the project: “Water quality in the United States continues to be one of the most pressing environmental problems we face. This center will carry out critical research to better understand the impact of these chemicals and suggest ways to mitigate the risk of such chemicals.”

The environmental and human health hazards caused by these chemicals are only beginning to emerge. Although the chemicals have been produced and used in consumer products for decades, their ubiquitous presence in human blood and the environment was discovered only around 2000.

Sources of the chemicals include landfills, the chemicals’ manufacturers, industrial users of the chemicals, and airports and fire-training sites that use foam to extinguishes fires. The chemicals, also known as PFASs, are persistent because they don’t break down when exposed to air, water or sunlight and can travel long distances, exposing people and other living things in environments thousands of miles away.

Researchers will use a wide range of tools and equipment for their studies, ranging from new detection tools like water samplers to laboratory experiments with mice, clams and worms that have been exposed to the chemicals. The project aims to understand how the chemicals contaminate the groundwater, the food chain and, ultimately, humans.

Working with principal investigator Lohmann is an interdisciplinary URI team: Geoffrey Bothun, professor and chair of chemical engineering; Alyson McCann, water quality coordinator of URI Cooperative Extension; Angela Slitt, associate professor, and Bongsup Cho, professor, both of biomedical and pharmaceutical sciences; and Judith Swift, professor of communication studies and director of the Coastal Institute, along with the institute’s assistant director Nicole Rohr and digital media specialist Amber Neville.

Lohmann will validate new sampling

approaches for the pollutants and work with the U.S. Environmental Protection Agency to examine to what extent worms and clams become contaminated when exposed to polluted sediment from Cape Cod and possibly Hoosick Falls, a community in upstate New York whose drinking water was compromised by chemicals from a plastics plant.

Bothun will explore how the chemicals travel from blood into human cells; Slitt will explore what the chemicals do to animals; McCann, working with the Silent Spring Institute, a nonprofit environmental group, will conduct community outreach with Cape Cod communities; Cho will lead an intensive training program for graduate and postdoctoral students working on the project; and Swift, Rohr and Neville will create videos, brochures, op-eds and other communication material for the public on Cape Cod and at other contaminated sites throughout the country.

“Our job is to translate the science into a language the public can understand,” says Swift. “We’re the bridge between what’s happening in the science world and the public—and others in the science community.”

Slitt and Bothun will work together to better understand properties that allow the chemicals to enter cells in the body. Bothun’s goal is to measure physical and chemical properties of the chemicals and to study how these properties influence the way they interact with biological molecules such as proteins and lipids. Scientific findings about the chemicals are lacking, and conflicted.

Slitt’s goal is to understand how various PFASs might disrupt the body’s metabolism in ways that can lead to obesity and to explore whether exposure to the chemicals early in life through breastfeeding is a risk factor for potential adverse health problems, such as fatty liver disease and disruption of metabolic hormones. Whether PFASs, which persist in the human body, are associated with the development of fatty liver disease in humans is not clear. Slitt will use liver and fat cells from humans to answer these questions.

“The goal of our project is to connect findings in human-derived cells and animal models with human clinical studies being conducted by our collaborators at Harvard to better understand potential health risks associated with exposure to PFASs,” says Slitt.

Lohmann says the project is a great example of URI professors and staff working together: “I’m very proud that the center will train young scholars at URI and Harvard to make the world a healthier place.” ☺

*“Water quality in the United States continues to be one of the most pressing environmental problems we face. This center will carry out critical research to better understand the impact of these chemicals and suggest ways to mitigate the risk of such chemicals.”*

# The Narragansett Bay Toxic Algae Bloom, Explained

BY TODD MCLEISH

The toxic algae bloom that closed parts of Narragansett Bay to shellfishing last spring is still somewhat of a mystery. Although the algae species has not been identified and we don't know why it was producing the toxin at that time, the nuts and bolts of how it happened and what will happen next are well studied, thanks to the long-term Narragansett Bay plankton time series. The nearly 60-year research project at the URI Graduate School of Oceanography, the longest of its kind in the world, is designed to make sense of the changing patterns of plankton in the bay.

Managed by plankton expert Tatiana Rynearson, URI professor of oceanography, the time series involves the weekly collection and analysis of plankton from several depths in the bay. Based on her extensive knowledge of the algae in Narragansett Bay and how algae blooms form and dissipate, Rynearson provides answers to some of the pressing questions about the continuing toxic bloom.

## **Describe the mechanics of an algae bloom. How does a bloom get started?**

An algae bloom is the result of the perfect set of conditions for that particular algae. Algae are like plants; they photosynthesize, so they need light and they need nutrients, like nitrogen and phosphorous. They also need to have a situation where predators aren't there to eat all the algae. The amount of algae growth is a combination of how well they're growing plus who's there to eat them and how much they're eating.

## **Isn't the timing of the March 2017 bloom unusual, given that it was still technically winter?**

You don't generally think of blooms happening in winter—there are no flowers out yet and no leaves on the trees. But in Narragansett Bay we have a winter-spring algae bloom that often occurs exactly at that time of year and often even earlier. We have a lot of light in March, it had been pretty sunny, we had a lot of nutrients in the bay, and some of the grazers that are so important were not around. The classic spring bloom happens many places around the world, and it's really important for fisheries and to support the food web. That spring bloom is what kick-starts biological activity for the year. What made this particular bloom interesting is that it included an organism that is toxic.

## **What do we know about this particular toxic organism, *Pseudo-nitzschia*?**

*Pseudo-nitzschia* is a genus of diatoms that has formed harmful algal blooms on the

West Coast for quite some time. A lot of research has been done to try to figure out what's going on out there. *Pseudo-nitzschia* is comprised of a number of species, some that produce the toxin and some that don't, and the species that produce the toxin don't always produce the same amount or any at all. So that's what makes it hard to predict and understand. There are clearly things going on that we don't understand.

## **How does it become toxic and what does it do to us?**

The reason it's toxic is because, as plankton, it gets eaten by things like clams and mussels and quahogs, which are filtering everything that's in the water, and they're filtering the *Pseudo-nitzschia*. The *Pseudo-nitzschia* is producing a toxin called domoic acid. The filter feeders bring that into their bodies, and those shellfish get harvested and eaten by people. That domoic acid causes an illness called amnesic shellfish poisoning—you might vomit or get a headache, and it could also result in a coma, short-term memory loss, or even death. It's quite a potent toxin.

## **Where did it come from? Has it always been here?**

We don't actually know where it came from. We know that *Pseudo-nitzschia* is present in the bay and has been for a long time. Maybe there's a new species that we can't identify yet. There are about 48 species in this genus, and many of them don't look very different under the microscope; they're hard to tell apart. We know that







the genus is around, but we don't know if there's a new species or a new strain that's come in, or if the existing inhabitants of Narragansett Bay have now turned toxic.

#### **How long is it likely to be here?**

There are probably two dozen species that produce domoic acid, and they may be here and just aren't producing domoic acid. The one that's producing domoic acid might stick around and stop producing it. So we probably need to figure out what species it is and why it's producing domoic acid. We can get a sense of that from the long-term Narragansett Bay plankton time series, which has been run out of GSO since the mid-1950s. For most of that time, it was run by professor Ted Smayda, and it continues today. It gives us context for interpreting the *Pseudo-nitzschia* dynamic that we're seeing now. For the last 60 years, we've been taking weekly plankton samples from the bay, so we can now get a sense of whether the *Pseudo-nitzschia* is there at all and whether the levels are normal or higher than normal. We don't test for domoic acid, but we know what algae are there, and we can start to contextualize the dynamics and abundance of this organism in the water. We're in a unique situation because we have all this data, and now we can go and mine the data and say, 'What have we been seeing? And is this year different from all the past years? What's going on that's generating these blooms?' Most places that have these blooms don't have a time series; they don't have any way to contextualize what they're seeing.

#### **Is there anything that can be done? Or do we just sit here and wait for it to go away?**

There are grazers out there that will eat these algae. And the filter feeders eat them. There's also a pretty good flushing rate in Narragansett Bay, so they could flush out into the ocean. And the algae community

**Stephanie Anderson, a GSO doctoral student in Professor Ryneanson's Lab, samples plankton from the R/V *Cap'n Bert* for the weekly Narragansett Bay plankton time series.**

*“For the last 60 years, we've been taking weekly plankton samples from the bay, so we can now get a sense of whether the *Pseudo-nitzschia* is there at all and whether the levels are normal or higher than normal.”*

tends to change over time. So, we can sit and wait and watch, and we can take samples during this event so we can figure out why it started. While we're not sure why this particular bloom happened when it did, there are a lot of vectors in the marine environment that can bring new algae into a new location. Was it a bird that came from a harmful algal location and brought spores of this species? Is it just regular circulation that caused it? Were they here already and they're just now responding to a particular environmental cue? All those things are unknown, so it would be unwise to do something about it since we don't know what led to the bloom and if it's anything more than natural variation. The R.I. Department of Environmental Management really tries to stay on top of this. They take samples and shut the shellfishery down in certain parts of bay, so they're concerned and try to do everything they can. While we keep an eye on it, they also want to keep everyone safe. ©

# Remembering Ted Smayda

BY DAVID BORKMAN, PH.D. '02

Professor Ted Smayda passed away in April 2017. Ted's long and productive career at GSO began in 1953. He graduated from Tufts University and entered URI as a graduate student in 1953, working with Professor David Pratt on Narragansett Bay phytoplankton. After completing his M.S. at URI in 1955, he worked as an assistant biological



oceanographer at the Narragansett Marine Lab from 1959–1961, when he became an assistant professor of oceanography—the same year the former Narragansett Marine Lab became the URI Graduate School of Oceanography. Ted enrolled in the Ph.D. program at Yale, then won a Fulbright Fellowship to study phytoplankton ecology at the University of Oslo, where he received his Ph.D. in 1967. In Norway, Ted studied under the direction of Professor Trygve Braarud, who was part of the “Norwegian School” of phytoplankton ecology, which traces its lineage to H.H. Gran. For his doctoral work, Ted did a comprehensive study of the phytoplankton of the Gulf of Panama, compiling detailed morphometric measurements on phytoplankton size, volume, and biomass, and examining the role of upwelling in stimulating phytoplankton production. During his doctoral work, Ted's lifelong love of languages was put to the test: he spoke Spanish while doing fieldwork in Panama, then returned to Norway to defend his Ph.D. thesis in Norwegian!

