

Aboard GSO

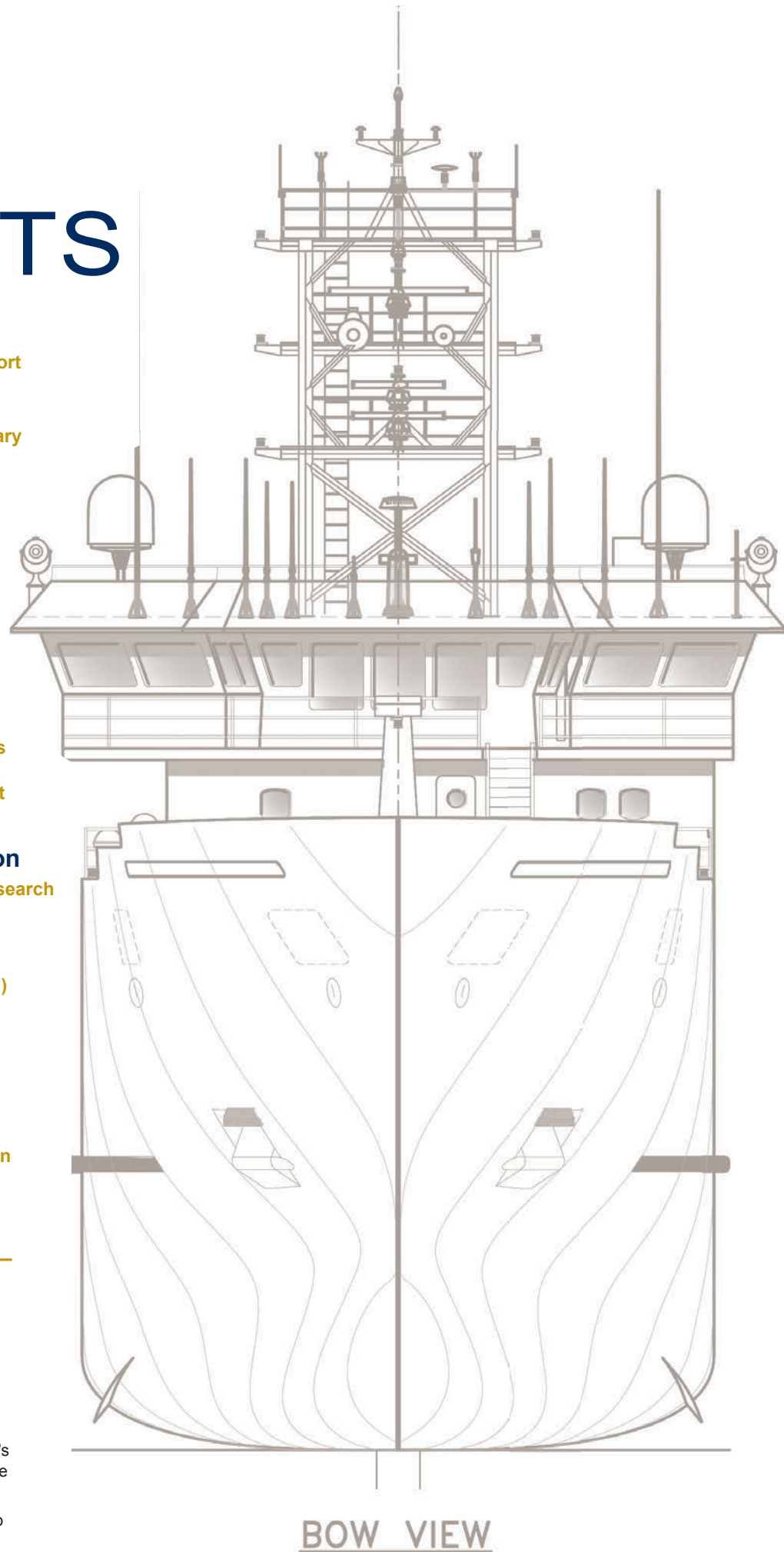
SUMMER 2018



THE
UNIVERSITY OF RHODE ISLAND | GRADUATE SCHOOL OF OCEANOGRAPHY

CONTENTS

- 2 View Port**
The 2018 Volvo Ocean Race visits Newport
- 4 Happenings on the Waterfront**
A chronicle of events at GSO from January to June 2018
- 8 Cause & Effect**
Scientists investigate Rhode Island Sound and Narragansett Bay
- 10 Fisheries Program in the Philippines**
The Coastal Resources Center lands a historic grant
- 12 Dawn of a New Day**
The National Science Foundation awards its next Regional Class Research Vessel to GSO and the newly formed East Coast Oceanographic Consortium
- 16 The Future of Ocean Exploration**
Professor Ballard discusses ongoing research and core goals
- 19 Walking the Talk**
GSO alumna Leanna Heffner (Ph.D. 2013)
- 22 Make Fast**
Shore-side preparations and implementation of the campus master plan
- 24 Alumni Support**
Growth in dollars raised and participation
- 24 Alumni News and Notes**



BOW VIEW

Right: On the drawing board and under construction is RCRV-2, the yet-to-be-named vessel that will call Narragansett, Rhode Island, home. She'll arrive at GSO's pier in 2021.

Cover: "Endeavor at Dawn" by Alex DeCiccio.

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Please email your comments, questions, and/or news to info@gso.uri.edu

AIR DRAFT
88'-4" ABL

MAST 03 LEVEL
78'-6" ABL

MAST 02 LEVEL
71'-9" ABL

MAST 01 LEVEL
65'-0" ABL

04 LEVEL
54'-0" ABL

03 LEVEL
45'-6" ABL

02 LEVEL
37'-0" ABL

01 LEVEL
28'-0" ABL

MAIN DECK
19'-0" ABL

1st PLATFORM
10'-0" ABL

TANK TOP
6'-0" ABL

“Steady on course, full speed.”

One of the rights of passage

for geological cruises on the R/V *Trident* was to man the precision depth recorder as the ship carried out a mapping survey. Course changes were marked and annotated on the recording sheet, and, once the ship was underway with a new heading, *Steady on course, full speed* was noted. I was reminded of this recently while reviewing recent events here at GSO and the number of changes that have occurred over the last six years.

The Next Vessel and Campus Renovations

The East Coast Oceanographic Consortium (ECOC), led by GSO, was chosen to manage and operate the new Regional Class Research Vessel (RCRV). This selection capped a six-year effort that included developing a Narragansett Bay Campus Master Plan, which highlighted the need for an enlarged dock and a new building for marine operations to support the RCRV. We have been successful in getting a \$45-million bond request on Rhode Island’s 2018 ballot this November to provide funds for the pier upgrade, a building for marine operations, a new building for innovation and collaborations in ocean technology and the design and planning work necessary for the next phase of the master plan.

Academics and Outreach

We’ve made excellent progress with our educational programs, including a revised Master of Oceanography program, which is a professional master’s degree. We have also significantly increased our undergraduate enrollments thanks to faculty who have designed “Grand Challenge” courses intended to address critical global issues. The faculty have worked very hard and made great progress increasing our teaching footprint, and our research funding continues to be at an exceptionally high level. Faculty recruitment has been a high priority for GSO over the last six years, and, as a result, we have hired seven new faculty and will search for two additional members to join our community in the coming academic year.



We continue to build upon our innovative outreach work through the Inner Space Center, Center for Ocean Exploration, and the Coastal Resources Center, all of which are making significant regional, national, and international impacts in ocean science. Look no further than CRC’s recent \$25 million grant—the largest in URI history—from the U.S. Agency for International Development for fisheries work in the Philippines to understand just how far GSO’s reputation for excellence extends.

Moving Forward Together

As we prepare to initiate the Narragansett Bay Campus Master Plan and bring a new vessel to GSO, we can reflect on these changes that have positioned us to address the needs and challenges of ocean science in the coming decades. The growth of our school, both in our past and in our future, is only possible because of the community of people who make GSO a premiere institution: faculty, staff, students, alumni, advisors, supporters and many others. I hope you enjoy this issue of *Aboard GSO* that provides a closer look at the people behind our current work and future plans and aspirations.

Best wishes,

Bruce H. Corliss, Dean



On May 9 and 10, 2018, seven sleek state-of-the-art 65-foot-long one-design boats sailed into a rainy Fort Adams in Newport for a weeklong stop during the round-the-world Volvo Ocean Race. During the stopover, nearly 125,000 visitors were treated to views of these cutting-edge boats as well as a chance to learn about the ocean that the boats sail in.

The Graduate School of Oceanography was present with a variety of interactive exhibits.

At the center of Fort Adams was the “One Ocean Exploration Zone” held inside an enormous tent abuzz with activity from an estimated 3,000 school children on field trips, as well as many more teenagers and adults. Staff, faculty, and students from GSO hosted displays in this ocean-themed science fair to show the groundbreaking

VIEW PORT

GSO Engages Thousands as the Volvo Ocean Race Sails into Narragansett Bay

By Veronica Berounsky





VERONICA BEROUNSKY

work happening on the Narragansett Bay Campus. Highlights included GSO faculty-led exhibits such as an interactive demonstration from Brice Loose's lab of how carbon dioxide affects pH in the ocean, a display by Isaac Ginis about storms and hurricanes, and a joint exhibit by Susanne Menden-Deuer's and Tatiana Rynearson's labs called "Plankton: Small, Beautiful Bugs with a Big Impact." Rhode Island Sea Grant brought an exhibit about how old fiberglass boats can be recycled and used to make cement. A popular spot was the Narragansett Bay touch tank, organized and staffed by Ed Baker and his crew from GSO's Anne Durbin Aquarium Building. GSO's Inner Space Center entertained children and parents alike with fun and games designed to increase their knowledge about the ocean. In addition,

the second Ocean Summit was held in the Race Village and moderated by Rhode Island Sea Grant Director Dennis Nixon. The summit saw Rhode Island become the first U.S. state to sign on to the U.N. CleanSeas campaign to fight ocean plastic pollution.

Why did Volvo, a car and truck company, sponsor an around-the-world ocean sailing race? Peter Chaisson, Volvo business development manager, said, "Quality, safety and environmental care are our core values. Making people better aware of our ocean and what we can do about problems—for example the huge amount of trash and microplastics found even at remote parts of the ocean during this race—falls right within our core values."

—AG



ALEX DECICCO

Happenings

on the Waterfront

Edited by Kathleen Beck and Peter Hanlon

JAN

GSO professor **Peter Cornillon** was one of the architects of URI's 10th Annual Academic Summit, titled "URI 2035." The emphasis was on the future, drivers for change, and implications for higher education.

The Coastal Resources Center (CRC) provided participants at the annual RI League of Cities and Towns Convention with a training session as part of its **PREP-RI** (Providing Resilience Education for Planning in Rhode Island) online learning program. The program is now state-required training for local level decision-makers and planners working to understand and address climate change impacts associated with strong storms and sea-level rise.

Research Highlights

Illuminating how planktonic food webs respond to environmental change

Funding Recipient:

Led by Heidi Sosik of the Woods Hole Oceanographic Institution (WHOI) with GSO professors Tatiana Rynearson and Susanne Menden-Deuer

Funding Source: National Science Foundation's Long-Term Ecological Research Program (LTER)

Editor's Note: *In the first half of 2018, URI's Graduate School of Oceanography received more than \$15.8 million in research funding. A few notable examples are presented in this section as "Research Highlights."*



In an inspiring blend of research, education and outreach, GSO students from the Chowder and Marching Society have been leading monthly presentations of their research at GSO. These well-attended talks make the science accessible to all, and student presenters gain valuable experience as they provide audiences with a fascinating glimpse at the world of oceanography. The **Bay Informed Discussion Series** is held (with support from RI Sea Grant and the Dean's Office) every third Thursday in Corless Auditorium. In 2018, the following talks were given:

January Rhode Island Shellfish Science

A discussion about shellfish research and management to ensure a sustainable future for lobster and quahog populations in New England.

February The Microbial Ocean

From coasts to the seafloor beneath the deep ocean, this discussion reviewed the techniques scientists use to learn about this microscopic world.

March Phytoplankton

They are responsible for the oxygen in every other breath we take, form the base of the food web, and even play a significant role in Earth's climate system. This discussion shared the amazing things we can learn from phytoplankton.

April Fisheries Science and Policy

Speaking about fish and shellfish management from ship to market, GSO students discussed research supporting all aspects of the seafood industry.

May Tsunami Science!

Tsunamis pose a threat to the U.S. East Coast, and this discussion gave an overview of the research and modeling efforts to better understand these events and aid in tsunami hazard assessment.

June Discovering Past and Future Climate

From looking millions of years into the past to understanding how marine ecosystems will change in the future, this discussion focused on how plankton are critical to climate science.

Purpose: The goal of the Northeast Shelf LTER is to understand and predict how planktonic food webs change through space and time in response to changes in the physical environment, and how those changes impact ecosystem productivity, particularly of higher trophic levels.

FEB

Dean Bruce Corliss hosted a reception for faculty, staff, students, and alumni in attendance at the biennial **Ocean Sciences Meeting** in Portland, Ore.

