



2024 ANNUAL REPORT

Advancing the frontiers of knowledge. Accelerating the search for solutions.



WOODS HOLE **OCEANOGRAPHIC** INSTITUTION.





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Alvin swimmers prepare the human-occupied vehicle to dive in the Aleutian Trench near Alaska. On June 5, 2024—the 60th anniversary of *Alvin*'s commissioning—the sub was in these chilly waters, diving to sites as deep as 5,000 meters. Scientists were investigating the deep-sea life and carbon in the unique ecosystems around methane seeps. The expedition was led by Scripps Institution of Oceanography Scientist Lisa Levin. (Photo by Luis Lamar ©Woods Hole Oceanographic Institution)

This page: WHOI engineer Jeff Pietro recovers a whale detection system near shipping lanes in the New York Bight area. Pietro is a member of WHOI's Mooring Operations and Engineering Group, which has been collaborating closely with WHOI scientist Mark Baumgartner and his Robots4Whales program. (Photo by Marley L. Parker, ©Woods Hole Oceanographic Institution)

A Message from the President and Director



Looking back on 2024 as I complete my fourth year as the president and director of Woods Hole Oceanographic Institution (WHOI), I find it remarkable what we have already achieved together.

We began our journey by outlining a vision focused on investing in our people, driving discovery, leading innovation, and engaging the world. In the years since, the remarkable strides we have made toward realizing this vision have positioned us in essential ways to navigate a rapidly changing set of circumstance in 2025 and beyond.

Our operating budget for fiscal year 2024 was \$295.8M, 76 percent of which took the form of government grants and contracts. We closed 2024 having raised 85 percent of our \$400 million working goal for the Campaign for Our Ocean Planet.

The pages that follow highlight some of WHOI's research, education, and outreach efforts in 2024. You'll meet some of the generous supporters whose gifts power WHOI's success. And you'll read about some of the scientific and technological milestones achieved over the course of the year.

Throughout 2024, WHOI scientists worked on projects that ranged from developing new methods to restore coral reefs to creating biodegradable plastics and a new class of compact, affordable remotely operated vehicles. They expanded our understanding of marine life, explored previously unknown reaches of the

seafloor, and raised new possibilities for how life may exist on other planets. We also continued our leadership in national and international policy forums, keeping the ocean front and center in key policy discussions.

This year Dr. Benjamin Van Mooy was the first WHOI scientist to receive a prestigious MacArthur Fellowship, just weeks after he was appointed interim deputy director and vice president for science and engineering. Over the summer, as we celebrated *Alvin's* 60th anniversary, we looked back over the submersible's storied history and many of WHOI's greatest achievements in deep ocean exploration and looked ahead to even greater ones in the future.

WHOI enjoyed a successful fundraising year in 2024 thanks in large part to the incredible generosity of trustees, life trustees, and Corporation members, under the leadership of board chair Paul Salem. Many of our donors stretched in 2024, especially 20 individuals and organizations that made seven- and eight-figure gifts.

We would like to extend a special thank-you to the Grossman Family Foundation for its \$10 million commitment to establish the Grossman Catalyst Program; to the anonymous Corporation member who made a \$10 million bequest; to Brian Halligan for his \$5 million gift; to Francis E. Fowler IV for an extraordinary \$5 million advance payment against his earlier bequest; to new supporters Robert and Michelle Atchinson for

“

We offer unparalleled opportunities for motivated women and men to apply their extraordinary talents to critical problems within a culture of research independence”

—Peter de Menocal

Photo by Jayne Doucette © Woods Hole Oceanographic Institution

their seven-figure gift; and to MIT-WHOI Joint Program alumnus Bill Sunda for his \$2 million pledge to support future generations of graduate students. We would also like to celebrate the G. Unger Vetlesen Foundation, whose million-dollar commitment last year has brought its 38 years of consecutive giving across the \$25 million threshold.

In my time at WHOI, I’ve learned what sets us apart and how we can use that difference to lean into the complex challenges facing humanity. We offer unparalleled opportunities for motivated women and men to apply their extraordinary talents to critical problems within a culture of research independence, unbridled creativity, engineering excellence, and seagoing capabilities that outshine any other institution.

WHOI remains strong thanks to you, our closest friends and champions. Thank you for your part in sustaining this community.