Ted was appointed associate professor at GSO in 1966. In the early 1960s, space was at a premium on the new GSO campus. Ted and other GSO faculty established temporary offices and lab space in Bunker C, a Spanish-American War-era underground bunker located just downhill from the Fish Building. Ted, his staff, and students renovated the interior of the bunker and it became a busy and productive phytoplankton ecology lab. They worked in this ‘temporary’ location from the 1960s until December 2015. While Ted often grumbled

about the bunker—where mice, snakes, woodchucks, and raccoons were common, and windows were scarce—he was also fond of it. He often said that it was not the outward appearance, but what was on the inside, that was important. Ted was appointed professor in 1970, and during his tenure, he and his students made good use of

the Bunker C space: 33 graduate students completed their degrees and hundreds of publications came from research carried out there.

Ted had a unique combination of skills and became an authority on phytoplankton ecology and harmful algae blooms. He was a prolific reader of the phytoplankton literature—in all languages—for decades. It was not uncommon to find phytoplankton journals from Scandinavia, Russia, Korea, Japan, and Europe in Ted's lab. He also had a deep knowledge of the taxonomy and ecology of phytoplankton species and could list an ecological profile of the growth rate, nutrient uptake rates and other species-specific biological properties of most phytoplankton species. His knowledge of phytoplankton ecology, including potentially harmful species, evolved into the study of harmful algae blooms. Ted viewed these blooms not only as potentially harmful events, but also as a kind of “Rosetta Stone” that could yield indicators of the biological, physical, and chemical factors responsible for selection and proliferation of phytoplankton species. Ted co-founded the journal *Harmful Algae* in 2002, and remained a co-editor through 2017. His achievements in harmful algae bloom research were acknowledged with a Yasumoto Lifetime Achievement Award (2002) and a Trail Blazer honor (2010) from the International Society for the Study of Harmful Algae. Ted also maintained an active collaboration with European colleagues, especially through his work with the International Council for Exploration of the Sea (ICES), for which he

received a service award in 2006. Details of Ted's other achievement awards may be found at [theodorejsmayda.org](http://theodorejsmayda.org).

Ted believed in “first principles” thinking, which led him to observe phytoplankton processes in locations like Narragansett Bay, the Gulf of Panama, and the Sargasso Sea. He was especially proud of the long-term Narragansett Bay plankton time series observations that he and his students and staff made weekly at ‘Station II’ in lower Narragansett Bay from 1959–1997. At maximum effort, 27 variables ranging from phytoplankton and zooplankton species identification, to rate process measurements like nutrient uptake and primary production rates, were measured each week. The extensive 1959–1997 phytoplankton time series observations are available at [nabats.org](http://nabats.org). Along with harmful blooms, the Narragansett Bay time series was a central theme of Ted's research. Ted and his students and the broader Bunker C community published more than 100 plankton ecology publications based on research related to the time series.

Ted maintained professor of oceanography status at GSO until 1995, when he was appointed research professor of oceanography, a position he held until his passing. During Ted's career, he maintained nearly continuous external funding to support his research and fund students and staff for over 50 years. He loved teaching and his enthusiasm for phytoplankton was infectious. He taught courses at Bigelow Lab in Maine and Tvarmine Zoological Station in Finland. He enjoyed mentoring summer students as part of the GSO SURFO (Summer Undergraduate Research Fellowship in Oceanography) program from 2012–2016. We will miss Ted's enthusiasm, his love of learning, and his smile, but his legacy will continue through his students, his ideas and publications, and the ongoing long-term Narragansett Bay plankton time series. ©

*David Borkman earned his Ph.D. at GSO with Ted Smayda. He is a biologist in the R.I. Department of Environmental Management's Office of Water Resources Shellfish Monitoring Program.*

# On the Job

## *Back on the Bay*

BY COLLEEN MOUW, M.S. '03, PH.D. '09

Who would ever expect to find themselves back where they started? After a decade-long tour around the Great Lakes, I'm back at GSO with a view from the other side of the desk (and a magnificent view out the window).

In my time away, I had the opportunity to be part of many varied institutions—from a small private religious-affiliated Midwestern university (Valparaiso University), to a major research mega-institution (University of Wisconsin-Madison), to a mid-sized science and engineering school trying to build a name for its graduate and research programs (Michigan Technological University). Through my experiences at these institutions, I was able to clearly see the value of GSO's academic and extended programs, the richness of the Bay Campus community, and the importance of the proximity to many state and federal agencies. GSO is a special place. While these experiences were not at institutions that GSO looks to as its peers, this less conventional route has provided me a unique perspective on the breadth of water education and research.

Coming out of GSO's graduate program, I found myself highly prepared to port my skills to a new system (the Great Lakes) and able to compete for research resources right from the start in both oceanography and limnology. I also quickly realized that I was not as well prepared for the magnitude and pace of the writing my work demanded, and that I needed exposure to and practice with the many other professional skills that are often more important than technical skills in navigating a career. In learning effective strategies to help myself in these areas, I developed a graduate writing course and a series of professional development seminars for graduate students. I have continued this work at GSO by reviving the Graduate Writing in Marine and Environmental Sciences course and by working closely with the professional development director in the URI Graduate School to lead and facilitate professional development

seminars for all URI graduate students. I hope these additions to the program will make our graduates' career transitions smoother.

As an alumna, I have a special interest in helping GSO be as great as possible. My less conventional path and my time at a variety of institutions exposed me to a wide array of perspectives, processes, and decision philosophies. I am excited to bring the best of these to GSO. I am still in the steeping phase—listening and learning how to translate my experiences into positive impact for GSO. So, to help in the continuous improvement of our programs, I would love to hear from you—GSO alumni—about the strengths and weaknesses of your graduate experience. How prepared were you for your own transition from graduate school to career?

I feel very fortunate every morning as I drive down South Ferry Road to GSO and see Narragansett Bay peek over the hill. I do hope you will knock on my door when you find yourself back in Rhode Island. I would love to hear about your water wanderings.

*Colleen Mouw is an assistant professor of oceanography at URI. In addition to earning her graduate degrees at URI, she completed a Summer Undergraduate Research Fellowship in Oceanography (SURFO) at GSO in 1999 while she was an undergraduate at Western Michigan University.*



*“Coming out of GSO’s graduate program, I found myself highly prepared to port my skills to a new system (the Great Lakes) and able to compete for research resources right from the start in both oceanography and limnology.”*

# Invaluable Assistance

*GSO's Inner Space Center credited for role in discovery of data recorder for El Faro wreck*

BY ELIZABETH RAU

GSO's Inner Space Center (ISC) won high praise from federal investigators recently for its help finding the data recorder of the doomed *El Faro* cargo ship. The National Transportation Safety Board (NTSB) released a transcript of audio recordings from the data recorder, which the ISC helped locate in 15,000 feet of water off the Bahamas in the Caribbean in April 2016.

Christopher Hart, chairman of the NTSB, singled out GSO's ISC for its "invaluable assistance" in the search. During a news conference in December 2016, Hart thanked the center—the only one of its kind in the country—for installing cutting-edge telepresence technology on the R/V *Atlantis*, the Office of Naval Research ship that conducted the search. The center, Hart said, provided "secure, high-speed, high-volume video and data transmission from the sea floor to the *Atlantis* and then via satellite to NTSB headquarters for analysis while the mission was in progress."

Dwight F. Coleman, ISC director, said he was honored to work on such an important investigation to assist in "bringing closure to the families who lost loved ones." Coleman and his staff had installed specialized ship-to-shore telecommunications equipment on the *Atlantis* that linked to NTSB headquarters in Washington, D.C. He supervised improvements to the ship's satellite-tracking antenna to allow video and data to stream ashore from the autonomous and remotely operated underwater vehicles used in the search. He also installed telecommunications equipment at NTSB's headquarters to receive the broadcasts and enable two-way communication. "We hope to work closely with the NTSB during future investigations that involve any kind of maritime loss, including plane accidents," said Coleman. "Our expertise can be crucial to these types of probes,



**Dwight Coleman, director of GSO's Inner Space Center (ISC). The ISC was instrumental in helping the NTSB to locate the data recorder of the *El Faro* wreck.**

especially when you're fighting against time."

The 790-foot *El Faro*, loaded with shipping containers and cars, sank October 1, 2015, during Hurricane Joaquin, a Category 4 storm, on its way from Jacksonville, Fla., to San Juan, Puerto Rico. All 33 crewmembers—28 Americans and five Polish nationals—died. Investigators found the ship a month later. With the help of URI and other organizations, investigators discovered the data recorder in April 2016 and retrieved it from the ocean floor in August.

The NTSB spent last fall examining the recordings to determine what went wrong. One crucial finding was that the captain ordered the crew to abandon ship not long after the main propulsion failed and flooding occurred.

URI was among a notable group of investigators. Other organizations recognized by the NTSB for their assistance included the U.S. Coast Guard; the U.S. Navy Supervisor of Salvage and Diving; the U.S. Navy's Military Sealift Command; the National Science Foundation; and the Woods Hole Oceanographic Institution.

The ISC was developed through the efforts of marine explorer and URI professor Robert Ballard. Supported in part by a \$14 million bond issue approved by Rhode Island voters in 2004, the facility opened in 2010. The ISC's mission is to expand participation in seagoing oceanographic research in real time by connecting scientists on ships with their colleagues on shore. It's modeled after Mission Control at the Johnson Space Center in Houston. The ISC supports the research missions of the R/V *Endeavor*, a URI research vessel; Robert Ballard's research ship, the exploration vessel *Nautilus*; and the *Okeanos Explorer*, which is based at Quonset Point, R.I., and owned and operated by the National Oceanic and

Atmospheric Administration. The center hopes to expand its operation over the next few years.

"The *El Faro* project enhanced the center's technical capabilities for ocean exploration," said Coleman. "The more projects we do like this, the better we become at what we do. There's a great future in the world for the application of telepresence technology." ©

# Deep Carbon

## *Integrating New Science*

BY ROBERT POCKALNY, PH.D. '91

**D**eep carbon science is a burgeoning new field, exploring how much carbon is in Earth, how it moves, what form it takes, where and how it originated, and how it has changed over billions of years. The Office of Marine Programs (OMP) here at URI's Graduate School of Oceanography is leading the charge in helping integrate this new science as a pillar of geological scientific inquiry.

The Deep Carbon Observatory's (DCO) Engagement Team is led by GSO marine research scientist Robert Pockalny, Ph.D. '91, with OMP staffers Katherine Pratt, DCO communications director, and Josh Wood, DCO digital content manager. This group of science communication and design professionals works with Earth and life scientists around the world to share groundbreaking new research with a variety of audiences, ranging from scientists to journalists to members of the general public.