The **East Coast Oceanographic Consortium (ECOC)** agreement among URI-GSO, WHOI and the University of New Hampshire was signed

by all parties, a culmination of five years of discussions.

CRC, RI Sea Grant, and URI began a **coastal resilience partnership** with Westerly High School in which 9th and 10th graders will assess their readiness and help URI researchers learn more about behavior change and emergency preparedness. The project is led by James Prochaska, URI psychology researcher and director of the Cancer Prevention Research

Center, and Pamela Rubinoff, CRC coastal manager and Sea Grant extension agent.

Alumna Katy Croff-Bell (Ph.D. 2011) spearheaded “**Here Be Dragons!**” hosted by MIT’s Media Lab in collaboration with the National Geographic Society and New England Aquarium. The event convened a broad selection of innovators to discuss our largely unexplored and poorly understood global ocean as well as new and emerging technologies that might be deployed to help bridge the enormous gaps. GSO professor Robert Ballard provided the keynote address, and URI ocean engineering assistant professor Brennan Phillips participated on a technology panel with NOAA’s Office of Ocean Exploration Research Director Alan Leonardi.

MAR

The URI Chapter of the Society for Women in Marine Science (SWMS) hosted their inaugural **SWMS Spring Symposium** at the Narragansett Bay Campus. The program focused on mentoring and career choices available to women and minorities in marine science. Keynote speakers included GSO joint-faculty professor Bethany Jenkins and NOAA’s Catalina Martinez (M.S. 1999).

Master’s student **Loes van Dam’s research**, which uses corn syrup to simulate how molten lava flows to gain insights into how Earth evolved geologically, was profiled in an article on *URI Today*, which was then



Aboard *Endeavor*, deploying the megacorer at night

picked up by multiple media outlets including *The New York Times*, *U.S. News & World Report*, CBS News, and ABC News. Van Dam’s major professor is GSO professor Christopher Kincaid.

The **University-National Oceanographic Laboratory System (UNOLS)** held a free one-day chief scientist training session open to graduate students, post-docs, and other interested parties. The training was intended to provide an understanding of the UNOLS system, how to apply for ship time, insight on working with ship technical support, the

importance of safety on board vessels, and a tour of the *R/V Endeavor*.

At a RI Sea Grant **Coastal State Discussion Series** event, GSO Ph.D. candidate Joseph Langan and GSO professor Jeremy Collie discussed their recent work looking at the role temperature plays in winter flounder populations. Their primary focus has been looking at which life stages of winter flounder are most vulnerable to temperature, with the aim to help resource managers identify which habitats to protect to sustain a winter flounder population in Narragansett Bay.

APR

As part of the **NSF-funded STEMSEAS** program, *R/V Endeavor* left for Barbados to research the impact of the Amazon River Plume on nitrogen availability and planktonic food web dynamics in the Western Tropical North Atlantic. Aboard were 11 undergraduates from diverse backgrounds. The students were mentored by our ship techs, three experienced scientists, and Chief Scientist/PI Joe Montoya from Georgia Tech.

Undergraduate students from the URI Honors Program departed on a **six-day oceanographic research expedition** aboard the *R/V Endeavor* in which the Inner Space Center coordinated three *Endeavor Live!* Facebook broadcasts and one hosted event. The expedition was part of “CSI Oceans,” a URI Honors course led by GSO professor Karen Wishner and GSO graduate student Christopher Orphanides.

New GSO faculty members **Roxanne Beinart, Kelton McMahon, and Colleen Mouw** joined a discussion moderated by GSO professor emeritus James Yoder on tips and strategies for applying for jobs in marine science.

A dedication of a GSO bench for the late professor **Scott W. Nixon** featured remarks and many “Scott stories” from Nixon’s colleagues and students. Nixon served as a GSO professor for 42 years, as well as director of RI Sea Grant from 1984 to 2000, before his unexpected death in 2012.



The 6th Annual Scott W. Nixon Lecture featured alumna **Robyn W. Fulweiler** (M.S. 2003, Ph.D. 2007) entitled “So Many Estuaries, So Little Time.” Fulweiler studied under professor Nixon, and is currently an associate professor in the departments of Earth and Environment and Biology at Boston University and director of the BU Marine Program.



The new NIH STEEP Center (Sources, Transport, Exposure and Effects of PFAS) led by GSO professor **Rainer Lohmann**, hosted a kickoff lecture in the STEEP Center Series by Dr. Detlef R.U. Knappe of North Carolina State University titled, “Impacts of fluorochemical production and use on drinking water quality in North Carolina.” The seminar was cosponsored by the NIH INBRE Program and RI NSF EPSCoR Program.

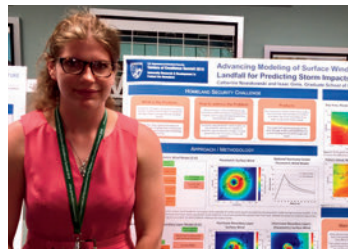
Brice Loose was promoted to Associate Professor with tenure and **Christopher Roman** promoted to Full Professor.

“**Sushi by the Sea**” brought together entrepreneurs, technologists, investors, and GSO and ocean engineering (OE) staff and faculty to celebrate ideas and innovations from URI. The event, held in the Nautilus Galley and sponsored by the Slater Technology Fund, URI Research Foundation, and URI Business Engagement Center, introduced GSO, OE and the Narragansett Bay Campus to regional investors with a strong interest in developing the blue economy in Rhode Island and southern New England.

GSO Ph.D. candidate Colin Jones was awarded a prestigious **Schlanger Ocean Drilling Fellowship** through the U.S. Science Support Program, one of only four awards made this year. His successful proposal was titled, “What Drives Sub-Millennial Variability in the mid-Holocene West Antarctic Peninsula?” Jones’ advisor is professor Rebecca Robinson.

MAY

CRC hosted a **delegation from Senegal** including the Minister of Fisheries. The group visited GSO and various agencies in Rhode Island and Washington, D.C., to learn about U.S. efforts in fisheries management and illegal fishing enforcement as well as share and discuss their efforts.



Catrina Nowakowski, a master’s student working in GSO professor Isaac Ginis’ lab, presented a poster at the Department of Homeland Security’s (DHS) Center of Excellence Summit at George Mason University. Nowakowski’s work focuses on improving hurricane wind forecasts during landfall as part of a project focused on coastal resilience funded by DHS.

CRC, in collaboration with the College of the Environment and Life Sciences, received a **\$25-million grant from USAID** for fisheries work in the Philippines. This is the largest grant received in URI history. (See page 10 for details.)

Research Highlights *Improving models to better prepare for hurricane hazards*

Funding Recipient: GSO professor Isaac Ginis (with GSO professors Christopher Kincaid, Tetsu Hara, Lewis Rothstein, and marine scientist David Ullman)

Funding Source: U.S. Department of Homeland Security’s Coastal Resilience Center of Excellence

Purpose: To refine combined coastal and inland flooding models—developed during the first three years of the project—for real-time forecasting during hurricane landfall, and to expand those models to all of southern

New England and potentially any U.S. coastal region. This two-year extension comes after a rigorous review, and the project will expand to develop 3-D hazard impact and visualization tools with input from local emergency managers.

JUN

The spring meeting of the **Dean’s Advisory Council** was held, highlighted by a number of presentations to the council from GSO faculty, staff and students.

GSO hosted the **NOAA North Atlantic Regional Team** (NART) annual meeting, which highlighted NOAA partnerships at URI.

Recent GSO graduate Sierra Davis (M.S. 2017) received a **NOAA Coastal Management Fellowship** with the Delaware Coastal Program. Davis received her master’s degree with a focus on marine geology and marine geophysics this past December.

The Coastal Institute launched a promotional campaign to attract community engagement at the **2018 STEEP Science Day** in Barnstable County on Cape Cod. Community members received an update on the program’s current work, findings, and goals. The challenges and benefits of creating passive samplers to determine the presence and concentration of PFAS in water was explained.

The R.I. Shoreline Change **Special Area Management Plan** (Beach SAMP) was approved. CRC assisted the R.I. Coastal Resources Management Council since 2012 in developing the milestone recommendations plan, which provides comprehensive guidance, data and tools to coastal communities and stakeholders proactively seeking to address the impacts of storms and sea-level rise.

At the GSO **Employee Recognition** event, Dean Corliss joined the GSO community in congratulating retirees Sara Hickox, Eric Klos, Marsha Warren, Helen Silvestri, and Linda Palazzo for their dedication and faithful service on behalf of GSO. Numerous GSO employees received a recognition award for 10, 15, 20, or 25-plus years of service.

Research Highlights
Investigating a submarine earthquake following the Kilauea eruption

Funding Recipient: GSO professor Yang Shen
Funding Source: National Science Foundation RAPID (Rapid Response Research)
Purpose: To investigate a magnitude 6.9 earthquake following the eruption of Hawaii’s Kilauea volcano. Shen and graduate student Jiahang Li deployed a network of ocean-bottom seismometers (OBSs) off the coast of the Big Island to record seismic activity associated with the ongoing eruption as well as physical and geologic properties of the area.



WELCOME NEW GSO ALUMNI

Graduation weekend featured GSO’s Shirting Ceremony to recognize our new graduates, and a recognition ceremony highlighted by visits from URI President David Dooley and Provost Donald DeHayes.

Samuel Gartzman, Samuel Giannakos, Megan Layman and (front row, left to right) Caroline Salvaneschi, Christina Wertman, Nicole Brennan

Above: At the Commencement Ceremony in the Ryan Center were (back row, left to right) GSO Associate Dean David Smith, David Gleeson, Corinne Truesdale, Arash Bidgeli,

In the 2017-2018 academic year, GSO awarded 18 master’s degrees and six doctorates. Below are all degree recipients with their major professors.

Master of Oceanography

- Shann Aharon (David Smith)
- Nicole Brennan (Arthur Spivack)
- Samuel Giannakos (David Smith)
- David Gleeson (Christopher Kincaid)
- Megan Layman (Isaac Ginis)
- Colleen O’Day (David Smith)
- Caroline Salvaneschi (David Smith)
- Hailey Simpson (David Smith)
- James Spilsbury (David Smith)

Master of Science

- Sierra Davis (John King)
- Samuel Gartzman (Brice Loose)
- Sylvia Kim (Anton Post)
- Christopher McAleer (Brice Loose)
- Neil Redmond (Rebecca Robinson)
- Donald Rudnickas (Brice Loose)
- Tucker Sylvia (Christopher Kincaid)
- Corinne Truesdale (Jeremy Collie)
- Noah Walcutt (Melissa Omand)

Doctor of Philosophy

- Arash Bidgeli (Brice Loose)
- Annie Foppert (Kathleen Donohue)
- Conor McManus (Jeremy Collie)
- Jason McNamee (Jeremy Collie)
- Justine Sauvage (Steven D’Hondt)
- Christina Wertman (Christopher Kincaid)



Cause & Effect

GSO scientists
investigate conditions
behind toxic algal blooms
in Rhode Island Sound
and Narragansett Bay.

By Meredith Haas

MEREDITH HAAS

Above: Associate Marine Research Scientist Lucie Maranda; Opposite: Associate Marine Research Scientist David Ullman and graduate student Joseph Barnes bag mussels to be deployed at a sentinel station for measurement of domoic acid uptake.

Anchored boats and buoys slowly emerge from and vanish back into the fog that lays thick across the water's surface in the early morning hours as we slowly motor out of Wickford Harbor. It's the beginning of May and I'm with GSO researchers Lucie Maranda, David Ullman, and their student, Joe Barnes, in a 16-foot center-console heading to a mussel farm in Narragansett Bay's east passage. The team will collect mussels from American Mussel Harvesters then monitor for domoic acid, a toxin produced by certain species of algae from the phytoplankton genus, *Pseudo-nitzschia*, which can infect shellfish.

"Mussels filter a lot of water and are generally the first shellfish to become toxic," says Maranda, explaining why mussels are used for monitoring research.

The fog had started to burn off by the time we rafted up to the American Mussel Harvesters' workboat amidst the rows of black buoys marking the mussel lines. The crew passed us a crate of recently harvested mussels that the research team divided into 16 orange mesh bags. The bags are attached to two 12-foot lines and deployed on moorings at a sentinel station south of Brenton Point to begin monitoring domoic acid uptake.

"We will collect them biweekly and run an [amnesic shellfish poisoning] test," says Maranda, adding that they will also test wild mussel stocks. "The test looks like a pregnancy test. It's either 'yes' or 'no,' positive or negative, for domoic acid."

The research is funded by Rhode Island Sea Grant and aims to better understand and predict blooms of *Pseudo-nitzschia*. The work is in response to an unprecedented bloom that spanned from Long Island to Maine in 2016. Although these species can be found throughout the bay and elsewhere at any time of year, 2016 saw the first-ever shellfishing ban in Narragansett Bay triggered by a toxic algal bloom. After five tons of shellfish were recalled in Maine that September, and a rapid increase of *Pseudo-nitzschia* was detected outside of Newport Harbor in early October, a shellfish ban was issued for Narragansett Bay, the Sakonnet River, and Mount Hope Bay. Rhode Island required dealers to hold all shellfish until tests could be made to determine whether the toxins were present at levels of concern.