For our ocean, our planet, our future,



Peter de Menocal

Leadership Transition

DEPUTY DIRECTOR AND VICE PRESIDENT FOR SCIENCE AND ENGINEERING

In September 2024, after five years of dedicated service, Rick Murray transitioned from the role of deputy director and vice president for science and engineering to senior scientist emeritus in the Department of Marine Chemistry and Geochemistry. Some of the highlights of Murray’s time at WHOI included assisting Peter de Menocal in the development of Vision 2030, directing the deployment of internal award programs, shepherding the Scientific Strategic Planning process, leading the changes in scientific staff titles and other improvements to internal career ladders, and coordinating WHOI’s response to the COVID-19 pandemic.

During the transition, de Menocal appointed Ben Van Mooy to serve as interim vice president for science and engineering.* Van Mooy has been at WHOI since starting postdoctoral work in 2003 and is a senior scientist in WHOI’s Department of Marine Chemistry and Geochemistry, where he has served as department chair. In October 2024, several weeks after assuming this new role, Van Mooy was awarded a MacArthur Fellowship. MacArthur Fellows are chosen for their exceptional creativity, the promise of important future advances in their track record of significant accomplishments, and a fellowship’s potential for facilitating their subsequent creative work.

When Van Mooy learned he had received a MacArthur Fellowship, he observed: “The Fellowship recognizes creativity foremost, and I credit WHOI both for its culture of scientific independence and its commitment to sponsoring research by its scientists, both of which enable the risk-taking necessary to turn ideas into knowledge about how the ocean works.”

**In March 2025, Staff Council appointed Van Mooy the full-time deputy director, vice president for science and engineering.*



© John D. and Catherine T. MacArthur Foundation

Research Highlights

In 2024, WHOI scientists, researchers, and engineers collaborated on more than 900 projects worldwide to advance the frontiers of scientific knowledge and accelerate the search for solutions to urgent global challenges. Here are some of their findings.

SONIC YOUTH: HEALTHY REEF SOUNDS INCREASE CORAL SETTLEMENT

Although people may enjoy the sound of silence, coral larvae prefer the raucous noise of a vibrant, healthy reef, according to a new study.

Corals are stationary as adults, but their larvae swim freely in search of ideal conditions before settling on the ocean floor. Research has shown that the right water chemistry and microbial community can cue this settlement. Now we have clear evidence that the snaps, crackles, and grunts of a healthy reef can be just as important.

WHOI biologist Aran Mooney and PhD student Nadège Aoki tested the idea using underwater speakers at three reefs—one healthy, two degraded—in the U.S. Virgin Islands. Although speaker setups were installed at all three reefs, the team played sounds at only one degraded site and measured the number of larvae to settle at distances up to 30 meters (roughly 100 feet) from the speakers. Results showed as much as a sevenfold increase in coral settlement when reef sounds were played.

“This gives us a new tool in the toolbox for potentially rebuilding a reef,” Mooney says.

Funding: Vere Initiatives, Oceankind, and the U.S. National Science Foundation



Photo by: Dan Mele, © Woods Hole Oceanographic Institution

FIVE NEW HYDROTHERMAL VENTS DISCOVERED IN THE EASTERN TROPICAL PACIFIC OCEAN

In March 2024, tag team operations between a deep-sea robot and a human-occupied submersible led to the discovery of new hydrothermal vent sites more than a mile below the ocean surface.

The research team, which included WHOI marine geologist Daniel Fornari, found the vents while exploring the East Pacific Rise, part of a mid-ocean volcanic mountain chain created by the separation of two tectonic plates. In this volcanically active area, hydrothermal vents spew superheated water into the water column at temperatures exceeding 300°C (572°F). These mineral-laden jets provide essential energy to deep-sea ecosystems.

During the expedition, the team mapped the ocean floor using the autonomous deep-sea robot *Sentry*. With high-resolution maps in hand, the explorers had a better idea of where vents might lie and set out in the submersible *Alvin* to survey the site and collect samples. “The analyses of rock samples will let us figure out how quickly the lava erupted, how far it traveled, and the impacts deep-sea lava eruptions have on hydrothermal venting,” says Fornari.

Funding: U.S. National Science Foundation

Human occupied vehicle (HOV) *Alvin* arriving at the seafloor. (Photo by J. McDermott (Lehigh University); T. Barreyre (CNRS, Univ Brest); R. Parnell-Turner (Scripps Institution of Oceanography); D. Fornari (Woods Hole Oceanographic Institution); National Deep Submergence Facility, *Alvin* Group. Funding support from the National Science Foundation. © Woods Hole Oceanographic Institution, 2024.)