**Microbiologists Karen Lloyd and Donato Giovannelli sampling at one of Costa Rica's many springs.**



**Locations of DCO field studies.**

DCO is a 10-year initiative (2009–2019) supported by the Alfred P. Sloan Foundation, which pledged \$50 million to support infrastructure development, scientific workshops, novel technology development, and research and fieldwork. This seed funding helps catalyze collaborative scientific efforts around the world, increasing public and private spending in deep carbon science, and creating a thriving community of international scientists as its legacy.

Since 2013, the DCO Engagement Team has worked with DCO leadership to build a global community of scientists working in a vast array of scientific disciplines. The DCO Science Network now boasts more than 1,000 members in 40 countries. The Engagement Team works in a variety of ways to ensure the success of DCO, from regularly sharing news of DCO science on its website and social media, producing a monthly newsletter for its members, publicizing high-profile work to the global news media, and working with community members to produce high-quality graphics, videos, and other engaging scientific content.

In many ways, the DCO Engagement Team's job has been easy, since there has been a continuous flow of scientific advances creating a solid foundation for deep carbon science. Among their many transformational advances, DCO scientists have identified biotic vs. abiotic sources of methane with unparalleled precision; measured gas emissions at volcanoes around the world, inching closer to eruption prediction; and discovered water that is nearly two billion years old, which may hold clues about the origins of life. In addition, the evolution of carbon-bearing—and other—minerals has been linked to major changes in the evolution of the Earth, including the rise in atmospheric oxygen ~2.2 billions years ago, and the more recent impact of human activities.

The Engagement Team is in the process of switching gears to help synthesize all that has been learned about deep carbon science in this decade. The team is helping orchestrate a series of books, special issues, videos, infographics, and other content that will contribute to the integration of deep carbon science into classrooms, conversations, and the scientific record. Stay tuned. ©

*Robert Pockalny is a GSO marine research scientist and principal investigator on the DCO project.*



The R/V *Endeavor* is required by the American Bureau of Shipping (ABS) to go into dry dock twice every five years for a major maintenance overhaul.

## Where's *Endeavor*?

BY MALIA SCHWARTZ

Normally when someone asks, “Where’s *Endeavor*?” she’s out at sea working hard for the scientists and crew who depend on her for their research. But last fall, when I didn’t see R/V *Endeavor* at her GSO dock and needed an update for our weekly e-news, “On the Waterfront,” I contacted Thomas Glennon, GSO director of marine operations, who explained that *Endeavor* was in dry dock at the Senesco Marine shipyard at Quonset Point, R.I., for her bi-quinquennial (twice every five years) major maintenance overhaul.

He said she would be there until Christmas, and would I like to take a tour of her and see the work that was being done? I jumped at the chance! It had been some 25 years since I’d had the pleasure of sailing on *Endeavor* for a scientific cruise out on Georges Bank as a graduate student.

“Hope you’re not afraid of heights,” Glennon said, and sent me a picture—*Endeavor*’s decks now some 50 to 70 feet above the dry dock floor, accessible only by climbing a very steep ladderway. So on a bright, crisp fall day, we headed to the shipyard for the tour.

The *Endeavor* is required by the American Bureau of Shipping (ABS) to go into dry dock twice every five years to open, inspect, and test all sea valves, the main propulsion system, including the tail shaft, propeller blades and hub, rudder stock, and any other ship system located below the waterline.

The first question that came to mind upon arriving at the shipyard and seeing *Endeavor* in her dry dock berth was, ‘How did they get her up there?’ It turns out that the dry dock ballast tanks are flooded to sink the entire structure, allowing *Endeavor* to float in—assisted by lines and diver—and blocks positioned to cradle the load carefully and evenly while the dry dock lifts up out of the water as the ballast tanks are drained.

As we walked around the underside of the ship, Glennon pointed out the numerous tasks being undertaken during the two-and-a-half month overhaul. He showed me the sea “skin” valves along *Endeavor*’s wetted hull, which are the intakes and overboard discharges for various ship systems, allowing cooling water for the main engine

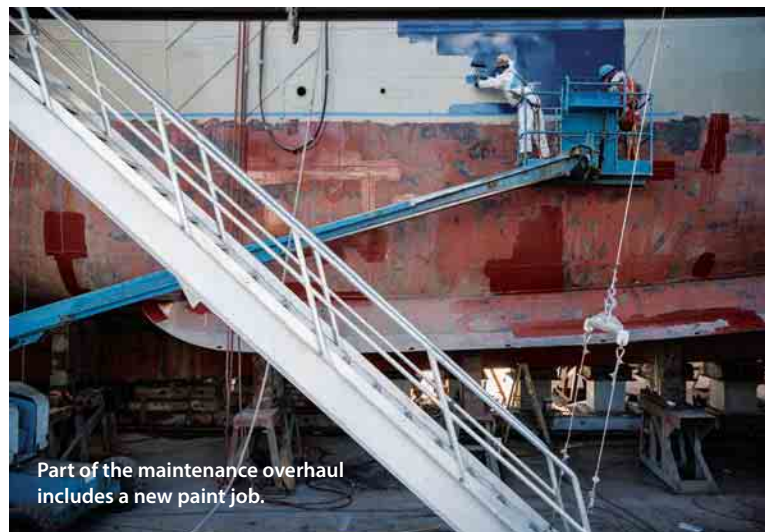
and diesel generators, ballast systems, fire main, and even the saltwater supply for all the ship’s toilets. Each of these approximately 50 valves, which range in size from 0.5 to 10 inches would be opened, inspected, and tested. Next, Glennon pointed out the 44 heavy-duty zinc anodes that would be replaced. The hostile marine environment can take a toll on a steel ship’s hull, so to prevent corrosion, sacrificial anodes (plates made of zinc) are welded onto the hull to counteract the galvanic corrosion of the steel hull, but in doing so, the zinc is consumed, and must be periodically replaced. Lastly, Glennon explained that four sets of ballast tanks and two sewage tanks would be blasted to white metal, inspected, repaired, and recoated.

Our next stop was the main deck and the ship’s interior, and for that, we made the steep climb up the suspended staircase—I tried not to look down!

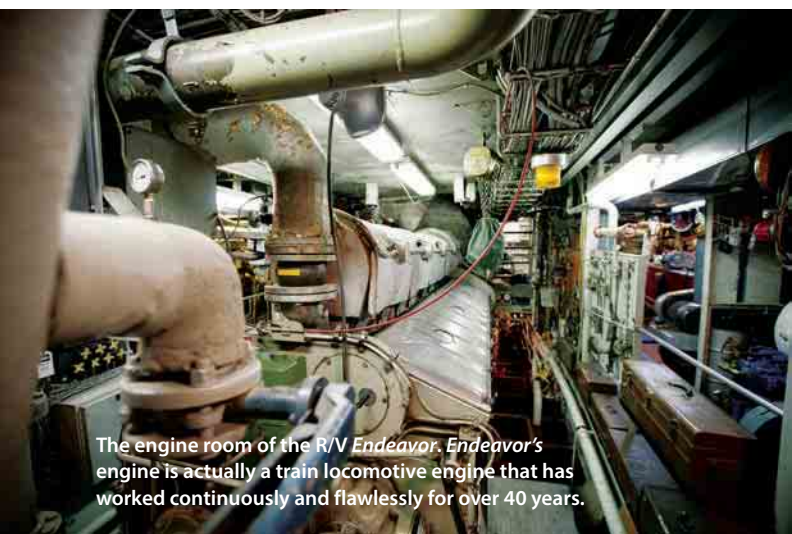
We were greeted by Daniel Alexander, *Endeavor*’s port engineer, who was at the shipyard every day during the 72-day dry dock period, supervising all the activities carried out for the inspection. He was



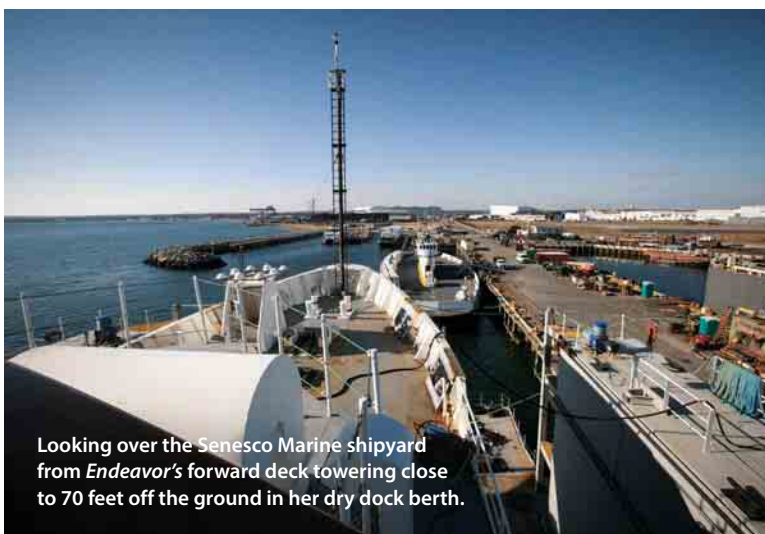
Thomas Glennon, GSO director of marine operations, oversees all aspects of *Endeavor's* operations.



Part of the maintenance overhaul includes a new paint job.



The engine room of the R/V *Endeavor*. *Endeavor's* engine is actually a train locomotive engine that has worked continuously and flawlessly for over 40 years.



Looking over the Senesco Marine shipyard from *Endeavor's* forward deck towering close to 70 feet off the ground in her dry dock berth.

joined by William Fanning, lead marine technician, who was responsible for care and maintenance of all the science outfitting. In the forward Main Laboratory, used by scientists during their research cruises, we met marine technician Erich Grubel, who was in the process of removing the old electronics rack system in the lab and replacing it with a larger system, adding space to accommodate new electronic components. The new components greatly improve the ship's closed-circuit TV system, giving scientists more and better data, in real time, allowing them to share the information with colleagues, students, and others involved with the science cruise mission at sea and onshore.

The tour continued to the engine room. While *Endeavor's* engine was not part of this maintenance overhaul (the ship's engine undergoes a full rebuild every

32,000 hours—the last one completed in December 2014), Glennon took the time to point out some interesting features of *Endeavor's* Electro-Motive Diesel (EMD) main engine—one of them being that this type of engine is most commonly used as a train locomotive engine. "As port engineer, when I attended an EMD class, I was the only marine engineer in the room," says Glennon. "Everyone else was a locomotive engineer." Thanks to the many conscientious *Endeavor* engineers, this 3,000-HP turbo-charged engine has worked continuously and flawlessly for over 41 years.