"We had no idea what was going to happen or how quickly," says Angelo Liberti, chief of Water Resources at the Rhode Island Department of Environmental Management, during a public debrief shortly after the event. "Our first priority was whether they could release the dealer stock safely."

If humans consume highly contaminated shellfish, illnesses can range from gastrointestinal problems and lethargy to more severe cases of short-term memory loss and seizures. Sales dipped for some local harvesters, and many state agencies were left scratching their heads as to why this bloom occurred.

"*Pseudo-nitzschia* is comprised of a number of species, some of which produce the toxin and some that don't, and the species that produce the toxin don't always produce the same amount or any toxin at all. So that's what makes it hard to predict and understand," said Tatiana Rynearson, a plankton expert at GSO, in an interview last winter.

One theory that Maranda and Ullman, along with fellow GSO oceanographer Christopher Kincaid, are investigating is that Rhode Island Sound may be a potential source for harmful algal blooms since the 2016 bloom was concentrated in the mid- and lower-bay, with its longest duration in RI Sound.

To date, only two plankton samples near the Jamestown Conanicut Marine dock have shown positive results for domoic acid. Mussels from both the sentinel stations, as well as wild populations near Fort Wetherill, have produced negative results. Maranda's and Ullman's work will eventually help determine the abundance and distribution of *Pseudo-nitzschia* and two other toxin-producing species (*Alexandrium* and *Dinophysis*) in relation to physical parameters within the sound and lower Narragansett Bay, and whether these species are introduced into the bay from the sound or whether they develop into algal blooms from already

established populations.

"One of the important things missing is the water coming in from the shelf," says Kincaid. "There's a deep pool of nitrogen in the bottom water [offshore] in the summer. We have current meters that show steady intrusions of water, plus these big wind-driven intrusions, but we don't have good measurements of the two of them together."

The knowledge gap, he says, is understanding the nitrogen budget and figuring out if, and how, this nitrogen-rich bottom water is making its way to the photic zone in the bay where it can fuel harmful algal blooms. "We need a true nitrogen budget to understand circulation patterns and how that impacts the ecosystem."

Kincaid and his team have set up several sensors along an east-west transect in the lower east passage, which is the main conduit for water entering the bay from the sound. Data on the velocity of water flow at various depths as well as temperature



and salinity will be used to improve model estimates of nutrient intrusion flux.

"This approach to nutrient monitoring is similar to that on the West Coast, where they have a narrow continental shelf and an upwelling of nutrients from the deep water. On the East Coast we have a broad continental shelf and very dense cities, so there's more focus on land sources," says Kevin Rosa, a Ph.D. candidate in physical oceanography working with Kincaid. "But there are a lot of nutrients in RI Sound. It looks like the exchange between the bay and the sound could be an important nutrient source." —AG

Editor's Note: In April, GSO's Coastal Resources Center (CRC) received word from the U.S. Agency for International Development of a \$25-million grant—the largest grant in URI history. Since then, a CRC team has arrived in the Philippines to begin laying the groundwork.



Coastal Resource Managers to Lead Fisheries Program in Philippines

By Elizabeth Rau and Carol McCarthy

The Philippines is one of the largest fish producing nations in the world, employing millions and feeding the planet. Yet the industry is in peril, largely due to destructive fishing practices, typhoons and coastal degradation.

The Coastal Resources Center (CRC) at the University of Rhode Island's Graduate School of Oceanography is leading an international initiative to address these challenges by bringing coastal science and fishery reform to the island-dwelling country of more than 100 million people.

Partnering with the U.S. Embassy in the Philippines' U.S. Agency for International Development (USAID) and a multi-sector consortium of local universities and nongovernmental organizations, CRC will implement a \$25-million, five-year sustainable fisheries grant program called the USAID Fish Right Program.

"We're honored to be leading this consortium, and I'm excited to work in a country that has a great commitment to sustainable fisheries and improving the livelihoods of its residents," says Elin Torell, CRC director for international programs and the lead researcher for Fish Right.

GSO Dean Bruce Corliss says the award demonstrates USAID's confidence in CRC's reputation for excellence in fisheries management worldwide.

"...(Coastal Resources Center) will implement a \$25-million, five-year sustainable fisheries grant program called the USAID Fish Right Program."

“(Fish Right) will also work with national, regional and multinational partners to develop economic incentives for sustainable fisheries, coastal resource management and community building.”

“URI’s experience in the region, and demonstrated success globally, most certainly factored greatly in USAID’s decision,” says Corliss. “CRC has a deep understanding of the science and a history of creating local partnerships that build sustainable fisheries, protect marine ecosystems and empower coastal communities.”

Fish Right seeks to increase fish stocks in key areas in the Philippines by improving fisheries management and building the resilience of fishing communities. The program is expected to benefit up to 2 million Filipinos in coastal communities in Calamianes, Southern Negros and the Visayan Sea. It will also ensure that women and other marginalized groups benefit and participate as equals in conserving and managing coastal and fisheries resources.

Fish Right will work closely with the Bureau of Fisheries and Aquatic Resources of the Philippines Department of Agriculture. It will also work with national, regional and multinational partners to develop economic incentives for sustainable fisheries, coastal resource management and community building.

The program will be directed in the Philippines by Nygiel Armada, a national leader in fisheries reform in his country. “I’m looking forward to energizing, focusing and guiding our consortium partners at this pivotal moment for the Philippines’ fisheries,” says Armada.

Torell and Glenn Ricci, CRC program manager, will lead the Philippine program from URI’s Narragansett Bay Campus. Co-investigators are Michael Rice and Emi Uchida, professors in URI’s College of the Environment and Life Sciences, and Brian Crawford, CRC senior coastal manager.

The major partners on Fish Right are: Path Foundation Philippines, a local nonprofit; Resonance Social Impact Investment, a consulting group; NGOs for Fisheries Reform; Silliman University in the Philippines; the University of the Philippines at Manila and Visayas; and the Sustainable Fisheries Partnership, a United States-based nonprofit.

“Having strong local partners is a proven strategy for sustainability,” says Torell. “They are the backbone of this program, and we’re happy to have them on board.”

CRC’s history with the archipelagic state stretches back to the 1980s, most recently in 2013. In 2014, the CRC received a \$23,987,827 grant from the federal agency to lead a fisheries program in Ghana, which is flourishing today. That is the second largest grant in URI history.

In addition to the Philippines and Ghana, the center is working on fisheries programs in Senegal, Malawi, Madagascar, Nicaragua, El Salvador, Guatemala and Honduras. These grants reflect URI’s



demonstrated expertise in promoting sustainable fishing practices to coastal communities throughout the world.

J.P. Walsh, CRC director, GSO professor and an investigator on Fish Right, says he is proud of “the dedicated staff that constructed this complex, well-coordinated proposal.”

“The award is a testimony to the passion, hard work and talent of the team and its partners,” he says. “Our center strives to help coastal communities.” —AG

Above: The Fish Right program is focusing on coastal communities like these artisanal fishermen. It’s goal is to improve livelihoods by building sustainable fisheries.

Dawn of a New Day

By Carol McCarthy



The National Science Foundation (NSF) has selected the East Coast Oceanographic Consortium, led by the University of Rhode Island's Graduate School of Oceanography, to operate a new oceanographic research ship, one of only three such vessels in the nation.

Owned by NSF and valued at more than \$100 million, the Regional Class Research Vessel (RCRV) will be constructed in Louisiana, delivered to Rhode

Island in 2021 and home-ported at URI's Narragansett Bay Campus.

institutions," said URI President David M. Dooley. "No doubt the new vessel will help researchers, educators, students and the public gain a richer understanding of our planet and stimulate exploration that will lead to discoveries we can't yet imagine."

"This is tremendous news for the Consortium members, URI, and the state of Rhode Island," said GSO Dean Bruce Corliss. "This new ship and our Consortium will provide cutting-edge technology and exciting new opportunities for research, education and outreach in ocean science and exploration."

"The award of the RCRV to the East Coast Oceanographic Consortium demonstrates the power of collaboration," said Robert Munier, vice president for Marine Facilities and Operations at the Woods Hole Oceanographic Institution (WHOI). "Providing access to the sea for our scientists and engineers is a key mission objective, which the Consortium will now be able to provide for decades to come."

"This is particularly exciting news for the new School of Marine Science and Ocean Engineering at University of New Hampshire," said Larry Mayer,

The vessel's endurance, draft, ice classification and science mission equipment are tailored for essential science throughout the Atlantic Ocean and adjoining seas.

Island in 2021 and home-ported at URI's Narragansett Bay Campus.

"This significant investment in the nation's scientific research recognizes URI's half-century of leadership in the field of oceanography and its long-standing and fruitful collaborations with partner

New Consortium Key to the New Era

By Carol McCarthy

“This new ship and our consortium will provide cutting-edge technology and exciting new opportunities for research, education and outreach in ocean science and exploration.”

—Dean Bruce Corliss

director of the school. “As a member of the East Coast Oceanographic Consortium with access to this new state-of-the-art research vessel, UNH scientists will have an unprecedented opportunity to participate in a range of important coastal and deep-sea research experiments.”

Continuing URI’s half-century of ocean-going research, the new vessel will support such scientific studies as the tracking of ocean currents and fish migration, seafloor surveys in earthquake prone regions of the world, conservation of marine mammals or food-web dynamics in the deep ocean. In addition, the ship will offer educational opportunities to teachers and students from high school through the graduate level, as well as outreach to the general public.

In 2017 NSF awarded the first of the three new research vessels to Oregon State University, which is overseeing design and construction of all three ships. Naval architecture and engineering consultant Glosten Associates is developing the ship design, with

(continued on page 14)

In January 2018, URI’s GSO formalized an agreement to create the East Coast Oceanographic Consortium (ECOC) to operate the research vessel *Endeavor* for its final years and to operate the new RCRV, which will also be based at URI’s Narragansett Bay Campus.

GSO Dean Corliss says establishing the ECOC with WHOI in Massachusetts and UNH—in collaboration with 13 associate members—creates new and exciting research, educational and outreach opportunities in ocean science and exploration.

The creation of the ECOC is the culmination of five years of discussion with marine science institutions along the Eastern seaboard and builds on GSO’s reputation as one of the world’s premier academic institutions of oceanography and ocean exploration.

“The objective of the Consortium is to enhance and promote research and education among its members,” says Corliss. “With decades of cumulative scientific experience and participation from dozens of the world’s preeminent oceanographers, the Consortium has the expertise, resources and commitment to safely and effectively manage a new research vessel to address critical scientific questions worldwide.”

“The Consortium creates a powerful model for collaboration among leading New England oceanographic institutions,” says Robert Munier, vice president at WHOI. “The consortium will create synergies of marine operational expertise and facilities with the goal of providing best-in-class access to the sea for our scientists and engineers.”

“The Consortium offers the opportunity for an already dynamic community of East Coast marine scientists to work more closely together,” says Larry Mayer, professor and director of the School of Marine Science and Ocean Engineering and the Center for Coastal and Ocean Mapping at UNH. “The

(continued on page 14)

“With decades of cumulative scientific experience and participation from dozens of the world’s preeminent oceanographers, the Consortium has the expertise, resources and commitment to safely and effectively manage a new research vessel...” –Dean Bruce Corliss

Dawn of a New Day

(continued from page 13)

input from leading oceanographers from throughout the United States. The ships will be built at Gulf Island Shipyards, LLC, in Houma, La.

RCRVs conduct operations in the coastal ocean ranging from near-shore environments to the outer continental rise, as well as the open ocean. The vessel’s endurance, draft, ice classification and science mission equipment are tailored for essential science throughout the Atlantic Ocean and adjoining seas.

NSF and other federal sponsors, including NOAA and the Office of Naval Research, are likely to continue annual funding of approximately \$5 million to URI to operate the vessel. These funds support the cost of operating a research vessel, which include crew, food, fuel, planned maintenance, safety training, and science logistics. Scheduling will be coordinated through the University-National Oceanographic Laboratory System.

The URI vessel will replace R/V *Endeavor*, a 185-foot ship that URI has operated for more than 40 years and is nearing the end of its useful life. *Endeavor* has traveled more than one million nautical miles from the Arctic to the South Pacific and nearly everywhere in between while conducting more than 600 research expeditions.

“As a floating laboratory and classroom, *Endeavor* has been a tremendous facility for the university and for the state and has raised URI and GSO’s profile internationally,” said Corliss. “*Endeavor* has made important contributions to the state’s economy, and the work conducted aboard the ship has advanced our understanding of oceanographic processes. We are pleased to continue this legacy over the next 40 years with the new vessel.”

New Consortium

(continued from page 13)

efficiencies gained through this collaboration will have long-term impact on our ability to better understand our oceans and their impact on our lives.”