SOME PLASTIC STRAWS DEGRADE MORE QUICKLY THAN OTHERS, NEW STUDY SHOWS

Plastic straws are one of the most common forms of marine litter. To keep them from polluting the ocean, WHOI teamed up with the bioplastic manufacturer Eastman to determine which straws degrade fastest in seawater.

WHOI marine geochemists Collin Ward and Bryan James tested straws made from eight materials, including a standard polypropylene, paper, and cellulose diacetate, which is made from wood pulp. During a 16-week period, these straws sat in tanks under a constant flow of ocean water. The team measured the amount of degradation over time and found that foamed cellulose diacetate broke down faster than any other material, including paper.

By teaming up with scientists, manufacturers will be able to create better products down the line, according to the study’s authors. “We can work with companies to minimize the impacts of [the materials] should they leak into the environment,” Ward says.

Funding: Eastman Chemical Company

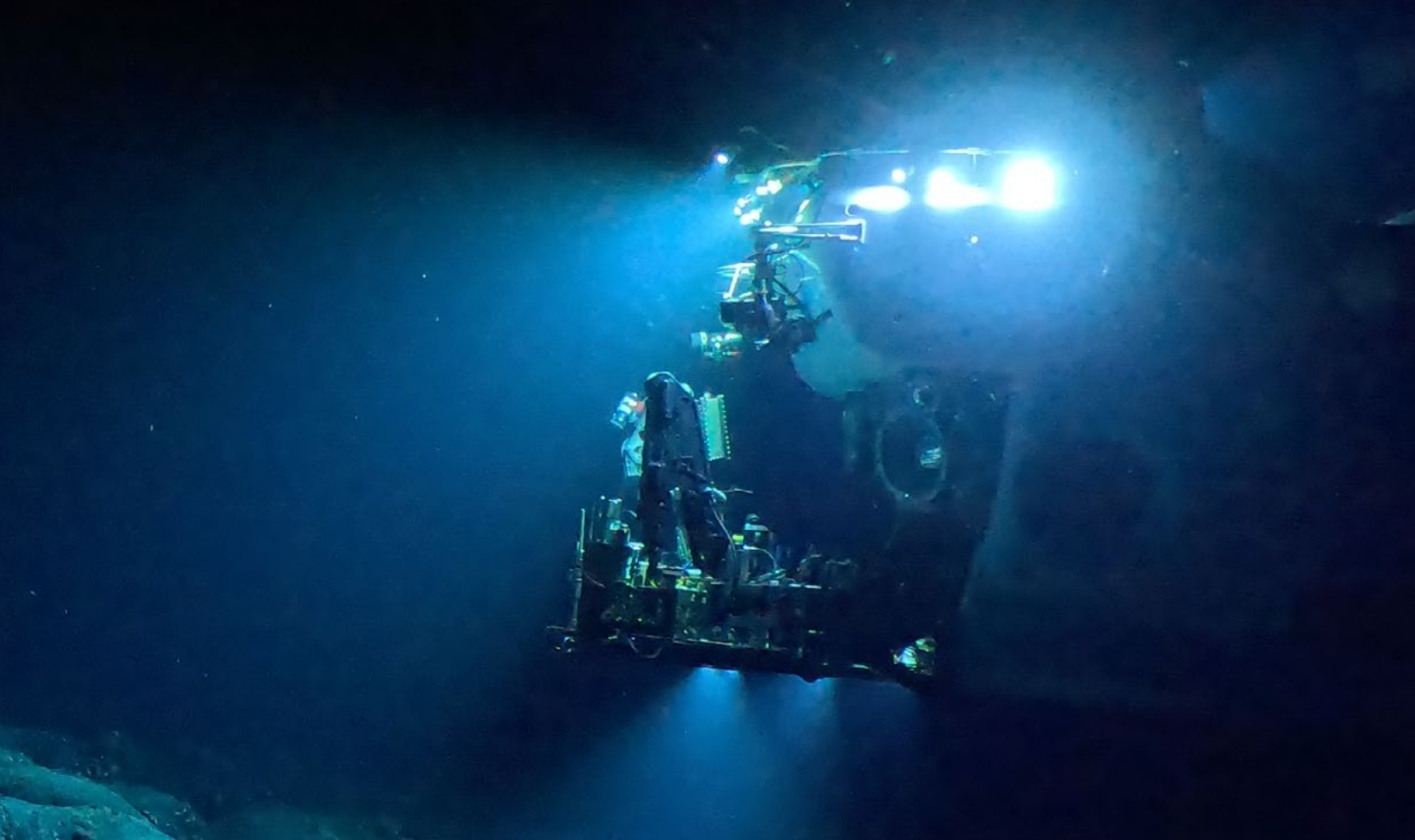
DESIGNING A NEW FAMILY OF REMOTELY OPERATED VEHICLES

In the fall of 2024, WHOI engineers began the design and construction of two medium-sized remotely operated vehicles (mROVs). Scientists will use these vehicles for studies of nearshore to offshore marine areas up to 2.5 miles (4,000 meters) deep.