We made our way out onto the deck, where we saw the deck winches, anchor windlass, and the aft deck capstan being overhauled and upgraded. In addition, both the A and J frames had been removed from the ship to be overhauled mechanically and hydraulically. The A and J frames, located

at the ship's stern and starboard side, are used to deploy and recover oceanographic equipment for sampling and other data collection at sea. Additionally, the main deck tonnage openings and hatches were being removed, refabricated and reinstalled due to excessive steel wastage.

Finally, the hull and exterior decks would be blasted and painted. As a last step in the ABS inspection, *Endeavor* was required to complete successful dock and sea trials to test all her newly renovated machinery and systems. *Endeavor* returned to her GSO pier on January 16, 2017, ready to begin a new year of scientific cruises in furthering oceanographic research. ©

*Malia Schwartz is assistant director for research at GSO.*

# Metcalf Moves to CELS

*“It’s been exciting to watch Metcalf Institute grow over the past 20 years into an internationally recognized program benefiting journalists and scientists worldwide.”*

In summer 2017, the Michael P. Metcalf Institute for Marine & Environmental Reporting joined the URI College of the Environment and Life Sciences (CELS). The Metcalf Institute was established at GSO in 1997 to honor Michael P. Metcalf, the late publisher of the *Providence Journal*, who had a deep passion for the environment and was known for his integrity, vision, and high journalistic standards. The institute expands accurate environmental news coverage and fosters informed public conversations about environmental issues through innovative training and resources for journalists, researchers, and other science communicators. The move will enhance CELS’ existing science and environmental communication

faculty and graduate students can continue our participation in Metcalf’s programs while expanding the institute’s reach throughout the entire University.” Metcalf Institute’s Annual Public Lecture Series and Annual Science Immersion Workshop for Journalists, which brings reporters and editors to URI from around the world, will continue to be hosted at GSO each June.

“URI has the institutional capacity to be a national leader in advancing science communication and engagement, and Metcalf Institute is a key component of this capacity,” said John Kirby, dean of CELS. “I’m looking forward to combining CELS’ global connections and Metcalf Institute’s training expertise to create new professional development opportunities in the United States and abroad, while expanding URI’s educational offerings to meet the needs of students who seek interdisciplinary grounding in science and communication.”

“We are proud of our success at GSO and the global outreach work of GSO’s Office of Marine Programs,” said Sunshine Menezes, executive director of Metcalf Institute. “Metcalf’s reputation for programmatic excellence is due, in part, to the contributions of GSO faculty, staff, and students who have shared their expertise with the hundreds of journalists who have attended our Annual Science Immersion Workshop since 1999. We look forward to continuing these relationships from our new location on URI’s Kingston Campus. As Metcalf celebrates its 20th anniversary, this is the right time for URI to address the growing communication challenges of both scientists and journalists in an integrated way, and we’re thrilled to be part of this effort in CELS.”

Since 1999, Metcalf Institute has conducted more than 80 programs benefiting nearly 1,600 journalists, scientists, and other science communicators at workshops, seminars, and conferences at URI and across the country. Metcalf alumni represent a wide range of local to international media organizations across all media types, as well as science researchers and communication staff from universities, state and federal agencies, and nonprofits. ☺



Metcalf Institute’s Annual Science Immersion Workshop attracts journalists from around the world seeking a deeper understanding of the science behind the environmental stories they cover.

research projects, courses, and fellowships and enable new partnerships and collaborations across academic disciplines throughout the university.

“It’s been exciting to watch Metcalf Institute grow over the past 20 years into an internationally recognized program benefiting journalists and scientists worldwide,” said Bruce H. Corliss, dean of GSO. “While we’ll miss Metcalf’s daily presence on the URI Bay Campus, we’re pleased that GSO



# Hurricane Expert Isaac Ginis Honored by NOAA

BY ELIZABETH RAU



## How did you get interested in studying hurricanes?

I became interested in hurricanes when I took physics in high school and was lucky to get the opportunity to study them as part of my doctorate thesis research. I wanted to better understand the physical processes that control a hurricane's behavior so we can better predict what the storm is going to do tomorrow or in the next few days.

## You are the first scientist to show the ocean's role in hurricane intensity. Can you explain your discovery?

From a physics standpoint, a hurricane is a heat engine. It's a massive natural machine for converting heat energy into mechanical energy—in this case wind. That heat energy is derived from the ocean. Recognizing this relationship between the ocean and the atmosphere allowed us to build computer models that can more accurately predict the strength of hurricanes. But hurricanes are complex, and there are many ingredients in the recipe for any given storm.

The temperature of the ocean is the most important factor in forecasting hurricane intensity. Scientists were largely unaware of this fact—until URI oceanographer Isaac Ginis discovered the crucial role the ocean plays in the path and power of hurricanes.

Ginis has received many honors for his decades of research, with the latest award from the National Oceanic and Atmospheric Administration, or NOAA. At the Tropical Cyclone Operations and Research Forum in March 2017, he received a certificate of appreciation from the federal organization for his contributions to hurricane forecasting.

Ginis, a native of Russia, doesn't sail or fly into hurricanes to study them. His groundbreaking research has been accomplished sitting at a computer. With a bachelor's degree in math and a doctorate in geophysics—both from Russian institutions—Ginis creates mathematical computer models to track storms and predict their strength. His expertise is sought out by public and state officials—including those in Rhode Island—trying to discern if, and when, a hurricane will make landfall. Ginis' insight is critical; his models give officials time to prepare for a storm and save lives.

URI's Department of Marketing and Communications talked to Ginis recently about his research, and whether climate change will bring more storms to the Northeast.

## If you don't fly into a hurricane, how do you get your data?

We have many observational platforms these days to gather data in the atmosphere and ocean that help predict hurricanes. Most important, of course, are the measurements made by reconnaissance aircraft. In their absence, satellites are the primary platform for hurricane observations, but critical measurements are also taken at sea by ships and buoys and on land by radars and other coastal monitoring systems.

## As temperatures increase due to climate change, do you expect more frequent and intense hurricanes in the Northeast?

Recent scientific evidence and modeling studies suggest that hurricane intensity may be increasing and will continue to increase due to warmer sea-surface temperature, but the connection to Atlantic hurricane frequency is less conclusive. In addition to intensity, models project significant increase in rainfall that will lead to inland flooding during hurricanes.

## What about other regions of the world? How do you help predict hurricanes elsewhere?

The computer models our URI hurricane research group helps to develop and

improve are used by NOAA's National Hurricane Center and the Navy's Joint Typhoon Warning Center worldwide. For example, our models were involved in forecasting Typhoon Haiyan in the Northwest Pacific, the strongest tropical cyclone recorded at landfall, which devastated the Philippines in 2013.

## Have you ever been in a hurricane?

Although I never experienced a hurricane personally, I was involved in surveying the damage after Hurricane Katrina in 2005. The devastation inflicted by that storm on the Gulf Coast is still vivid in my memory. In Biloxi, Miss., I saw houses destroyed by the storm surge with only a few items left on the ground and large casino barges severely damaged and pushed on shore. Those images made me appreciate even more the enormous destructive power of a hurricane.

## What advice do you have for students who want to study hurricanes? Is it more important to study math or physical oceanography—or both?

Weather and hurricane forecasting is a combination of physics, mathematics, and computer science. I suggest studying all of these subjects in college. ©

# Scientists Receive EPA Merit Award

BY ELIZABETH RAU

The U.S. Environmental Protection Agency (EPA) awarded an EPA 2017 Environmental Merit Award to the late Scott W. Nixon, an oceanographer at the University of Rhode Island, and Robert D. Kenney, a marine research scientist at URI's Graduate School of Oceanography, for their work as part of the Boston Harbor Outfall Monitoring Science Advisory Panel (OMSAP).

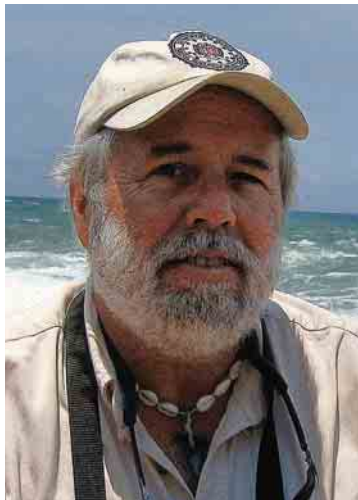
The OMSAP was critical to the success of the Boston Harbor cleanup and recovery. Established in 1998, the panel works to ensure that the Massachusetts Water Resources Authority (MWRA) meets permit requirements and that the recovery of Boston Harbor is not accomplished at the expense of Massachusetts Bay.

The independent group of marine scientists advises the EPA and Massachusetts Department of Environmental Protection (MassDEP) on the environmental effects of the discharge of about 320 million gallons per day from the MWRA's Deer Island sewage treatment plant. The discharge is sent nine miles offshore into Massachusetts Bay—an "estuary of national significance" under EPA's National Estuary Program. In the planning for the discharge location from the late 1980s into the 1990s, the public raised significant concerns about the potential effects of the discharge, especially the effects of nutrients on the food web that could adversely impact endangered species, especially the North Atlantic right whale.

Nixon was internationally renowned for his work involving coastal and estuarine ecosystems, notably the effects of nutrients in coastal waters. Kenney is a marine mammal and protected species expert, whose work on the critically endangered right whale provided the endangered species perspective needed on the OMSAP.

"There was great concern at the beginning about the possible effects of the new outfall on right whales in Massachusetts

Every year, EPA's New England office recognizes individuals and groups in the six New England states who have worked to protect or improve the region's environment. The award recognizes extraordinary ingenuity and commitment.



GSO marine scientist Robert Kenney (left) and the late Scott Nixon, GSO professor, were honored by EPA Region One for their work as part of the Boston Harbor Outfall Monitoring Science Advisory Panel (OMSAP).

waters. The whales are still endangered and presently declining, but we can confidently say after two decades of monitoring that the MWRA outfall is not responsible," said Kenney.

Nixon and Kenney are among a notable group: Other members of the OMSAP are Andrew Solow (retired chair), Woods Hole Oceanographic Institution (WHOI); Judith Pederson (interim chair), Massachusetts Institute of Technology Sea Grant; Michael Shiaris and Juanita Urban-Rich, both of the University of Massachusetts, Boston; Jim Shine, Harvard School of Public Health; Robert Beardsley, WHOI; Geoffrey Trussell, Northeastern University; and Norbert Jaworski, of the EPA Office of Research and Development (retired).