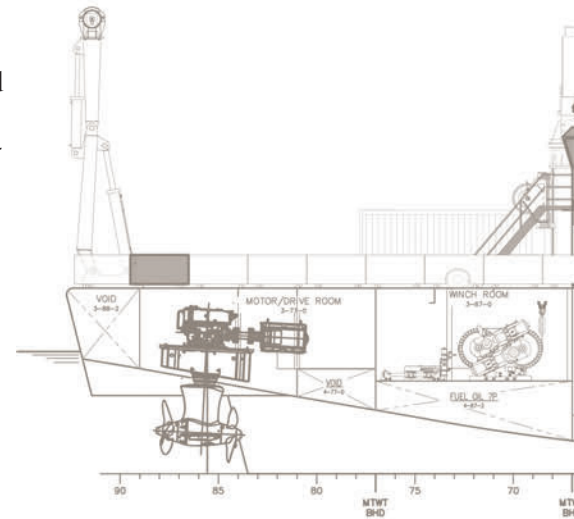
As head of the group, Corliss is responsible for the leadership, management and oversight of the entire Consortium. GSO Director of Administration James Patti is the Consortium’s director; GSO Director of Facilities and Operations David Palazzetti is responsible for the management and planning of the ship’s operations; and GSO Director of Marine Operations Thomas Glennon is responsible for the overall operation of the ship.

Two scientists from each of the major institutions will serve on the group’s policy board, setting long-range goals and promoting collaborative and innovative research initiatives.

The Consortium’s program advisory committee provides guidance on science, technology, equipment and instrumentation. The committee also implements strategy for supporting ocean research and education activities on board the vessel and explores opportunities for promoting relationships among Consortium members, as well as the broader ocean science community.

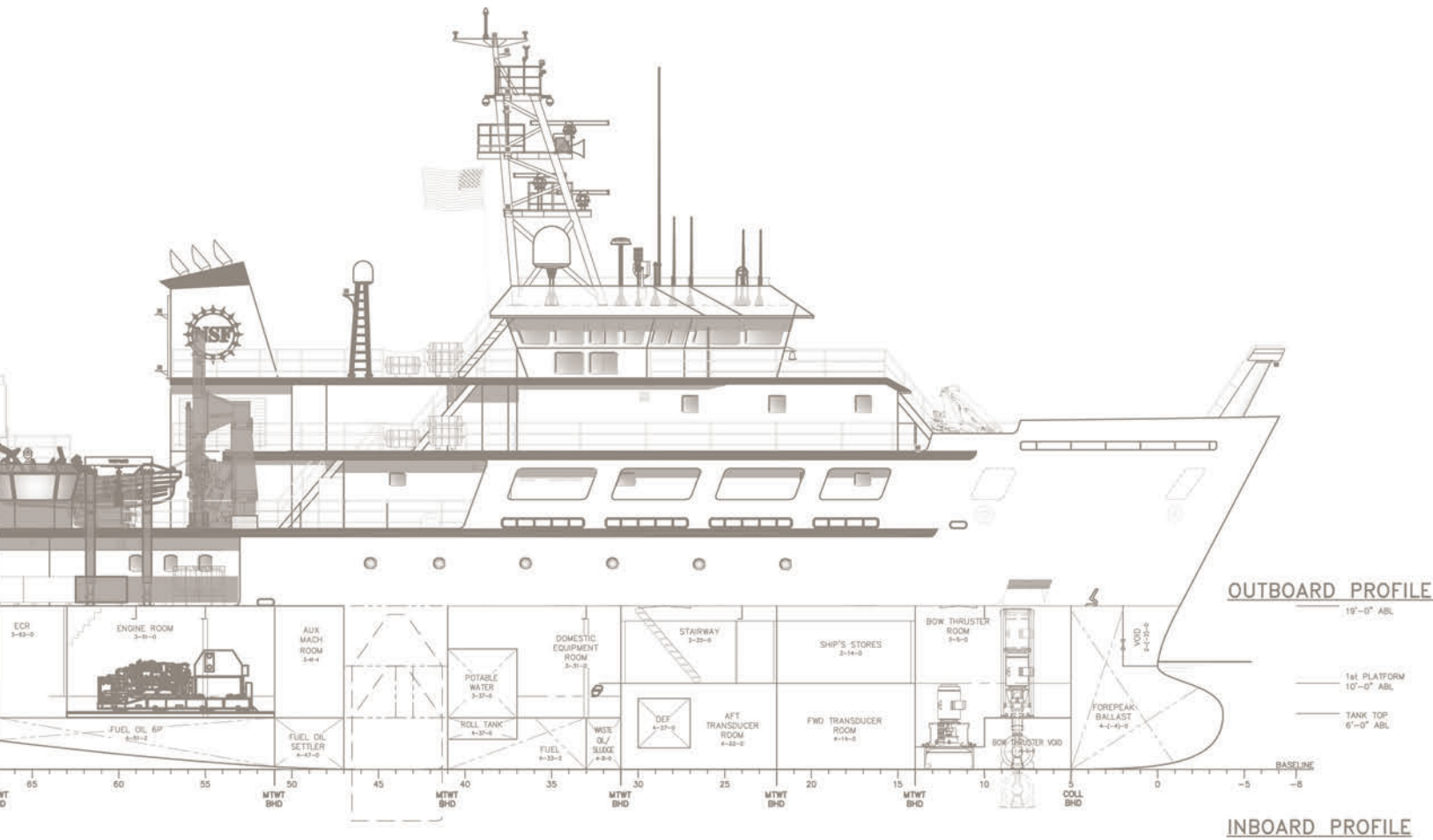
In addition to ship operations, a major goal of the group is to collaborate with other institutions on research and educational programs.

“The Consortium is a great example of genuine collaboration across institutional boundaries,” says Patti. “Together, URI, UNH and WHOI have accounted for more than a billion dollars in ocean science research funding over the past five years.”



ECOC’s Associate Members

- Bermuda Institute of Ocean Sciences
- Bigelow Laboratory for Ocean Sciences
- Brown University
- Columbia University’s Lamont Doherty Earth Observatory
- Florida Institute of Oceanography
- Harvard University
- Ocean Exploration Trust
- University of Maine
- University of Massachusetts, Boston
- University of Massachusetts, Dartmouth
- University of Miami
- University of Puerto Rico
- University of South Florida

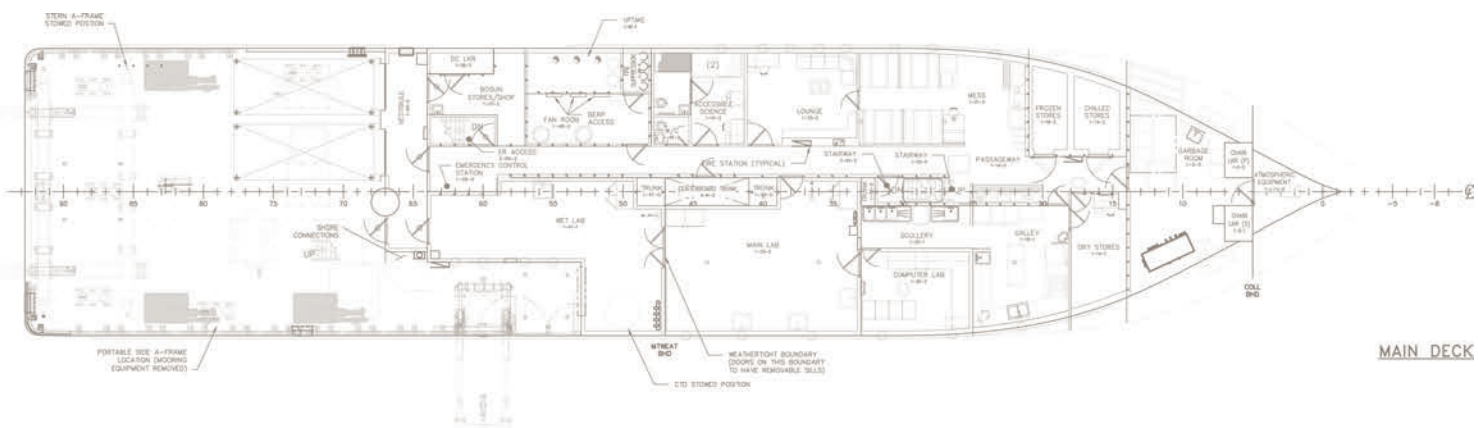


The new ship—currently known as RCRV-2—will be 199 feet long and 41 feet wide.

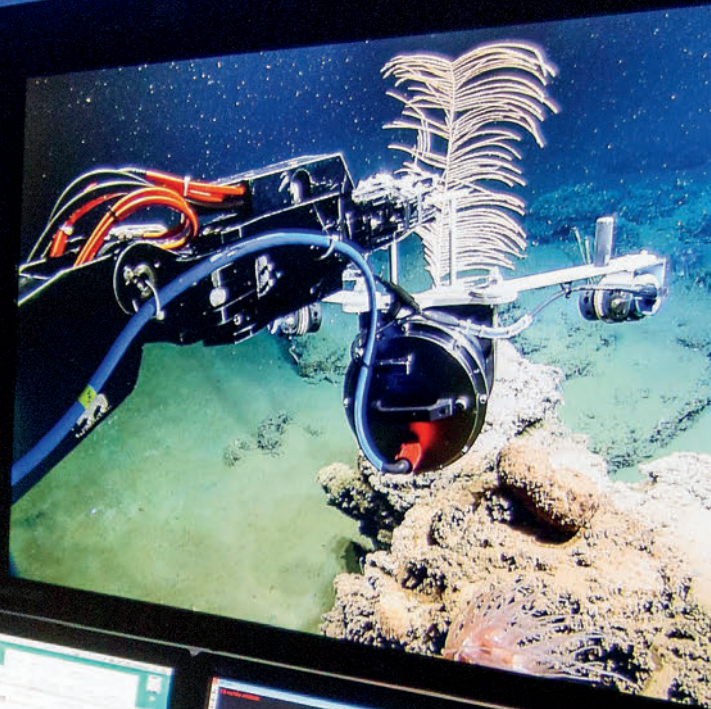
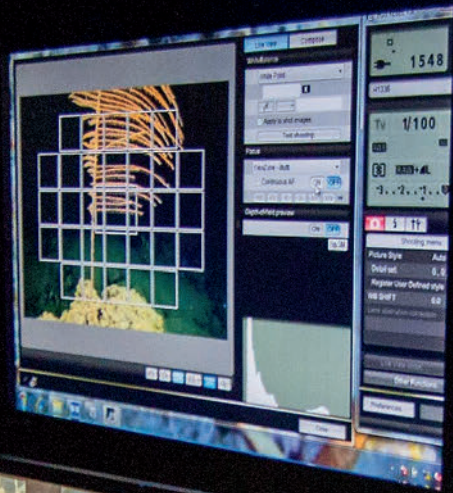
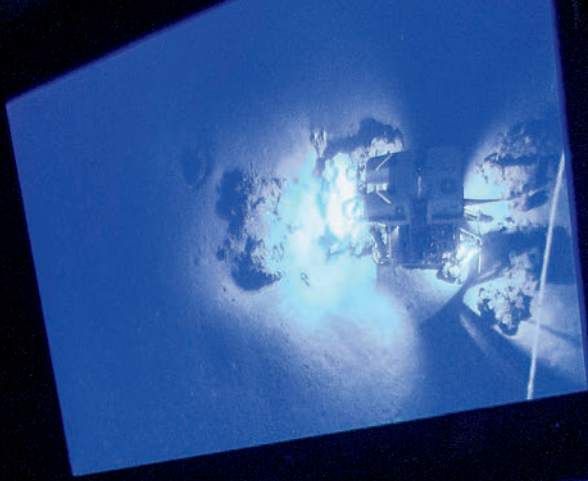
With a range of 5,400 nautical miles, it can cruise at 11.5 knots for up to 21 days.

The dynamic positioning system will enable RCRV-2 to remain in one exact spot for extended periods and allows for use of remotely operated vehicles.

RCRV-2 will offer improved science labs, more workspace, state-of-the-art technologies, and more comfortable berthing for a crew of 13 and up to 16 scientists.



Recently, *Aboard GSO* reached out to Professor Robert Ballard for an update. In the following report, Ballard details the current mission, collaborations, and capabilities of the ship *E/V Nautilus* and the teams with whom he has been working.



The Future of Ocean Exploration

By Robert D. Ballard

The partnership between the Center for Ocean Exploration (COE) at GSO and the Ocean Exploration Trust (OET)—which owns and operates exploration vessel *Nautilus*—brings together incredible talent and a unique set of assets that enables us to be global leaders in telepresence-enabled ocean exploration. As director of COE for the past 15 years and president of OET since its founding in 2008, I am committed to ensuring that this partnership continues to achieve the three primary goals of our mission for many years to come.

The first goal of our mission is to **EXPLORE**—“to boldly go where no one has gone before on Planet Earth” in an ongoing effort to better understand the global ocean.

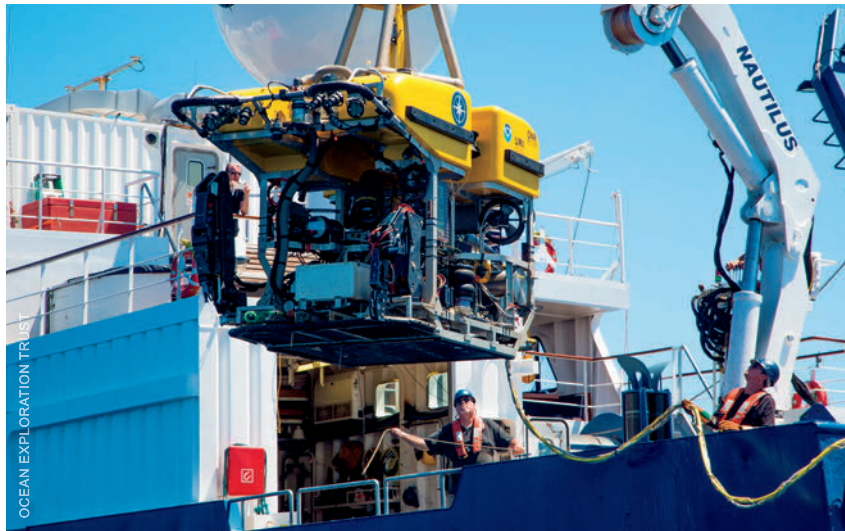
Science-based exploration requires us to **INNOVATE**—our second goal—to develop the latest technologies that aid and enhance ocean exploration with an emphasis on advanced robotic vehicular systems. These systems can greatly increase on-time and efficient exploration, and make it possible for scientists and the public ashore to participate in our work, in real time, as it happens.

Our third mission is to employ *E/V Nautilus* and its technology to **ENGAGE** by enabling students, educators, and the public—nationally and globally—to participate in our exploration as it happens.

“...what (the ROVs) see with their high-definition camera systems is transmitted through fiber-optic cable to a command center aboard *E/V Nautilus*, which is operating around the clock 24/7.”

Each year, *E/V Nautilus* and its Corps of Exploration spends approximately six months at sea exploring a variety of regions. In addition to *E/V Nautilus*, we are building a mobile remotely operated vehicle (ROV) system that can be deployed on other ships. Beginning in late 2019, the ROV system will make us a truly global exploratory program as operations expand both geographically and chronologically. The footprint of locations we’ll be capable of exploring will grow and the annual time at sea will increase from six months to eight.

A critical player in this global, real-time program is the Inner Space Center at GSO. This truly remarkable facility has become the telepresence hub for the oceanographic community. It connects via high-bandwidth satellite link to *E/V Nautilus* and other exploration and research vessels when they are at sea.



Above: ROV Hercules is loaded aboard *E/V Nautilus*.
Left: Aboard *E/V Nautilus*, the mobile command center for ROV operations is housed in a dedicated van and is in constant operation.

When our undersea ROVs Hercules and Argus are exploring the depths of the sea, what they see with their high-definition camera systems is transmitted through fiber-optic cable to a command center aboard

E/V Nautilus, which is operating around the clock 24/7. Those images, as well as the voices of the Corps conducting the ROV dive operations, are sent via satellite to the Inner Space Center, where they are displayed and broadcast to the public online.

Phoning a Friend

Inherent in our mission to explore is that we have no way of knowing what we will encounter on *Nautilus* expeditions. As such, we often do not have the appropriate expert on board when we make a new discovery. We solve this dilemma through our Scientists Ashore network. This program functions much like the emergency room of a hospital and doctors on call. When we make a discovery, no matter where we are, no matter the time of day, or the depth of the ocean we are exploring in, we are able to connect to our Scientists Ashore, our own doctors on call. Through telepresence, they can contribute to the investigation of the discovery in real-time and direct ROV dive operations from shore.



For example, imagine it's three in morning when a discovery is made far out at sea. The Watch Leader looks at his or her list of experts in biology, geology, archaeology, etc. He or she calls the relevant expert, who may be sleeping in bed half way around the world, and brings them up to speed.

'Hello Dr. Girguis, this is the *Nautilus* calling. Would you please boot up your laptop, go to NautilusLive.org and tell us what you think? While you are doing that we will patch your phone into the ear of robot pilot Bob Waters so you can decide what to do.'

If it is an important discovery, that scientist will immediately travel to his or her university where we have built miniature command centers similar to the one aboard E/V *Nautilus*. Once in this remote center, the expert is literally beamed aboard and can take over ship operations to better understand what we have just discovered.

Thinking Ahead

In addition to expanding the footprint of the expertise we have available on the ship to conduct science-based exploration, this telepresence technology also allows us to involve the next generation of explorers, scientists, engineers and educators in this exciting real-time exploration. Included in our Corps of Exploration at sea are educators and students participating in OET's fellowship and internship programs. Through their participation, embedded in the science and operations team aboard and connecting to their communities through ship-to-shore broadcasts in real-time, they serve as role models to their colleagues and communities in our efforts to motivate the next generation into considering careers in STEM (science, technology, engineering, and mathematics) disciplines.

Great Challenges

Each year our field season focuses on a growing number of programs. Our primary program, which is funded by the National Oceanic and Atmospheric Administration's (NOAA) Office of Ocean Exploration and Research is to explore the 50 percent of America that lies unexplored beneath the sea. By square miles, this is like conducting a modern-day version of the Lewis and Clark Expedition. However, unlike Lewis and Clark's Corps of Discovery, which were all men except for Sacagawea, our Corps of Exploration has a majority of women in positions of leadership and authority.

Another important partner is NOAA's Office of National Marine Sanctuaries. This office utilizes E/V *Nautilus* each year to explore the deep regions of the country's sanctuaries and better protect important marine species, ensure the sea can continue to feed our growing population, and discover lost chapters of human history.

Exploring our largely unknown ocean is one of the great challenges of our time—and great challenges breed mighty endeavors. At first glance, ocean exploration is a simple task: determine a place in the ocean no human has ever been to or seen, go to that place, and observe what is there. Yet, as the ocean-exploration and ocean-science communities know, executing at-sea missions is no simple task. With the talent that GSO and OET possess, and which is fostered in students, we aim to ensure the next generation of ocean explorers and researchers are well represented within the GSO alumni community. —AG

Above left: At sea, E/V *Nautilus* deploys state-of-the-art robotic exploration systems. Above right: Aboard *Nautilus*, Ballard discusses the current mission with Larry Mayer, an OET board member and professor at University of New Hampshire.

WALKING THE TALK

Following her career to the boreal region of Alaska, Yukon, British Columbia and the Northwest Territories, Leanna Heffner is putting the “field” in fieldwork.

By Sharron Luttrell

“Right now, science communication is a huge topic and a huge field. We recognize that for our society to continue to value science, people need to be able to understand it.”

LEANNA HEFFNER (PH.D. 2013) spent her academic career studying the impact of nutrient pollution on coastal ecosystems. Her research took her from the Atlantic shoreline to the Pacific, down to the lagoons of Louisiana, and ultimately to her dream job in the boreal forests of Alaska and western Canada.

Heffner’s shift from the continent’s coastlines to its northern interior was less a departure from her studies than a chance to apply them. Heffner is partnership director for the Northwest Boreal Landscape Conservation Cooperative (NWB LCC), a job that calls for communicating scientific data and working collaboratively with diverse groups to tackle critical environmental issues. One of Heffner’s focuses while at the University of Rhode Island’s Graduate School of Oceanography was in using conservation research to bring people together and

inform their decision making.

“Right now, science communication is a huge topic and a huge field. We recognize that for our society to continue to value science, people need to be able to understand it,” Heffner says.

Heffner’s passion for making science accessible to people outside the field took hold while studying under the late GSO Professor Scott Nixon, who taught his students to include human activity as an essential component of coastal ecosystems. When Heffner entered the doctoral program in 2006, demand was growing for science communicators, integrators, and bridge builders—professionals who could cut across disciplines and interpret complicated information for the layperson.

Heffner, who had considered a career in counseling before majoring in biology at Vassar College, was drawn to the challenge of working collaboratively with the people who would benefit directly from

ALL PHOTOS COURTESY OF LEANNA HEFFNER

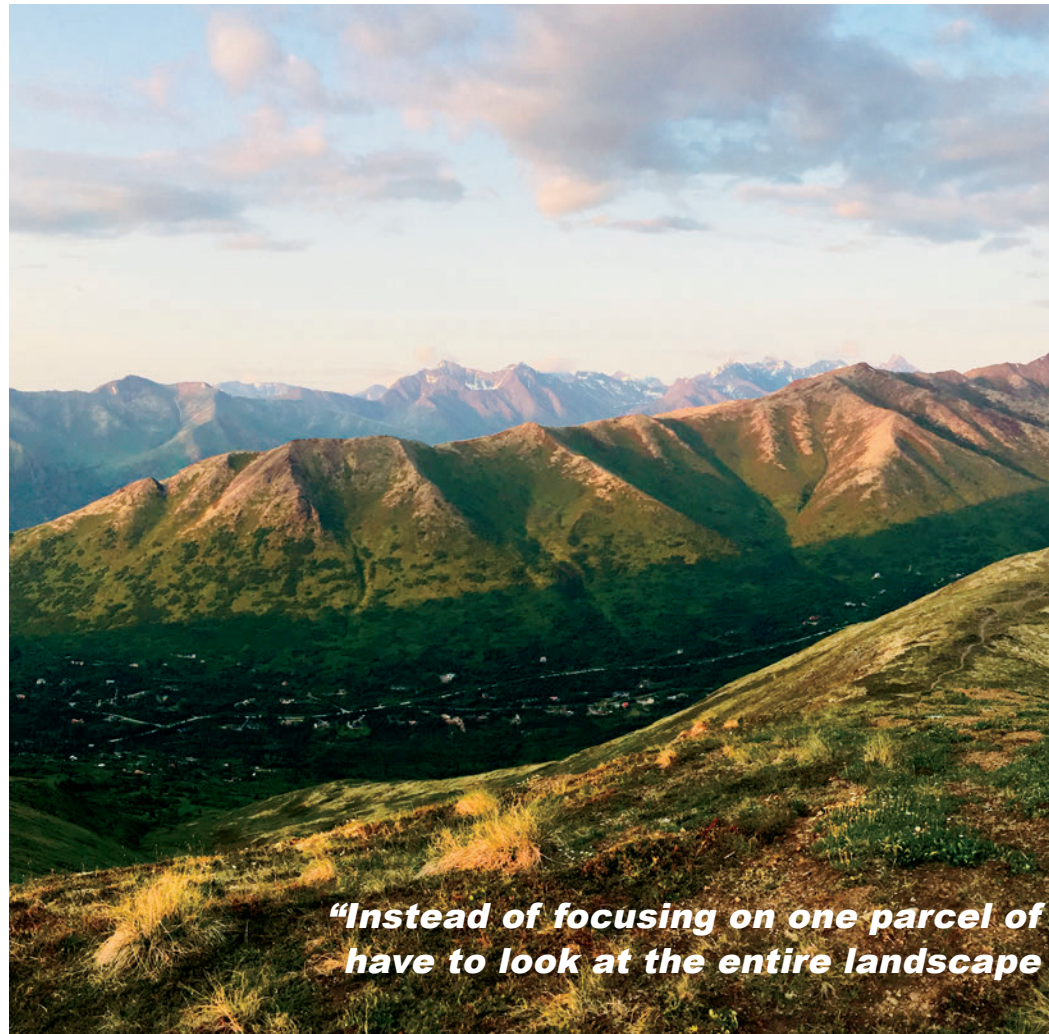


Heffner earned her Ph.D. at GSO in 2013. She is now partnership director at the Northwest Boreal Landscape Conservation Cooperative, which extends across 330 million acres and brings together land managers, policy-makers, researchers, conservation groups and indigenous leaders to work on shared conservation goals.

conservation research. But it wasn't until a field trip to the Providence waterfront that she began to fully appreciate how important—and complex—the task would be. She and her fellow students talked with shipyard workers, fishermen, a sewage plant manager and a property developer, each of whom depended on the waterfront for their livelihood.

Hearing their perspectives was “eye opening” for Heffner, who realized that a successful solution to the problems plaguing the waterfront would have to take into account the community’s economic and cultural ties to the area. A strictly conservationist approach that disregarded human dependence on the coast would be met with resistance and ultimately fail. “You need to go and learn about their worlds and then down the line you have to start building relationships and find common ground,” she says.