OMSAP's most important work is evaluating revisions in the MWRA Outfall Monitoring Program, used as a model for overseeing wastewater discharges in other coastal ecosystems. "This program, with review by the OMSAP, is one of the best

examples of adaptive management in New England. For almost 20 years, this independent group of highly regarded, dedicated, and professional marine scientists has helped the government ensure that the outfall discharge does not cause adverse effects, and has provided accountability and credibility to the public. The Boston Harbor recovery is a great story, and without the OMSAP, one of the chapters would never have been written," wrote the nominators for the EPA Award.

Every year, EPA's New England office recognizes individuals and groups in

the six New England states who have worked to protect or improve the region's environment. The award recognizes extraordinary ingenuity and commitment.

"Citizens, businesses, and organizations are going above and beyond to help protect people's health and preserve our region's environment," said Deb Szaro, acting regional administrator of the EPA's New England office. "Today we applaud these award winners who make our towns, cities, and countryside healthy, more vibrant places with clean air, land, and water. Many of these winners have shown us that good business and a clean environment go hand in hand." ©

# GSO Student Wins International Award

BY ELIZABETH RAU

“Organophosphate esters” is a mouthful to most, but for Carrie McDonough the cryptic words spell possible doom for ocean waters. McDonough, a GSO Ph.D. candidate who graduated last May, studies these flame retardants to find out whether they are polluting the ocean.

Her conclusion: Yes.

McDonough won the C. Ellen Gonter Environmental Chemistry Award from the American Chemical Society, the highest honor given by the organization’s Division of Environmental Chemistry. The Cleveland native was honored for her paper, “Dissolved organophosphate esters in the North Atlantic Ocean and Arctic Ocean.”

“I’m very excited about the award, and I look forward to presenting the work at the group’s annual meeting in the fall,” says McDonough. “It’s been a very interesting project to be a part of, and I’m very grateful to my advisor, Rainer Lohmann, for getting me involved with the work.”

Many of the award recipients have gone on to become leaders in the field of environmental chemistry, and that could play out for McDonough. A graduate of the Massachusetts Institute of Technology, McDonough has been researching how chemicals pollute waterways since she came to GSO to work with oceanographer Lohmann, an expert in marine pollutants.

She is studying two groups of compounds: synthetic fragrances, which are added to shampoo, soap, deodorant, detergent, and cleaning supplies; and flame retardants, which are added to furniture, textiles, plastic toys, and electronics to decrease flammability.

McDonough’s award-winning paper focused on organophosphate esters. They’ve been used more frequently over the past decade because scientists found that other kinds of flame retardants are toxic. Scientists speculated that the organophosphate esters wouldn’t break down in the environment, meaning they couldn’t travel to distant, fragile environments like the Arctic.



Carrie McDonough, Ph.D. '17, won the C. Ellen Gonter Environmental Chemistry Award from the American Chemical Society for her research paper on organophosphate esters in ocean waters.

It was thought that organophosphate esters weren’t capable of “long-range transport” to Arctic regions after being released into the air and adhering to airborne particles that end up in the water. But recent studies have found them in Arctic air, so McDonough investigated if she could measure them in remote ocean waters.

Through collaboration with Environment Canada and the Alfred-Wegener Institute in Bremerhaven, Germany, sampling was done to measure organophosphate esters in deep North Atlantic water and waters in the Canadian Arctic. McDonough placed passive polyethylene samplers, or sheets of plastic, on deep moorings in the North Atlantic to find out whether the contaminants were in the ocean.

Her results are alarming: The pollutants are present at much greater concentrations than many other pollutants, including the previously banned flame retardants. This suggests that organophosphate esters might not be a good replacement after all. “More research needs to focus on studying what

effects these pollutants might be having in remote regions,” says McDonough, “and how they’re ending up there in the first place.”

Lohmann says he’s not surprised McDonough won the award. “Carrie is already a very accomplished, diligent, and entrepreneurial student,” he says. “I’m glad she got rewarded for her outstanding work, in this case the first measurements of novel flame retardants in waters of the Arctic Ocean.”

McDonough is one of six students to win the international award, given annually to students at American and international universities who submit the highest quality research papers.

McDonough is also known for her successful blog, “oceanbites,” which offers plain-speaking articles about ocean sciences. Many of the contributors are students at GSO or GSO alumni.

“I’m happy,” she says, “to bring important science information to the world.” ☺

# Ocean SAMP Team Recognized with 2017 Benchley Award

BY ELIZABETH RAU

Jennifer McCann, director of U.S. coastal programs for the URI Coastal Resources Center (CRC) and extension director of Rhode Island Sea Grant, along with Grover Fugate, executive director of the state Coastal Resources Management Council (CRMC) and their colleagues at CRC, Sea Grant, and CRMC, have received an international award for their work in

Named in honor of the author of *Jaws*, the Benchley Awards celebrate those who have committed their lives to working on important ocean and coastal issues.

Winning in the “Excellence in Solutions” category, the Rhode Island team shared the award with two ocean policy planning groups in the Northeast and Mid-Atlantic that were established under the U.S. National Ocean Policy of 2010. U.S. Senator Sheldon Whitehouse, a recognized leader in Congress for ocean issues, nominated McCann.

Calling the recipients “widely admired planning bodies,” the judges praised the winners for “enabling us for the first time ever to make smarter, better coordinated planning decisions for long-term enhancement of our shared ocean resources, including fisheries stocks, transportation channels, and the leasing, permitting, and development of offshore energy

projects.” The judges went on to say that the three teams have created “landmark” ocean plans that prove “securing our ocean future in a collaborative way is not only possible, but the best way forward.”

The Ocean SAMP, a regulatory document to manage the state’s ocean resources, has won international praise from policy makers, fishermen, tribes, environmentalists, and Rhode Islanders for examining how best to manage, protect, and enhance increasing uses and resources of the state’s ocean waters. ☺



Jennifer McCann, director of U.S. coastal programs for the URI Coastal Resources Center (CRC) and extension director of Rhode Island Sea Grant, led the Ocean SAMP planning effort.

*“This has been a team effort with my colleagues at CRC, Sea Grant, and CRMC, our host of partners, and the people of Rhode Island.”*



coastal and ocean planning.

McCann led the development of the Rhode Island Ocean Special Area Management Plan, or Ocean SAMP, which provides regulations for the management and protection of Rhode Island’s ocean resources and activities.

“I’m deeply honored to receive this award,” said McCann. “I really feel that this has been a team effort with my colleagues at CRC, Sea Grant, and CRMC, our host of partners, and the people of Rhode Island.”

The nationally acclaimed management plan increased protection for fishing, marine trades, and conservation and resulted in the installation of the first offshore wind farm in the country.

This is the first time Rhode Islanders have won the award, now in its 10th year. Past winners have included four heads of state, U.S. secretaries of state and defense, senators, leading marine scientists, journalists, explorers, youth leaders, and citizen activists.

# ALUMNI AWARDS

## Colin Jones

I am a Ph.D. candidate at GSO working with Professor Rebecca Robinson. My research focuses on how individual diatom species can influence paleoceanographic nutrient consumption records. In January 2017, I participated in a Southern Ocean cruise on the R/V *Nathaniel B. Palmer* led by Professor Robinson, utilizing *in situ* pumps, CTD casts, coring, and shipboard growth experiments to examine nutrient isotope records from the surface ocean to the sediment (*see related story, page 3*). We also collected live diatoms to examine species-specific effects back at GSO.

Because of the support from a GSO Alumni Award, I had the opportunity to spend four weeks immediately following the cruise at the University of Otago in New Zealand working with the diatoms I collected. There, I made sure that the species we collected were growing well and I established a backup culture library. Working closely with a diatom taxonomist from Otago, I completed diatom identifications on samples collected during the cruise. I was also invited to give a seminar presentation on our cruise work to the marine sciences department there. The fruitful post-cruise work with faculty and discussions with graduate students working on similar questions sets the stage for future collaborations. And, importantly, the backup cultures established there increase our chances of a successful investigation for my Ph.D. research. Without Alumni Award funds, I would not have had the opportunity to continue time-sensitive post-cruise work in New Zealand or communicate my science and ideas to a group of potential international collaborators. I am grateful for this support. ©



Colin Jones working in the lab aboard the R/V *Nathaniel B. Palmer*, filtering a shipboard diatom growth experiment during the SNOWBIRDS Southern Ocean research cruise.



Noah Walcutt with advisor, GSO Assistant Professor Melissa Omand on the research cruise.

## Noah Walcutt

I am very appreciative of the generous financial support from a GSO Alumni Award, which funded my travel and accommodations for the “Sea to Space Particle Investigation” research cruise. This experience will surely be one of my most memorable from GSO, and I could not have participated without this financial assistance.

A brief summary: Along with my advisor, GSO assistant professor Melissa Omand, I departed Honolulu, Hawaii, on January 27, 2017, after a high-energy week of packing, performing last-minute tests, and participating in ship-side orientation. Chief Scientist Ivona Cetinić of NASA led our science party of 15 to “improve the accuracy of particle size distribution products gathered from satellite and remote-sensing data records...which aimed to transform our understanding of the roles of particle and plankton size in global biogeochemistry and other processes.” Our month-long transect included three stations en route to Portland, Ore., with drifting asset deployment/recovery, underway optical experiments, incubation experiments, and other projects. The team included GSO alumna Stephanie Schollaert Uz, M.S. ’97, as well as collaborators from NASA, Skidmore College, Duke University, Moss Landing Marine Lab, Brown University, and Sequoia Scientific, among others.

Overall, I couldn’t be more thrilled with the data I was able to collect for my graduate research, which included 45 deployments of a holographic microscope. We were also able to gather several days of marine snow time-lapse camera data, from a new instrument I’ve helped develop during my time at GSO. The successful completion of our lab’s science objectives can be credited to the hard work of the crew of the R/V *Falkor*, as well as the high-caliber science team I had the privilege of working alongside. You can find additional information, videos and blog entries about the cruise at [schmidtocean.org/cruise/sea-space-particle-investigation](http://schmidtocean.org/cruise/sea-space-particle-investigation). ©

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## ALUMNI NEWS

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**Randolph Barba, M.S. '78**, and Lorraine continued their grand travel excursions, traveling six-plus months each year. They have aggressively explored habitats, geology, tribal cultures, and ancient civilizations combined with sailing, fly fishing, and birdwatching excursions. They've learned so much and have developed what is for them a deeply nuanced view of the world. Randy says that retirement is a wonderful opportunity if you have the resources with which to take advantage of their time.

**Walter Berry, Ph.D. '87**, a longtime resident of the Davisville neighborhood of North Kingstown, R.I., was recently awarded an Independent Spirit Award for his volunteer efforts with the Concerned Citizens of Davisville (CCOD) and the Land Conservancy of North Kingstown (LCNK). He is co-chair of CCOD, where he advocates for the community by connecting residents with the town council and administration to voice their concerns and provide input on community issues. He is the stewardship co-chair for LCNK, where he does annual property walks and works with owners who have donated their development rights to ensure the protection of the conservation value of their properties in perpetuity. Walter was recognized at an awards dinner in October.

**Ted Durbin, Ph.D. '76**, and **Maria Casas, M.S. '93**, are doing fine in retirement. They just finished their house renovation and addition and are now working on their "jungle" outside. They don't miss the cold at all and report that the temperature is typically in the mid-70s in Sarasota!

**Michael Fine, Ph.D. '76**, has officially retired from Virginia Commonwealth University (now professor emeritus) as of January 2017, and will be residing between Virginia and Cape Coral, Fla. He recently published a paper in *Proceedings of the Royal Society of London B*, demonstrating that the toadfish swimbladder wall is a viscoelastic structure composed of anisotropic layers of collagen and elastin and is about 80 percent water. These properties cause the swimbladder to damp rapidly so that fish sounds are produced as a forced rather than a resonant response. Historically swimbladders have been considered resonant structures. Michael is also working on the sonic mechanism of deep-sea cusk eels and how it changes with depth on the continental slope.

**Miles Furnas, M.S. '75, Ph.D. '82**, retired from the Australian Institute of Marine Science (AIMS) as of July 2016 after 34 years, though he still has his fingers in a few (meat) pies as an AIMS Associate. As a biological oceanographer, he ended up in the world's best job. Over the years, his group worked across the fullness of the Australian tropics from Northwest Cape in Western

Australia (Ningaloo Reef) to Heron Island (southern Great Barrier Reef). Most of the effort was in the Great Barrier Reef, with an emphasis on system productivity, river runoff, water quality, and shelf edge upwelling. He arrived in Australia as an ice hockey player (Townsville actually has an ice rink), but now he's putting his sporting energy into rowing. His wife, Grace, will retire this year after practicing 40 years as a veterinary surgeon. Plan A is to travel a bit more, but they suspect that grandparenting for their two grown daughters living in Brisbane will change that soon enough.

**Don Gordon, M.S. '64**, was glad to hear that we are keeping the alumni directory alive. He still functions as an emeritus scientist and is completing a chronology that documents the history of BIO from 1962 to 2012. He is also working on his scientific memoirs, which of course include his time at GSO. Don just had hip replacement surgery and is gradually recovering. Thank goodness he has lots of projects to work on during this period of inactivity that helps him deal with cabin fever. He's looking forward to resuming normal activities soon.

**Brita Jessen, Ph.D. '16**, wrote all a wonderful letter: "Dear Friends, I am writing from a new home where a 'cold snap' is anything less than 70 degrees, and my office window view looks out to the tangled stems of mangroves.

Over the past whirlwind month, I have been warmly

welcomed to my new position as the research coordinator of the Rookery Bay National Estuarine Research Reserve in southwest Florida, and thrown straight into the deep-end, as they've been existing without a research coordinator for half a year. I wouldn't want it any other way: After focusing deeply on one project for so long, I've quickly learned how it feels to have one's mind engaged in a wide range of topics, from water quality to fisheries to birding to sea-level rise to sediment transport to mangrove restoration...and on! I am enjoying the camaraderie, the chance to do important work, and the hope that I might be making a difference on any scale. Work is my antidote to the news of the day. And so is my family. Corwyn is just about 17 months and is happily befriending the beasts (he loves to gab with frogs and lizards, and has given a gopher tortoise a pat). Aoife and Riordan will be 8 and 10 when they join us this summer, and are pretty locked in on a certain theme park in Florida to visit... Adam is bringing home all sorts of curiosities he finds beneath the waves, and Maya is soaking up the sunshine like a Puerto Rican sato loves to do.

There's so much to do here, so much tangled politics to maneuver, so many priorities and people needing attention. I can't thank you enough for giving me such a strong foundation from which to stand. Your wisdom and example replay in my mind with every new encounter I face. All my best to you and yours! Brita"

# ALUMNI NEWS

**Ed Kearns, Ph.D. '96**, has just been appointed as NOAA's first chief data officer, so now he works within the Office of the Chief Information Officer. His office is still in Asheville, N.C., though he spends about half his time in Washington, D.C., nowadays. Ed hopes all is well at GSO. He hasn't been back in years but hopefully...

**Allen Myers, Ph.D. '74**, was called out of retirement to go to the Union Congregational Church on Isle au Haut, so he is once more on the ocean regularly, plying the waters between Stonington, Maine, and Isle au Haut, five miles further out. He continues to restore reed organs (that is, in fact, how Allen initially went to Isle au Haut, to fix the church reed organ; the island has 14), and his publication list on that subject now exceeds the sum of his scientific contributions, whatever that may be a measure of.

**Barbara Nowicki, M.S. '83, Ph.D. '91**, is fully retired, happily tending to an enormous organic fruit, vegetable, and flower garden and serving as the president of a Unitarian Universalist congregation in Newport. She has a 24-year-old daughter who is a textile and graphic design artist. Best wishes to all from Barbara!

**Dick Payne, Ph.D. '72**, continues to be very active in his local land conservancy, The 300 Committee Land Trust, serving on the board and executive committee, as well as two other committees. He also continues to take flute lessons and plays in his local orchestra. Life is pretty good!

**Nancy Reichley, M.S. '85**, has retired from Washington Sea Grant and is now figuring out what the next steps will be!!

**Kurt Rosenberger, M.S. '01**, is coming up on 12 years with USGS and loving every minute of it. He's had the opportunity to work in some amazing places—from the depths of Monterey Canyon to the reefs of Guam, Hawaii, American Samoa, Marshall Islands, Northwest Australia, and Puerto Rico. His wife Taryn and he have two boys, ages 7 and 3, and are expecting their third, a girl, at the beginning of August. He's feeling blessed in a time of uncertainty for the earth sciences.

**Karen Young, M.S. '82**, lives on the beach on Singer Island and works at her church. She's living the great life now. She has worked at Christ Fellowship Church since November 2015. At Christ Fellowship she works in the human resources department on leadership development and training projects.

## GSO Directory Additions

In the recent printing of the GSO Directory of Graduates 2016, some of our graduates were inadvertently omitted. Here is a list of those individuals.

### **Joseph Devine, Ph.D. '87**

Deceased

*Major Professor:* Sigurdsson; *Field of Study:* Geological

### **Harriet Diamond, M.S. '81**

32 Chatham Road, Newton, MA 02461, 617-964-5377, deahd@rcn.com

Diamond Environment Associates, Inc., 32 Chatham Road, Newton, MA 02461

*Major Professor:* Jeffries; *Field of Study:* Biological

### **Mariel Oakman Dickinson, M.S. '88**

8152 South Saint Paul Way, Centennial, CO 80122, 303-771-9577, djmodickinson@gmail.com

*Major Professor:* Leinen; *Field of Study:* Geological

### **Stephen M. Dickson, M.S. '86**

7 Penley Street, Augusta, ME 04330, 207-622-0202

Maine Geological Survey, Department of Conservation, 93 State House Station, Augusta, ME 04333-0022

*Major Professor:* Laine; *Field of Study:* Geological

### **John W. Farrington, Ph.D. '72**

65 Braeside Road, Falmouth, MA 02540, 508-540-2878, cell: 508-274-1926, jfarrington@whoi.edu

Dean Emeritus, MS#8, Woods Hole Oceanographic Institution, 360 Woods Hole Road, Woods Hole, MA 02543

*Major Professor:* Quinn; *Field of Study:* Chemical

### **Alan Horigan, Ph.D. '81**

Deceased

*Major Professor:* Knauss; *Field of Study:* Physical

### **Jason Krumholz, Ph.D. '11**

33 Spindrift Drive, Saunterstown, RI 02874, 401-787-0944, jkrumholz@my.uri.edu

NOAA, NE Fisheries Center, 888 Washington Boulevard, Suite 911, Stanford, CT 06904

*Major Professor:* Oviatt; *Field of Study:* Biological

### **Heather Miceli, M.O. '08**

157 Kerri Lyn Road, Warwick, RI 02889, 315-345-2777, heather.s.miceli@gmail.com

*Major Professor:* Thornber; *Field of Study:* Oceanography

### **Jessica Worst, M.S. '11**

1132 Minnesota Avenue, Duluth, MN 55802, 860-886-3155, Jessica.S.Worst@uscg.mil

*Major Professor:* Donohue; *Field of Study:* Physical

# IN MEMORIAM

BY DEAN BRUCE CORLISS

**H. Perry Jeffries** passed away on July 31, 2017, surrounded by his family. He was a professor emeritus of oceanography at URI. He received his B.S. and M.S. from URI, and his Ph.D. in zoology from Rutgers in 1959. He also served as a lieutenant in the U.S. Infantry. He began his career at URI as an assistant professor of oceanography in 1959. On the URI faculty, Perry served as chair of the Faculty Senate, secretary of the University Faculty, and president of the American Association of University Professors. He was a visiting investigator at Skidaway Institute of Oceanography in 1981. He also served on the Board of Directors of Save The Bay, was president and vice president of the URI Chapter of Sigma Xi, served as president of the New England Estuarine Research Society and the Estuarine Research Federation, and was associate editor of *Estuaries* and editor of *Coastal Oceanography and Climatology News*. He was major professor to over 20 graduate students

and served on over 100 graduate student committees. He was recognized as a Fellow of the American Association for the Advancement of Science. Perry worked with Charles Fish on the Narragansett Bay Fish Trawl, eventually becoming responsible for the trawl until the early 1990s. As one of the original faculty members of the Graduate School of Oceanography, he helped establish GSO's international reputation in coastal oceanography. Perry remained an active member of the GSO

community, even after his retirement in 1992, and maintained a strong interest in Narragansett Bay and GSO.

**Robert K. Sexton** died peacefully at home in Little Compton on March 22, 2017. Bob served in the U.S. Army for two years before earning his B.A. from Brandeis. He worked at the Woods Hole Oceanographic Institution (WHOI) and Lamont Doherty Earth Observatory, participating in the search for the *USS Thresher*. Bob was active in a range of projects, including the *R/V Trident*, *R/V Endeavor*, *Sea Grant*, and the restoration of South Ferry Church. As assistant to GSO Dean John Knauss, he was widely known as the “go-to person” for the campus and as someone who “made things

happen.” In his retirement, he began work on an early history of oceanography in Rhode Island and the Narragansett Bay Laboratory, which is being edited by GSO professor emeritus Michael Pilson. He also collected—and donated to GSO—an impressive set of photographs of the early days of GSO and the Narragansett Bay Campus. He retired from GSO in 1990, having made significant contributions to the school's evolution in its first quarter century.