At GSO, Heffner took advantage of

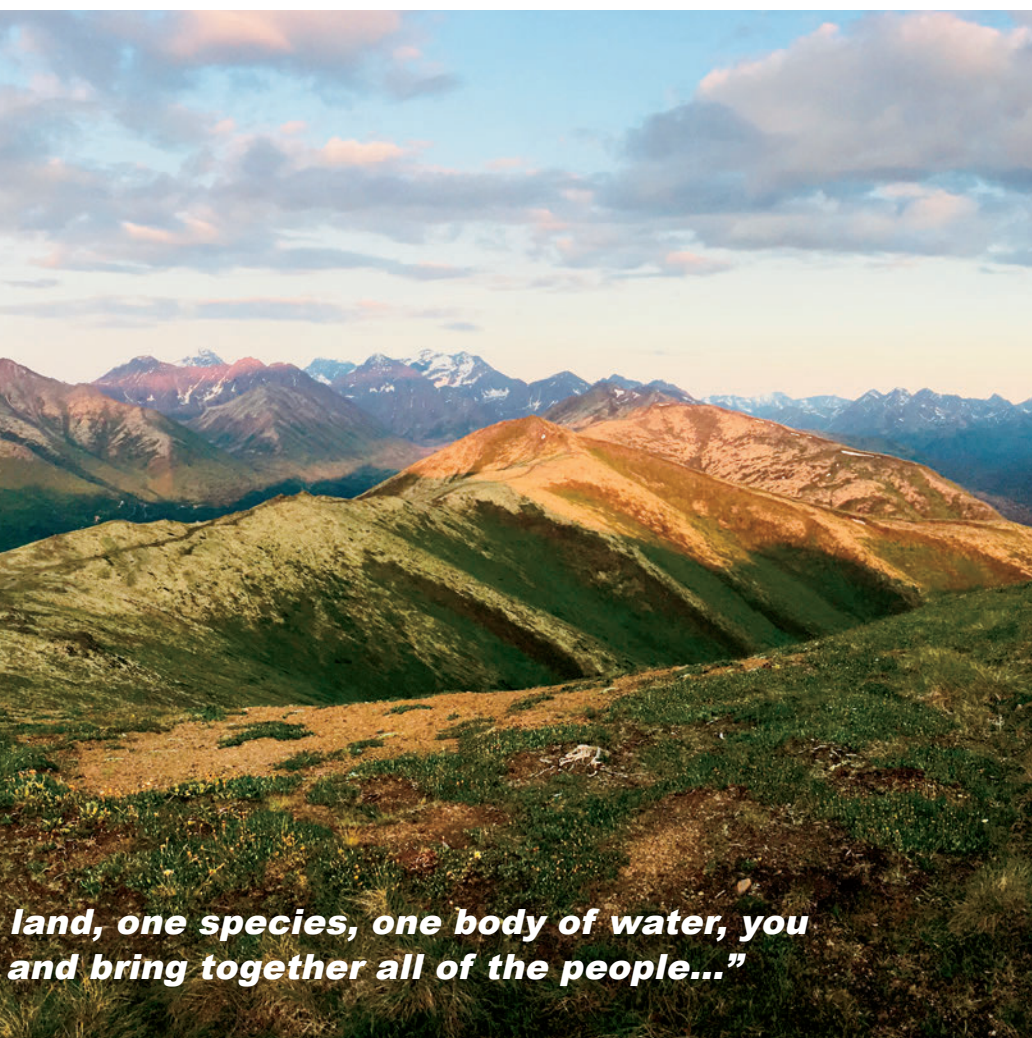


“Instead of focusing on one parcel of have to look at the entire landscape

opportunities to work across disciplines and hone both her communication and research skills. She was a trainee in the National Science Foundation’s Integrative Graduate Education and Research Traineeship (IGERT) program at the Coastal Institute, which tackled problems by bringing together diverse teams of people with differing values and interests. During summers, she volunteered with the Metcalf Institute for Marine and Environmental Reporting, teaching journalists how to cover science. In turn, she learned how to communicate effectively with the press. She spent several semesters at the URI Coastal Resources Center on a collaborative project that involved applying techniques developed by behavioral scientists to persuade homeowners on the coast to protect their property from climate change impacts. As an outreach scientist with the GSO Office of Marine Programs, Heffner brought coastal science to school

teachers and their students.

Heffner earned her Ph.D. in 2013 after defending her dissertation, “Responses of Nitrogen Cycling to Nutrient Enrichment in New England Salt Marshes over an Annual Cycle.” After completing postdoctoral work at the Department of Oceanography and Coastal Sciences at Louisiana State University, she moved to Alaska with her husband, Larry Pokladnik to become science communications coordinator for the Western Alaska LLC. It is one of five LLCs founded in 2011 and 2012 to bring together land managers, policy makers, researchers, conservation groups and indigenous leaders to work together on shared conservation goals. “The idea being that instead of focusing on one parcel of land, one species, one body of water, you have to look at the entire landscape and bring together all of the people who live and work on the land to figure out the major issues and work together



land, one species, one body of water, you and bring together all of the people..."

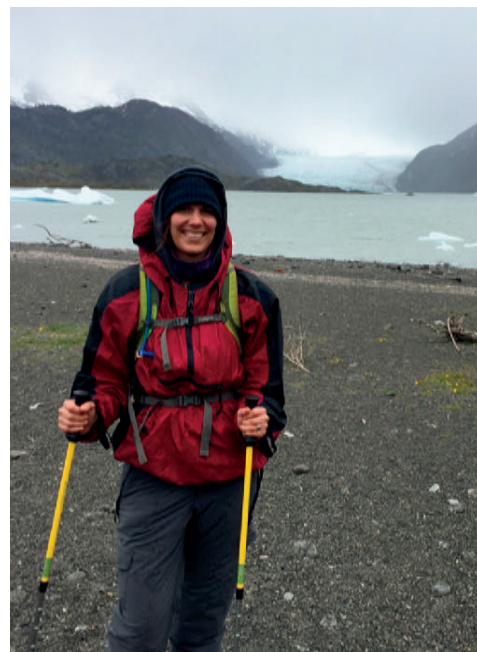
to come up with solutions," Heffner says. The LCCs were originally funded by the U.S Department of Interior but are now dependent on public and private support.

In January, Heffner edged out 120 candidates to become partnership director at the NWB LCC. The cooperative covers 330 million acres in the boreal region of Alaska, Yukon, British Columbia, and Northwest Territories.

Heffner spends her days meeting with people representing various interests in the region, discussing and crafting strategy, fundraising and networking. Her studies at GSO prepared her well. In particular, her conversations with Providence waterfront workers over a decade ago primed Heffner to collaborate with indigenous groups, whose generations-long connection to the land and rich knowledge is invaluable when seeking solutions to critical environmental issues. "It blows my expertise out of the water," she says.

This past summer, Heffner immersed herself in the indigenous culture, joining the Yukon River Inter-Tribal Watershed Council on a two-week canoe trip along the Yukon River to take water samples, meet with tribal councils to talk about mining and other issues, and to do trainings for "citizen science."

"This has been like a dream job for me," she says. "It's doing science that is integrated with people's values, belief systems and cultures ... It has been the most humbling, cool, challenging experience of my life."—AG



Top: Heffner with her husband, Larry Pokladnik, and her dogs, Khody and Kush. Above: On the Kenai Peninsula across Kachemak Bay; the receding glacier in the background is testimony to rapid change in a fragile ecosystem.

Director of Marine Operations Thomas Glennon, left, discusses shore-side improvements with Director of Facilities and Operations, David Palazzetti.



ALEX DEICICIO

The clock is running to rebuild infrastructure that makes GSO a home port.

Make Fast

By Todd McLeish

When the new research vessel arrives in 2021 to replace the R/V *Endeavor*, it will dock at a new pier and be serviced by new support facilities that will soon be under construction.

“We need to start working on these facilities immediately,” said David Palazzetti, director of facilities and operations at the Narragansett Bay Campus. “It’s going to be a race to see if we can build a new pier before they finish building the new ship.”

Palazzetti explains the existing pier is too short for the new vessel. The wide section of the dock that accommodates vehicle access has been in place since

before the arrival of the university’s first ship, *Trident*. The rest of the dock consists of catwalks and dolphins that enable the crew to access the mooring lines and shore power connections at the bow.

“Equipment and supplies for both the *Trident* and *Endeavor* were only loaded on the stern,” he said. “No heavy gear had to be loaded on the bow, so the dock was never extended the full length of the ship. But the new ship is configured differently, so we’ll need to be able to drive a truck to the bow to load and unload supplies.”

The existing pier is an L-shaped structure just 85-feet long on its outboard face. The new pier will be T-shaped and 200-feet long, enabling cranes on the forecandle and stern to load food, supplies and science equipment at both ends of the new 199-foot vessel.

The new pier will also be designed to accommodate the mooring of a visiting boat up to 68-feet long, temporarily, along its shore-side face.

In addition, the pier will be equipped with an enclosed structure to house instruments sampling bay water year-round through access panels in its floor and a small davit crane to allow easy launching and retrieval of research equipment and instrumentation.

Utility connections from the ship to the pier will be relocated to accommodate those on the new ship. But no dredging will be required, since the draft of the new ship is just 15 feet, four feet less than that of the *Endeavor*.

The new pier and approach road will also be raised by a few feet because rising sea levels, higher tides and more severe storms have frequently caused flooding in recent years.

“During heavy storms, our entire pier has been under water a number of times, and the road also gets flooded,” Palazzetti said. “It’s been almost a routine occurrence during nor’easters. Raising the pier higher will not only get it out of the range of storms and higher tides, but it will also ease the loading of the new ship, which has a higher main deck than *Endeavor*.”

To accomplish all of this work, the existing pier will be completely removed. The timbers that support the pier date to at least the 1960s, and wood-boring marine organisms have taken their toll. The new pier is expected to feature steel-encased concrete piles driven into the seafloor and a decking of reinforced concrete.

According to Palazzetti, none of this work can commence until a designer and contractors are hired and permits are

secured from R.I.'s Coastal Resources Management Council, the Army Corps of Engineers, and other agencies. He anticipates the entire process will take approximately two-and-a-half years and cost about \$10.5 million.

Consolidating and Upgrading

While that project is under way, a new home for marine operations will be constructed. The 12,250-square-foot facility will be occupied by the department responsible for operations and maintenance of the vessel. This building will also accommodate equipment assembly and storage areas that are currently located nearby in smaller buildings.

“The new center for marine operations will help GSO make the most of the new vessel with larger and much improved spaces for the marine offices,” said Thomas Glennon, director of marine operations. “Along with more efficient office and conference spaces, it will also have much needed additional space for storage, spare parts, and areas that support the staging of upcoming science missions.”

The center for marine operations will be located on Pier Road adjacent to the marine logistics building. It will feature offices on the second floor, high-bay work space on the first floor with an electronics shop and machine shop, and large staging areas where gear can be worked on and prepared for deployment at sea.

Funding for the marine operations building is expected to come through a bond referendum to be voted on by the Rhode Island electorate in November.

Nurturing Innovation

An ocean technology building—part of the Narragansett Bay Campus Master Plan—will also be constructed. This facility will house and empower cooperative efforts between marine operations and scientists in oceanography and ocean engineering who conduct research and development on remotely operated vehicles, autonomous vehicles and other underwater robotics systems that can be tested and operated from the new vessel.

Funding for an ocean technology building also depends on passage of the bond referendum. Details on these game-changing facilities will be featured in upcoming issues of *Aboard GSO*. —AG

Advancing GSO, Phase I: Implementing the Narragansett Bay Campus Master Plan

In November 2018, there will be a State of Rhode Island ballot initiative requesting voter approval of \$70 million of general obligation bonds in support of our higher education institutions. Of that total, \$45 million has been designated a down payment for renewal of URI's Narragansett Bay Campus. The remainder has been directed to projects at Rhode Island College.

Upon passage of the referendum, we intend to invest the bond proceeds, combined with at least \$5 million in private support, on construction of a new 20,000-square-foot ocean technology building (\$20-million), reconstruction of the GSO pier to accommodate the newly-awarded research vessel (\$10.5 million) and construction of a new building for marine operations (\$7 million) that will house land-based personnel and logistical support for the research vessel. The remaining funds are destined to cover other critical campus enhancements, renovations and planning for Phase II construction. These enhancements include design and engineering work, revised layout and construction of roads and parking areas, and upgrades to utilities.

A building especially designed for innovation in ocean technology is a focal point of new construction in Phase I. Research laboratories for faculty in GSO and Ocean Engineering will be located here.

These faculty work on research and development of autonomous underwater vehicles (AUVs), remotely operated vehicles (ROVs), sea gliders and related technologies with broad application in national security, biology, archaeology and seafloor mapping. The high-bay space that facilitates rapid prototyping and collaboration with industry will figure prominently in this new building's design. We expect this building to serve as a center of excellence in Rhode Island—a building in which essential contributions to the growth of the state's Blue Economy will be made.

Enhancements to our pier are critical to accommodate the new RCRV. More about that project is presented in the article at left. Most notably, the existing pier—built in the 1960s—will be raised several feet to anticipate the flooding that occurs during extreme weather events and that can only grow worse and more frequent.

The building for marine operations will replace a facility that is more than 50 years old and has been temporarily housing Director Tom Glennon and his staff, as well as the team of marine technicians who are essential to scientific operations aboard *Endeavor*.

We look forward to sharing news on the progress of these initiatives, and appreciate your continued support of GSO.