**Theodore J. Smayda** passed away on April 5, 2017. Ted was an influential faculty member at GSO. An expert in marine phytoplankton, he authored over 150 research papers, served on national and international committees, and was major professor to many GSO students. He received his B.S. from Tufts University and his M.S. in biological oceanography from URI in 1955. He enrolled in the Ph.D. program at Yale, received a Fulbright Fellowship to study phytoplankton ecology at the University of Oslo in Norway, where he received his Ph.D. In 1959, he took a position at the Narragansett Marine Laboratory at URI. He was one of the first professors at the newly founded GSO in 1961 and helped establish biological oceanography as one

row River. He was also a member of the Jamestown Conservation Committee. (*Editor's note: For a remembrance of Professor Smayda, see page 8.*)

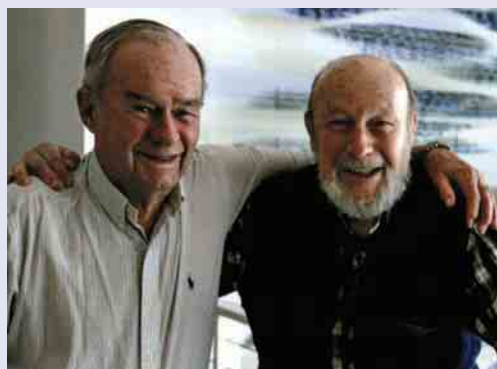
**W. Redwood Wright** passed away on May 8, 2017, at home in Falmouth, Mass. Professor Wright was a GSO alumnus and had a rich career in oceanography. He served in the U.S. Army in Korea and graduated Phi Beta Kappa in history from Princeton in 1950. He taught at St. George's School in Middletown, R.I., then became a newspaper reporter for the *Providence Journal* in the 1950s. He was hired as a public information officer at WHOI in 1960 and, after participating on several research cruises with Valentine Worthington, changed careers

and completed his M.S. and Ph.D. degrees at GSO with Dean John Knauss. He joined the scientific staff at WHOI, worked at the Northeast Fisheries Science Center in Woods Hole, and in 1982 helped found a coastal ocean-

ography consulting group, Associated Scientists at Woods Hole, Inc. He had a long affiliation with the Bermuda Biological Station for Research and served as president of the board for nine years. He also served as a trustee of the Bigelow Laboratory in Maine and the Provincetown Center for Coastal Studies.



Perry Jeffries (left) and Ted Smayda in 1955 as M.S. grads, and in 2010 at GSO.





# GSO HAPPENINGS

## Open House draws over 3,000 visitors to Bay Campus

Inclement weather didn't dampen the spirits of the volunteers and visitors who participated in GSO's Open House in October 2017. If anything, the rain provided the committed public an opportunity to experience a true oceanographic field session. Over 3,000 visitors came to the Narragansett Bay Campus to experience our work on "Ocean Science for the Ocean State." Large tents were set up on the Knauss quadrangle and by the dock, with some 50 exhibits put together by research groups from the GSO, Rhode Island Sea Grant, the URI College of the Environment and Life Sciences (CELS), URI Ocean Engineering, U.S. EPA, National Oceanic and Atmospheric Administration (NOAA), the Navy, and the R.I. Coastal Resources Management Council (CRMC). Tours were offered of the R/V *Endeavor*, the Marine Science Research Facility, the Marine Geological Samples Lab, the Inner Space Center, the Narragansett Bay Classroom, and the Rhode Island Nuclear Science Center. The URI Coastal Institute hosted an exhibit of marine art by senior fellow and artist Eric Lutes, including a new portrait of the R/V *Endeavor*. The GreenFins tuna tank, newly renovated mesocosm facility, and low-profile innovation grant wind turbine facilities were all open for the public to explore. A series of talks in Corless Auditorium featured two sessions of research bites by the GSO graduate student group Bay Informed, a history of South Ferry, an alumna talk about the work of GSO in the Narrow River, and a projection of plankton art by an artist-in-residence who also ran an active plankton-drawing workshop. Model volcanic eruptions punctuated the day on the quad. Over 170 enthusiastic Bay Campus volunteers were on hand to ensure the day was a success. •



Over 170 enthusiastic Bay Campus volunteers were on hand to ensure GSO's Open House was a success.

## GSO welcomes new faculty members

Two new faculty members joined GSO this fall—Roxanne Beinart and Kelton McMahon, both assistant professors of oceanography. Beinart is a biological oceanographer who received a B.S. in biology from Cornell University in 2006 and a Ph.D. in biology from Harvard University in 2013. Since that time, she has carried out postdoctoral work at the Woods Hole Oceanographic Institution (WHOI) as a National Science Foundation (NSF) Ocean Sciences Postdoctoral Fellow and as a Coastal Ocean Institute WHOI Scholar. Beinart carries out research in deep-sea and coastal biogeochemistry with a focus on the physiology of microbial symbionts and their effects on ecological and ecosystem processes.

McMahon is also a biological oceanographer who received a B.Sc. in biology from Bates College in 2005 and a Ph.D. in biological oceanography from the Massachusetts Institute of Technology-WHOI Joint Program in Oceanography in 2011. Following graduation, he was a postdoctoral fellow at the Red Sea Research Center at King Abdullah University of Science and Technology, a guest investigator at WHOI, a postdoctoral scholar in ocean sciences at the University of California-Santa Cruz, and, prior to his arrival at GSO, was a faculty lecturer and assistant research faculty member at UC-Santa Cruz. McMahon's research focuses on the role of food web architecture in structuring marine ecosystems and the influence of climate and human interactions on these relationships; his interdisciplinary work is based on compound-specific stable isotope analysis. •



Roxanne Beinart and Kelton McMahon, both assistant professors of biological oceanography, joined GSO this fall.

# GSO HAPPENINGS

## News from the GSO Dean's Office

The GSO Dean's Office is pleased to welcome James Patti as GSO's director of administration. Patti brings extensive experience in higher education finance and administration from work with Georgetown, Brown, and Bryant Universities. Reporting to Dean Bruce Corliss, he is responsible for finance, facilities, human resources, research administration, communications, and planning for GSO.

Second, Malia Schwartz has been appointed assistant director for research. In this role, she works with GSO faculty and staff to support proposal development for sponsored research. Schwartz brings an impressive scientific and administrative background to this position, having worked previously for the Rhode Island Sea Grant program and the URI Office of Research Development.

The newest member of the Dean's Office team is Ellen Anderson, who joins GSO as director of development. Anderson was a senior major gift officer at Connecticut College. Here at GSO, she will focus on building a culture of philanthropy in support of our research, education, and outreach programs, as well as the campus renewal project outlined in the Master Plan. •



Pastel painting of Bluff Point salt marsh, across from Great Island in Galilee, by Lori Jeremiah. The picture is hanging in the Coastal Institute Building in the office of Charles Roman, coastal ecologist and and associate director of the URI Coastal Institute.

## Vetlesen Distinguished Speaker Series

Now in its eighth year, the Vetlesen Distinguished Speaker Series is one of GSO's signature outreach efforts, with compelling talks on issues at the forefront of oceanography.

The 2017 series began in April with a lecture on tsunami detection by Charles-Antoine Guérin, a French scientist and URI Distinguished Visiting International Scholar. Guérin, a Fulbright scholar, discussed "Ocean Remote Sensing with HF Radars and Application to Tsunami Detection." He is a professor at the University of Toulon and with the Mediterranean Institute of Oceanography, a French research laboratory.

In September, the series continued with a lecture examining ocean warming. Gregory C. Johnson, an oceanographer at NOAA's Pacific Marine Environmental Laboratory, is an expert on measuring ocean warming, and his talk, "Improving Estimates of Earth's Energy Imbalance," focused on how improved ocean sampling over the last decade has made it easier to identify warming trends.

October brought "Climate Change Impacts on Antarctic Marine Ecosystems" with Patricia Yager, University of Georgia marine sciences professor. For the last decade, Yager's team has worked in West Antarctica. Their research has shown a connection between iron, which supports plankton productivity, and the melting ice sheet.

In November, the final 2017 Vetlesen lecture was by M. Dennis Hanisak, an oceanographer at Florida Atlantic University, on "Exploring Pulley Ridge: The Deepest Mesophotic Coral Reef on the U.S. Continental Shelf." Hanisak is part of a collaboration studying coral reefs from Pulley Ridge—the deepest light-dependent coral reef in the United States—to shallow-water reefs in the Florida Keys. These ecosystems are a refuge for threatened species of corals and fish. Results of the study will help experts develop ways to protect the reefs.

The Vetlesen Series is sponsored by the G. Unger Vetlesen Foundation and presented by GSO. Since its founding in 1955, the Vetlesen Foundation has advanced prominent oceanographic and earth science institutions in the United States. •



Since its founding in 1955, the Vetlesen Foundation has advanced prominent oceanographic and earth science institutions in the United States.



## GSO HAPPENINGS

### CRC, Sea Grant launch R.I. Shellfish Initiative

The URI Coastal Resources Center (CRC) and Rhode Island Sea Grant (Sea Grant) partnered with state and federal agencies, academic institutions, and other organizations to launch the Rhode Island Shellfish Initiative. Rhode Island Sea Grant Director Dennis Nixon and GSO Dean Bruce Corliss welcomed URI President David Dooley, Rhode Island Governor Gina Raimondo, U.S. Senators Jack Reed and Sheldon Whitehouse, U.S. Congressmen James



Langevin and David Cicilline, Roger Williams University (RWU) President Donald Farish, NOAA Deputy Assistant Administrator for Operations/NOAA Fisheries, and state government and industry leaders for the April 2017 launch of the initiative, a yearlong effort to join NOAA's effort to raise public awareness of the economic, social, and environmental values of shellfish resources and its industry. At the launch, speakers and attendees celebrated by filling a 10-year time capsule with shellfish-related mementos. Initiative partners are CRMC, the R.I. Dept. of Environmental Management, CRC and Sea Grant, RWU, the East Coast Shellfish Growers Association, the Rhode Island Shellfisherman's Association, and the Nature Conservancy. •



URI President Dooley, UCC Vice Chancellor Ampiah, and the delegation are discussing how to strengthen ties between URI and UCC.

### Ghana's University of Cape Coast visits GSO

The hard work of creating academic opportunity for a new generation of oceanographers, marine scientists, and coastal policy planners continued, as an academic delegation from University of Cape Coast (UCC) in Ghana, headed by Vice Chancellor Joseph Ghartey Ampiah, visited URI and the Narragansett Bay Campus. The UCC professors and deans who visited are working out details with URI President David M. Dooley, GSO Dean Bruce Corliss, CRC, and other URI faculty and staff.