—James Patti, Director of Administration, GSO

OCEAN SCIENCE

Alumni Support Shows Strong Growth

By Ellen Anderson

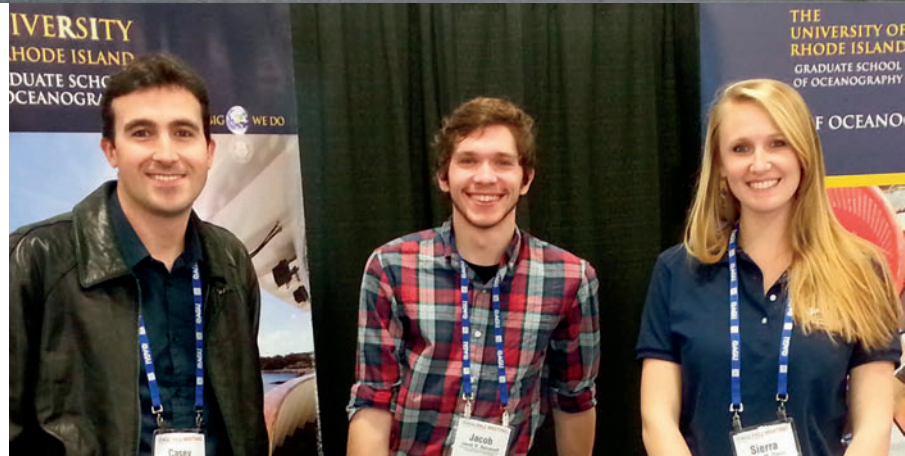
Hearfelt thanks to all who donated to the GSO Fund in Fiscal Year 2018. Your generosity led to an increase for the annual fund by more than 80 percent from \$85,500 in FY17 to \$153,500 in FY18.

The value of this level of support is illustrated when considering that, at URI's current spend rule of 3.3 percent, it would require an endowment valued at \$4.65 million to generate this same amount of funds.

Equally impressive is that the number of donors increased by nearly 10 percent. Every penny raised is critically important—the GSO Fund makes possible all manner of experiences and opportunities that otherwise would not happen.

One clear example of the GSO Fund's impact is illustrated by the work of the Alumni Awards Committee.* This group of dedicated alumni met early in the spring to provide students with funding for equipment and travel to meetings. The requests for funds are solicited in the fall and spring and provide students with extraordinary opportunities to enhance their research or present work at conferences and meetings. These funds come through the generosity of GSO Fund donors.

This spring, funds were distributed for both domestic and international travel, as well as for



Your generosity led to an increase for the annual fund by more than 80 percent from \$85,500 in FY17 to \$153,500 in FY18.

computer equipment to support student research. In the spring and summer 2018, students traveled to conferences in Santa Barbara, Calif., Boulder, Colo., Lucca (Barga), Italy, Atlantic City, N.J., and Davos, Switzerland, to present their work to their future colleagues and to meet potential collaborators. Conferences attended included the 148th American Fisheries Society Meeting; a numerical modeling workshop in Atmospheric Chemistry; the Kavli Institute

for Theoretical Physics Program: Planetary Boundary Layers in Atmospheres, Oceans, and Ice on Earth and Moons; the POLAR 2018 Open Sciences Conference; and the 2018 Gordon Research Seminar on Marine Microbes.

Another call for support will be issued to the GSO graduate students in early fall. Many of these awards will aid students who will attend the American Geophysical Union Fall Meeting in December 2018 to present posters or papers there.

Your contributions to the GSO Fund are a direct investment in the next generation of ocean scientists who will be called on to address the challenges facing our oceans, both here in Rhode Island and around the globe. Thank you for your continued support. —AG

Each year, the GSO Fund, in part, supports graduate students to attend scientific meetings, such as the American Geophysical Union Fall Meeting, to present their research.

*Alumni Awards Committee: Walter Berry (Ph.D. 1987), Doug Cullen (M.S. 1983), Kathleen Donohue (Ph.D. 1996), Matthew Horn (Ph.D. 2011), and Autumn Oczkowski (Ph.D. 2009).

A Special Invitation to GSO Alumni: October 13 Open House on the Narragansett Bay Campus

Please join us for a **networking brunch in the Trident Room** on the second floor of Watkins, from 8:30 to 10:00 a.m., to meet students and reminisce with faculty and staff and one another. The Trident Room will be alumni headquarters for the entire day—a spot where alumni can duck in for a breather. We want your graduate school to feel like home throughout this special day!

The GSO Open House 2018 will also be a day of celebration in honor of the newly awarded regional class research vessel.

At the end of the day, after exhibits close at 4:00 p.m., there will be a **celebratory reception** on the Knauss Terrace at the top of the quad for all volunteers, the GSO Advisory Council members, and all GSO alumni in attendance. “Informal” is the name of the game. So please join us and relax after a day of showcasing all that is special about the Graduate School of Oceanography!



MICHAEL SALERNO

ALUMNI NEWS & NOTES

Compiled by Veronica Berounsky

Richard (Dick) Payne (Ph.D. 1972) wrote that he is “still active but not in oceanography.” In July he left the board of The 300 Committee, his local land trust, after serving for 12 years, but will remain on two of its committees. He also recently became active in Citizens Climate Lobby, a nonprofit nationwide organization attempting to enact legislation to put a fee on carbon. He continues to play in his local chamber orchestra and in a woodwind trio.

David Morgan (Ph.D. 1973), who has been retired for some time now, was Director of the Kentucky Division of Water, responsible for all water issues in the state. He worked for the Department for Environmental Protection in Kentucky for 23 years after teaching at the University of Notre Dame for eight years. David is now chairman of the Owen County Tourism Commission and co-owner with his wife Joy of “Serenity Woods Cottage,” a secluded retreat in the woods of Northern Kentucky designed for getaway weekends (see serenitywoodscottage.com). He is also enjoying four grandchildren.

Douglas (Lee) Cone's (M.S. 1974) interest in marine fossils stems back 30 years. For the past decade, Lee has spent many hours on the bottom of the Cooper and Edisto Rivers in South Carolina, searching gravel beds for the abundance of fossils waiting to be uncovered.

These finds can date from the Eocene, but more commonly represent Oligocene, Miocene, and Pliocene marine deposits. Terrestrial Pleistocene fossils also appear on the bottom of the black-water rivers. As Lee describes it, “Black-water diving is an adventure on its own since visibility is usually less than a foot, but the history scattered on the bottom more than makes up for the inconvenience of the conditions. The exhilaration of finding an archaeocete tooth or a 5-inch *C. megalodon* tooth cannot easily be duplicated.”

Lee's finds even include a Miocene whale fossil (pictured at right) that now resides on display in the Mace Brown Museum of Natural History at the College of Charleston. For the past four years, Lee has worked with the *FOSSIL Project* (University of Florida-Paleontology) as an amateur contributor and supporter of *myFOSSIL* and has presented at regional Geological Society of America conventions. Lee adds, “My fondest memories in my education at GSO are of Dr. Saila (my major professor) and Dr. McMaster (geological oceanography). I loved being a teacher myself.”

William A. Richkus (Ph.D. 1974) recently retired from Versar, Inc. in Columbia, Md.

David Schultz (Ph.D. 1974) says that “the only change to my info is that I have retired after 31 years building custom cabinetry, specializing in kitchen and bathroom cabinetry and built-in bookcases





Above, David Schultz with his wife, Barbara; right, Lorrie and Lloyd DeKay, while on a trip to the Grand Canyon with Dave Muerdter and Nancy Penrose, point out the “Great Unconformity”; below, Rick Beach; far right, Robert Dwyer with his wife, Kathy.

and display shelving, and am working on the ‘to-do’ list.” He and his wife, Barbara, have been involved in the Connecticut Cactus and Succulent Society for many years and have taken on the task of selling books for the society.

David Lai (M.S. 1976, Ph.D. 1983), spouse of Sally Lawrence (see note), recently retired from his position as a Research Scientist with Northwest Research Associates of Bellevue, Wash.

Ping-Tung Shaw (M.S. 1976) lives in Raleigh, N.C. and has been retired from North Carolina State University since January 2017.

Robert Dwyer (Ph. D. 1980) will be retiring in early 2019 from his position as Associate Director for Environment in the Health, Environment and Sustainable Development of the International Copper Association. He reports that “in getting files together for my successor, I realized that I would be turning over data from my S.M.thesis at MIT, a study of the benthic biodiversity in Penobscot Bay, near the discharge of a defunct copper-zinc mine. I began that study in 1969 and it’s still of active interest.” Robert has been with ICA for 18 years, funding and participating in research programs that have resulted in over 400 publications, including those of over 50 graduate students. Next, Robert will be starting a small consultancy, tentatively named Risk Decision Sciences LLC, with the objective of supporting collaborators in using the best science to help choose among options with various associated risks (environmental, financial, etc.) all subject to uncertainty. He adds, “My wife, Kathy, and I continue to live happily on Cape Cod, and hope to continue traveling. We’ll also be visiting our kids and grandsons. We’re immensely proud of them, who each managed to emulate my science and engineering background, plus Kathy’s 29 years of teaching”

Richard (Rick) Beach (M.S. 1981) worked for a few years with smaller companies to expand environmental laboratory capabilities and then morphed into more consulting work developing and leading technical practices (Water Resources, Ports and Harbors, Wastewater, Contaminated Sediments) for several companies. He has worked on both sides of the regulatory table under USACE and USEPA contracts, and contracts with the regulated community and attorneys. As Sediment Practice Leader and Associate Principal & Vice President of GZA GeoEnvironmental in Philadelphia, Pa., he has focused

and developing scientifically based advocacy positions used to support allocation of liabilities. Rick has also been doing mentoring work to train younger people on the fate and transport of sediments and how contaminants should be evaluated.

Daniel (Dan) O’Neill (M.S.1981) retired three years ago from working as an Electronic Engineer for the Naval Undersea Warfare Center (NUWC) in Newport, R.I. He and his wife Donna are two of the mainstays in the band “Tool Box” which a number of GSO alums have enjoyed dancing to at the Narragansett Café in Jamestown and other local venues.



Dale T. Brown (M.S. 1982) recently retired from Community Development at the City of Gloucester and is enjoying having more time to sail and travel with her husband Curt (and sometimes with kids and grandkids).

Loretta (Lorrie) Sullivan DeKay (M.S. 1982) and **Lloyd DeKay** (M.S. 1982) have enjoyed 11 years in the Pacific Northwest since moving from Houston after Lloyd retired from Chevron. Lloyd is busy with community projects, building websites for non-profits, and leading geology trips in the Columbia River Gorge for the Ice Age Floods Institute. Lorrie is in her second term as a Washington Governor’s appointee to the 13-member Columbia River Gorge Commission, which oversees land use in the Columbia

on evaluating upland sources of contamination, assessing potential contributions to Superfund river sites,

River Gorge National Scenic Area, the largest NSA in the country. Both Lloyd and Lorrie also like discovering evidence of the Missoula Floods on camping

trips to eastern Washington, as well as camping on the coast. They report that they really enjoyed seeing familiar faces at the February GSO reception in Portland. They see Dave Muerdter (Ph.D. 1982) and Nancy Penrose fairly regularly, and shared a memorable week rafting through Grand Canyon on a geology trip with them a few years ago. Lorrie adds, "Life is good, and would only be better if both of our daughters didn't live on the East Coast. We hope to stop by (Narragansett) on a future trip back east."

Sybil P. Seitzinger (Ph.D. 1982) moved to Victoria, British Columbia in Canada a few years ago to become the Director

of birds. For more info, please visit lesliebulion.com. Leslie also notes that she resides in Connecticut and will "zip up to Rhode Island whenever I get a chance: true beaches, the coastal salt ponds, sweet, salty oysters—the 'real' shore!"

Peter Sorensen (Ph.D. 1984) reports that he is on sabbatical leave from the University of Minnesota through August, 2018 at the Institute for the Oceans and Fisheries, University of British Columbia.

Stephen (Steve) Dickson (M.S. 1986) reports that he was a student of Ed Laine's and after Ed moved to Bowdoin College, Steve took a job at the Maine

continue to teach a graduate course in environmental analysis at the University of Massachusetts, Lowell, at least for this fall. Jamie is looking forward to "time for family, volunteering and relaxing. I also hope to stop by GSO more often and visit my major professor, Candace Oviatt, who is still going strong."

Carol Fairfield (M.S. 1987) moved from New Hampshire to Anchorage, Alaska about five years ago and she writes that she "LOVES this immense state! So much beauty and lots of 'frontier' areas to explore." Carol works for the Bureau of Ocean Energy Management (formerly Minerals Management Service) where she heads up the state marine mammal research program. They do environmental studies to support offshore (outside state waters) oil, gas and mineral exploration and development. Carol remarks, "Luckily not much is happening in the offshore Alaskan waters relative to conventional nor renewable energy, though much is ongoing on the terrestrial front. We study the environment prior to offshore leasing, to attempt to remove sensitive areas. Our research programs have greatly expanded our knowledge of this unique and sensitive ecosystem. I have the added benefit of dealing with the Native subsistence activities to ensure our research does not impact these activities. Nothing like a good meeting with whalers, with an actual harpoon on the stage, to set the tone for many a meeting!" Carol also volunteers for the Iditarod dog race and has been doing work on the trail, and she is excited about getting to visit small villages along the Yukon and interior Alaska. As she sums up her life in Alaska, "there is always fun to be had up here!"

Amy Bower (Ph.D. 1988) took on the role of chair for the Department of Physical Oceanography at Woods Hole Oceanographic Institution (WHOI), as of August 1, 2018, for the next four-year term. Her husband continues to work as the manager of the Shipboard Scientific Services Group at WHOI, and their 16-year-old daughter Sara will be a junior at Falmouth High School next year.

Linda Stathoplos (Ph.D. 1989), after many years in private industry and 15 years of federal service at NOAA managing the operation and sustainment of NOAA's weather and sea-level monitoring satellites, retired in December 2017. She and her husband, former GSO research associate in Tom Rossby's lab John Lillibridge, have retired to a house in Wells, Maine, right on the water. They keep busy as Southern Maine volunteer beach profilers (*pictured at left*), feeding the results to GSO alum Steve Dickson, who works for the Maine Geological Survey. They do profiles in Ogunquit and



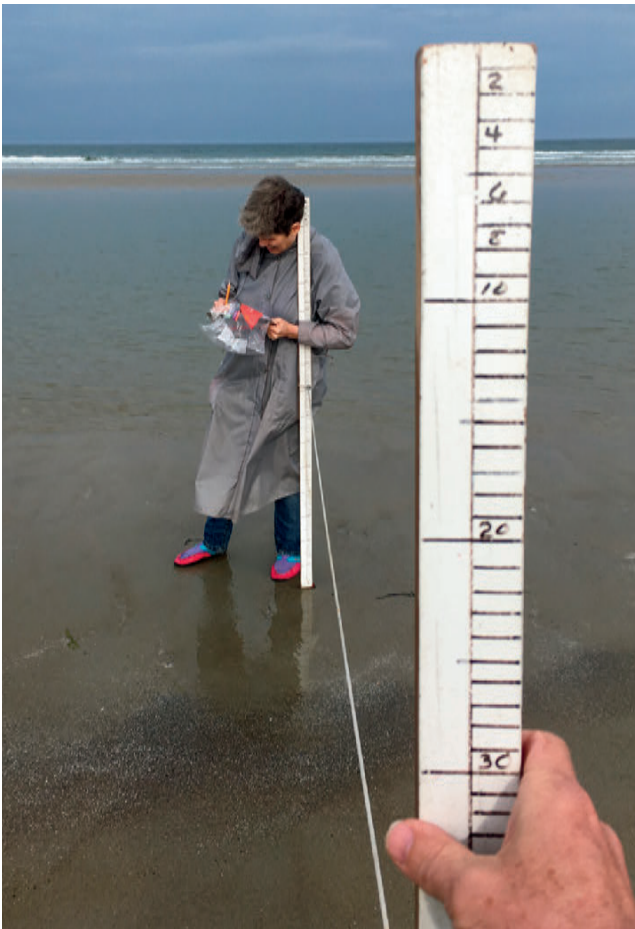
of the Pacific Institute for Climate Solutions at the University of Victoria. The institute has a "global vision of net-zero greenhouse gas emissions by mid-century" and hopes to achieve this by producing "leading climate solutions research that is actively used by decision-makers to develop effective mitigation and adaptation policies and actions." Previous to moving to Canada, Sybil was living in Stockholm, Sweden and working as the Executive Director of the International Geosphere-Biosphere Programme (IGBP).

Sally Lawrence (M.S. 1982), spouse of David Lai (see note), has retired and says she is "having a great deal of fun as a volunteer naturalist!"

Leslie Bulion (M.S. 1984) writes that, "My graduate studies at GSO have led to ongoing opportunities to share the love for studying science and nature with young readers. My writing research always includes my two favorite activities from GSO days—hands-on work and talking with scientists in the field!" Her newest book, "Leaf Litter Critters," is a humorous, poetic tour through the brown food web for readers ages 7-12. Next March brings "Superlative Birds," a poetry collection celebrating the "world record holders"

Geological Survey in February 1986 and has been there ever since. Steve stayed enrolled at GSO with Robert (Bob) McMaster as his major professor. He continued his education at the University of Maine's School of Marine Science and in 1999 he received his Ph.D. Steve reports, "With Sea Grant funding, I started (with two UME faculty) a citizen-science beach profiling program in Maine that has been running almost 20 years. This has now caught on in New Hampshire and a few other states. John Lillibridge (an old GSO housemate) and Linda Stathoplos (Ph.D. 1989) retired to Wells, Maine and they are now profiling beaches here. Here is some more about the beach profiling and you'll see me in the video: umainetoday.umaine.edu/stories/2018/sea-monsters."

James (Jamie) Maughan (Ph.D. 1986) is happy to report that he "finally retired in July 2018 and, except for finishing a lecture series I was in the middle of, I am done with that side of my career." Jamie was consulting for CH2M Hill and ended his 25 years there in July as Vice President for Water Resources. He was also an expert consulting with the U.S. Department of Transportation on environmental science and policy. He will



Wells. See details at seagrant.umaine.edu/extension/beach-profile-monitoring/home. It was recently announced that the Southern Maine Beach Profile Monitoring Program won the 2018 Northeast Sea Grant Regional Outstanding Outreach Achievement Award. Congratulations to Linda and John and their fellow beach profilers!

Veronica M. Berounsky (Ph.D. 1990), started the new column on the GSO website, the “Bay Campus (B)log” in March. Check it out at: uri.edu/gso/. The goal of the blog is to increase awareness and understanding of what we do at the Bay Campus and why. Fellow alums might particularly enjoy the Bay Campus history pieces. She is also continuing her research on Pettaquamscutt Estuary, commonly known as Narrow River, in two directions: examining the anoxic basins as they change over the seasons and analyzing the URI Watershed Watch water quality data with fellow GSO-er Annette DeSilva (see articles and PowerPoint presentations on narrowriver.org). Veronica says, “when I am out sampling I often think of the many GSO alums who have studied Narrow River through the years.”

Jennifer Hess (Ph.D. 1991) lives in Pennsylvania with her spouse, Rick. They have three children, two of whom have “flown the coop and are gainfully employed in Atlanta, Ga., and Oakland, Calif.” Their son has special needs and lives at home with them. Rick writes, “Our kids wanted to know where mom and dad met and fell in love. So in May of last year, we all flew into Providence and drove down to GSO. We stood on the deck of Mosby Center where we met in 1981. The view was the same. But the campus and the Horn building where my old office and lab (Michael Pilson’s) existed had changed drastically.”

William G. (Wge) Ellis, Jr. (Ph.D. 1992) reports that he is still at the University of Maine as an associate professor of oceanography and the associate director of the School of Marine Sciences.

Barbara Dorf (Ph.D. 1994) retired at the end of June from her position with the Texas Park and Wildlife Department in Rockport, Texas.

John Sifling, (M.S. 1997) recently retired as Vice President for Fleet Security for Princess Cruises in California and is self-employed as a maritime safety, security, and environmental consultant for Broad Reach Maritime, LLC, broadreachmaritime.com.

Jennifer L. Beauregard (Ph.D. 2001) resides in Woods Hole, Mass., and commutes to Boston where she has been a science professor at Berklee College of Music for the past eight years. She writes, “Oh, Berklee is an amazing place! You have to get used to hearing 10 different songs being played at the same time as you walk down the hall. I love it!” She applied to Berklee because her husband had already accepted a job at WHOI, and she was desperately trying to find a job nearby. Jennifer recalls, “It was a happy accident finding their ad. I convinced them that the Earth sciences was a good starting point, and here I am! We just hired our second full-time science professor.”

Sunshine Menezes (Ph.D. 2005), executive director of the Metcalf Institute for Marine and Environmental Reporting, moved to URI’s main campus last year, along with the institute to become part of the College of the Environment and Life Sciences (CELS). Sunshine is now the first clinical associate professor of environmental communication.

Emily Burns (Ph.D. 2007) is a geology professor at the Community College of Rhode Island where she teaches classes in natural disasters, urban geology, ArcGIS, and oceanography. In January she published a book called *The City*

Rocks: Learning About Geology with Building Stone. The book is a field guide to American building stone organized by physiographic province and age. It includes descriptions of 194 American stones and 21 common imports, and it combines a description of the evolution of the North American continent and regional geology with stone buildings and architectural styles around the country. There are also chapters on plate tectonics and geological time, quarrying, minerals and rocks, and architectural terms. The goal of the book is to make geology more immediate and relevant to students who live in or near cities. Emily says that these stones are an underused resource for teaching geology.

Christopher (Chris) J. Calabretta (Ph.D. 2009) continues working as an environmental scientist in the Environmental Restoration Division of Leidos in Newport, R.I. About five years ago, Science Applications International Corporation (SAIC) split into two companies. One company kept the SAIC name and the second, which included the marine science group, changed its name to Leidos.

Stephen G. Smith (M.S. 2010) writes that he received his Ph.D. from North Carolina State in May 2016 and is now a visiting assistant professor in the Center for Integrative Geosciences at University of Connecticut in Storrs, Conn.

Matthew (Matt) Horn (Ph.D. 2011) has worked for RPS Ocean Science, the Wakefield office of the international company that offers consulting services and marine technology solutions and was formerly known as Applied Science Associates. In October 2017, he was promoted from Senior Scientist to a new role as a Managing Director. He is one of three directors who, along with the Executive Vice President, form the executive management team. Matt writes, “Thankfully, I still maintain a good deal of technical work and am still very much involved in projects, testimony, and publishing. However, I have the added fun of managing a team of about 20 scientists. It’s been a wild and crazy ride, but exciting and fast-paced.”

Kelly L. Canesi, (M.S. 2015) has a new position as associate director, Foundation and Corporate Relations at the Marine Biological Laboratory (MBL) in Woods Hole, Mass.

Sierra Davis (M.S. 2017) started a NOAA Coastal Management Fellowship position with the state of Delaware. She says, “I value my education and professional network built at GSO.”

gsoalumni@etal.uri.edu

Please email your latest news to this address. GSO alumni around the globe are leading wonderful, amazing lives. We want to hear the stories, and print the stories.

While you’re at it, please confirm your preferred email address. We have a few stories of our own to share.

IN MEMORIUM

Dean Bruce Corliss writes:

“It is with great sadness that I pass along news of the passing of **Professor Robert Thunell** on Monday, July 30, as a result of cancer. He was 67 years old.

Dr. Thunell was a Carolina Distinguished Professor at the University of South Carolina and an alumnus of the Graduate School of Oceanography at the University of Rhode Island.



“Dr. Thunell graduated from Brown University in 1973 with a B.A. in geology/biology and earned a M.S. degree in 1976 and a Ph.D. in 1978 from GSO. As a graduate student, he studied with Professor James Kennett and wrote a number of landmark papers on the influence of Cenozoic volcanism on climate change. Following graduation from GSO, he was a post-doctoral fellow at the Woods Hole Oceanographic Institution, working with William Berggren on Cenozoic planktonic foraminifera and Susumu Honjo on ocean sedimentation. He joined the University of South Carolina in 1979 as an assistant professor of geology and marine science and

was promoted to associate professor in 1983, professor in 1987 and was a Carolina Distinguished Professor since 1992. He served USC in a number of capacities, including being Director of Graduate Studies,

Chair of the Department of Geological Sciences, Director of the Marine Science Program, Director of the School of the Earth, Ocean and Environment, and was Senior Associate Dean for Natural Sciences since 2011. Among his many professional activities, he served

as associate editor for *Marine Micropaleontology*, *Journal of Foraminiferal Research* and the *Geological Society of America Bulletin* and was the second editor of *Paleoceanography*, a journal started by James Kennett at GSO.

“During his career, he was a prolific researcher with over 225 publications, including 18 in *Science* and *Nature*, and focused on understanding modern sedimentary processes and the application of proxies to the marine sediment record to reconstruct past ocean and climate conditions. With his research group, graduate students and colleagues,

he developed times series of particle fluxes in the Cariaco Basin, Santa Barbara Basin and the Gulf of Mexico and made significant contributions to understanding oceanic sedimentation and climatic implications. He advised 22 M.S. students, 16 Ph.D. students, 12 post-doctoral investigators and many undergraduate students during his time at USC.

“Regarded internationally as a leader in paleoceanography and marine geology, he was a Fellow of the Geological Society of America, American Association for the Advancement of Science, and the American Geophysical Union. In 2013, he received the University of Rhode Island’s Graduate School of Oceanography Distinguished Achievement Award in recognition of his academic contributions.

“Widely considered one of the outstanding paleoceanographers of his generation, he was a mentor to many students, a role model to an entire generation of young ocean scientists and an inspiration to his many friends and colleagues. He was devoted to his wife, Maureen, and their three sons, Matthew, Thomas, and Daniel.”

Nancy I. Craig (M.S. 1989), 56, passed away unexpectedly on February 19, 2018, in Pompano Beach, Fla. Nancy was a master’s student of Candace Oviatt and carried out research on the bivalve *Nucula annulata* during the nutrient enrichment experiments in the mesocosms of the Marine Ecosystems Research Lab (MERL). Nancy went on to get her Ph.D. in 1998 with Glen Lopez at the State University of New York at Stony Brook and followed that with a postdoc at Beaufort, N.C. For the past several years she had been employed as a natural

resources specialist at Broward County Environmental Protection in the Miami/Fort Lauderdale area. While there, she was involved with developing a monitoring program in Florida in and outside of the barrier islands to evaluate the danger of land-based contamination on reef resources. Her funeral on March 9 in her hometown of Garden City on Long Island was attended by several of her MERL colleagues, Lynn Beatty (Ph.D.1991), Laura Reed and Eric Klos.



In the MERL shop, after defending her M.S. thesis, Nancy celebrates with her trademark exuberance.

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