URI's areas of academic focus, research expertise, and growth of new programs were presented by Dean Corliss, as well as deans and faculty of the Colleges of Environment and Life Sciences, Health Sciences, Engineering, Pharmacy, and Business Administration.

Dean Corliss observed, "This is a very important relationship for the Graduate School of Oceanography that builds on the excellent work the CRC has done over the years. Our collaboration will contribute to more effective management of sustainable fisheries in Ghana, even as it challenges us to hone oceanographic research and learning programs here

in Rhode Island. We're very pleased to participate in this program."

President Dooley, Vice Chancellor Ampiah, and the delegation are discussing how to strengthen ties between URI and UCC. The commitment to collaboration originated with the support of two projects in Ghana funded by USAID's Feed the Future Initiative—the Sustainable Fisheries Management Project at URI, and UCC's Fisheries and Coastal Management Capacity Building Support Project. The burgeoning URI-UCC relationship is driving growth in research partnerships, student exchanges, curriculum development, and, most importantly, a graduate dual-degree program.

The UCC delegation also included: Isaac Galyuon, Chairman, Project Management Board, and Provost, College of Distance Education; Denis Aheto, Director, Center for Coastal Management; Noble Asare, Head, Department of Fisheries and Aquatic Sciences; Johnson Nyarko Boampong, Dean, School of Biological Sciences; David Kofi Essumang, Dean, Physical Sciences; Ernest Okorley, Dean, School of Graduate Studies; and Edward Marfo-Yiadom, Dean, Business School. •

# GSO HAPPENINGS

## R/V *Endeavor's* Duffy and Bennett receive "Best Grub Award"

Congratulations go to the R/V *Endeavor's* long-serving chief steward, Mike Duffy, and newly hired messman, Larry Bennett, for winning the "2016 Best Grub Award," which recognizes high culinary merit among the University-National Oceanographic Laboratory System (UNOLS) fleet. The award was given at UNOLS' annual Research Vessel Operator's Committee (RVOC) meeting held last April in New Orleans. Duffy and Bennett provide up to 90 meals (and usually fresh baked snacks too!) for the crew and scientists every day, and, as is well known, food on a cruise is critical to morale and success. •



R/V *Endeavor* at her GSO dock.

## URI, GSO host Ghanaian university delegation

In May 2017, URI hosted a high-level delegation from the Kwame Nkrumah University of Science and Technology (KNUST) in Ghana. The mission set out to build on the partnerships and momentum that began with a project—Analytical Support Services and Evaluations for Sustainable Systems in West Africa (ASSESS-WA)—funded by USAID. ASSESS-WA is leveraging participation of KNUST, URI, Delaware State University, the U.S. Dept. of Agriculture (USDA), and other implementing partners. This leverage is creating new opportunities for research and development beyond the project. The delegation's visit surfaced ways in which the partnership can be expanded and sustained, following an initial visit by KNUST to URI in November 2014, the visit of President Dooley to KNUST in Ghana in April 2016, and the subsequent visit of GSO Associate Dean David Smith and other URI deans and associate deans in August 2016. KNUST is building a coastal marine cam-

pus and was keen to learn about GSO and URI efforts in marine science. The group discussed a number of collaborative projects, including staff and student exchanges. The delegation also explored outreach programs with CRC, the URI Coastal Institute, and CELS and the unique role of a university in engagement and collaboration with academic, governmental, and private-sector partners. •

## GSO's Robinson organizes, hosts international workshop

Last summer, GSO Professor Rebecca Robinson hosted an International Ocean Discovery Program (IODP) workshop, "Land-Ocean Interactions Across the Indian Ocean: Toward Regional Integration of Recent Drilling Results," with co-organizers Peter Clift, Louisiana State University; Liviu Giosan, WHOI; Christian Betzler, University of Hamburg, Germany; and Tomohisa Irino, Hokkaido University,

Japan, and funded by the U.S. Science Support Program. About 40 scientists from around the world gathered in the URI Bay Campus Coastal Institute Building to discuss results from recent ocean drilling expeditions in the Indian Ocean and plan for future science and drilling efforts in the region. The IODP is an international marine research collaboration that explores Earth's history and dynamics using ocean-going research platforms to recover data recorded in seafloor sediments and rocks and to monitor sub-seafloor environments. •

## Rear Admiral Jon White of the Consortium for Ocean Leadership visits GSO

In May 2017, GSO Dean Bruce Corliss hosted Rear Admiral Jon White, president and CEO of the Consortium for Ocean Leadership (COL), for a visit to GSO.

Prior to taking his post at the COL in 2015, White had a distinguished 32-year career in the U.S. Navy and retired at the rank

of rear admiral. He had numerous operational assignments at sea and ashore as a Naval meteorology and oceanography specialist, culminating in his assignment as oceanographer and navigator of the Navy from 2012 to 2015. This position included appointments as director of the Navy's Task Force Climate Change, and as Navy deputy to NOAA.

At GSO, Admiral White gave a special presentation for the Narragansett Bay Campus titled, "The Role of the Consortium for Ocean Research in Ocean Sciences."

As president of COL, White's goal in visiting GSO was to learn more about the campus' work, priorities, and challenges, as well as explore thoughts about COL and its work so the he may better represent the many voices of COL members as accurately as possible in Washington, D.C. •

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# GSO HAPPENINGS

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## Chowder & Marching launches monthly discussion series

In summer 2017, the Chowder & Marching Society, GSO's long-running student organization, launched a monthly discussion series to share some of the important research happening at GSO. The Bay Informed Discussion Series kicked off in June 2017 with a talk about climate change in the ocean and its influence on Narragansett Bay. Talks continued through the summer and into the fall, diving into climate change and its effect on severe weather, the connection with the carbon cycle, and a look at the Block Island Wind Farm, developed in the hunt for alternative renewable energy sources in the face of climate change.


GSO doctoral student Joseph Langan, the Bay Informed Discussion Series coordi-

nator, says the purpose of the monthly series is to inform the public about important environmental and scientific issues involving the ocean and spark an interest in getting involved locally and nationally. "In the current media environment, we feel it's important to communicate our science directly to the public and talk about some of the marine science issues in Rhode Island and across the globe," says Langan. "We also want to get better at communicating our science. We're used to giving very technical presentations, but for the layperson, they don't make sense. This gives graduate students (at GSO) an opportunity to improve their science communication skills."

Nearly 100 people attended the kickoff event. The students gave presentations and then took questions from the audience. "The auditorium was filled," Langan says. "We were happy with that, for sure." Since then, the monthly events have continued to draw an even bigger crowd.

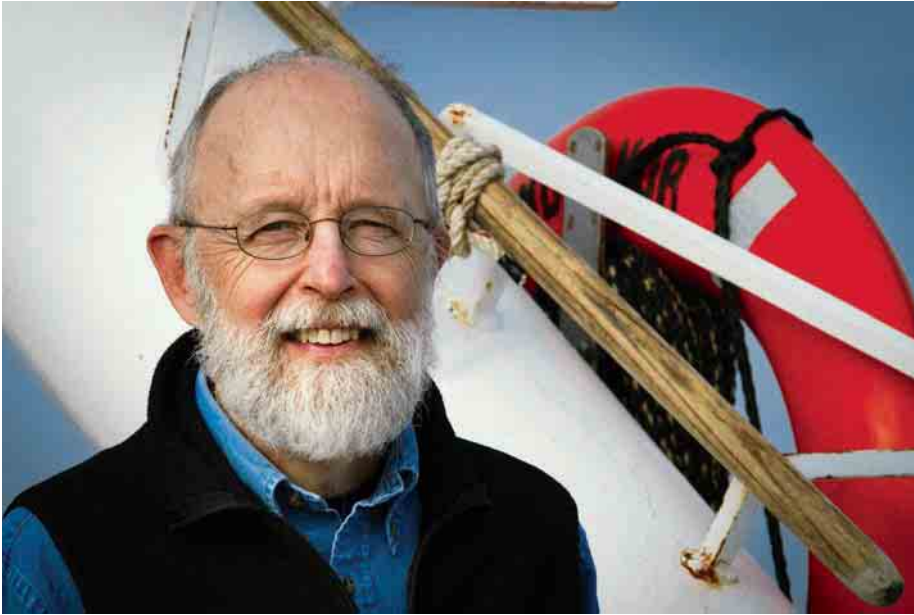
Fall 2017 talks titled "Paleoceanography: Drilling into the past to predict our future," and "Warming polar regions" rounded out the series. Talks are held through the academic year on the third Thursday of every month at 7 p.m. in GSO's Corless Auditorium, 215 South Ferry Road, Narragansett.

For more information, visit [uri.edu/chowder-marching/bay-informed](http://uri.edu/chowder-marching/bay-informed) or email [gsobayinformed@gmail.com](mailto:gsobayinformed@gmail.com). •



The monthly series will inform the public about important environmental and scientific issues involving the ocean.

## — MAKING A DIFFERENCE —



The GSO Fund is an important component of our strategic priorities and is built on a long history of sustained gifts from our alumni and friends. These funds are used to enable travel to professional meetings for our graduate students, giving them opportunities to present their research and meet colleagues in their respective fields; to cover research costs that may not be covered by other means; to purchase equipment for graduate students and faculty; and to provide funds that can be used to initiate new projects, conduct research and educational workshops, and more.

We are grateful for the strong support from you—our friends, alumni, and engaged community—in the past, and I hope that you will continue your generosity for GSO this year. If you have not thought to contribute to our work recently, I urge you to consider doing so. Gifts of all sizes are critical, as is your participation, particularly as we turn our focus on a significant fundraising effort which will revitalize the Narraganset Bay Campus while driving the strategic initiatives of the Graduate School of Oceanography. Your gift helps GSO reinforce and build on its deep commitment to ocean science and is an investment in those who will find solutions to societal challenges associated with our oceans.

To contribute to the GSO Fund, please visit [urifoundation.org/gsofund](http://urifoundation.org/gsofund) or use the enclosed envelope for your check or credit card information. Send to the URI Foundation and reference “GSO.” Should you wish to discuss how you can have an impact through additional giving opportunities, please contact Ellen Anderson, GSO development director, at 401.874.6131.

Thank you for your support.

Bruce H. Corliss, Dean



Thomas Glennon, GSO director of marine operations, surveys the hull of the R/V Endeavor while in dry dock for her bi-quinquennial major maintenance overhaul.



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University of Rhode Island  
Narragansett Bay Campus  
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