The new vehicles will offer expanded access to the deep sea. One will be operated by the National Deep Submergence Facility at WHOI and the other by the University of Southern Mississippi as part of the NOAA Ocean Exploration Cooperative Institute.

The mROV represents the next generation of ROV *Jason*, a robotic marine science powerhouse. Like *Jason*, the mROVs will be designed and built by WHOI’s National Deep Submergence Facility engineers. The new vehicles will be smaller and more agile—the size of an SUV—and easier to transport between study sites. The design and build of each vehicle will cost more than \$5.5 million. The vehicles are expected to undergo sea trials in 2026 and to be ready for the first full year of science operations in 2027.

Funding: U.S. National Science Foundation, National Oceanic Atmospheric Administration (NOAA) Office of Ocean Exploration and Research, and NOAA Fisheries Mesophotic and Deep Benthic Communities restoration projects



WARM WATER MAY PERSIST WITHIN ICY OCEAN WORLDS

A study by members of Exploring Ocean Worlds, a multi-institutional NASA program led by WHOI senior scientist Chris German, has shed new light on the potential for seafloor hydrothermal venting to occur on moons orbiting giant planets in the outer solar system.

Team members at the University of California Santa Cruz used a complex computer model to investigate how the influence of low gravity, as found on ocean worlds in our outer solar system, could influence flows of water and heat below their seafloors. Their conclusions were published in the *Journal of Geophysical Research*.

“A significant outcome from this study is that it suggests that low-temperature hydrothermal systems that are not too hot for life could have been sustained on ocean worlds beyond Earth,” said German, who coauthored the paper. “They could have existed over timescales much longer than it took for similar life to first take hold on Earth. Thus, ocean worlds in the outer solar system could also be habitable and, perhaps, host life.”

Funding: National Aeronautics and Space Administration

WHOI AND OCEAN DISCOVERY LEAGUE AWARDED \$1.2 MILLION NOAA GRANT TO DEVELOP AN ACCESSIBLE, NEXT- GENERATION, DEEP-SEA SENSING SYSTEM

WHOI scientists and engineers are adapting a mini chemical sensor to be part of the new Deep Ocean Research and Imaging System. This system is funded by a \$1.2 million NOAA ocean technology grant, one of the largest single investments in technology targeting the deep sea.

As part of this award, a WHOI team will develop a deep-diving, low-cost system to lower the financial and technical barriers to deep-sea exploration and research.

“We are proud to play a role in this global project,” says Anna Michel, associate scientist at WHOI and chief scientist of the National Deep Submergence Facility, who will lead the WHOI team adapting a carbon dioxide and oxygen sensor for use in the new system. “Adapting WHOI’s mini chemical sensor package for use in this system will help make deep sea exploration more accessible.”

The grant was awarded to the Ocean Discovery League and will be led by oceanographer and National Geographic deep-sea explorer Dr. Katy Croff Bell.

Funding: National Oceanic and Atmospheric Administration

A close-up photograph of a Weddell seal resting on a piece of ice. The seal has dark fur with white spots and a small tracking device with a red antenna on its head. The background shows a vast, flat expanse of ice under a clear sky.

WEDDELL SEALS IN THE ANTARCTIC STRATEGICALLY TIME THEIR MOST EXTREME DIVES TO MAXIMIZE FORAGING

Weddell seals in Erebus Bay, Antarctica, may look like couch potatoes when they are resting on ice. However, this southernmost population of the southernmost living mammals are exceptional divers that can reach depths of more than 900 meters (2,952 feet) and achieve recorded dives lasting 96 minutes, which is well beyond their aerobic threshold.

New research from WHOI scientists and collaborators identifies an optimal and novel dive foraging strategy that the seals employ to capture prey in the highly seasonal Antarctic environment with its rapidly changing light regimes. According to findings published in *Communications Biology*, the seals typically conduct their deepest, longest, most extreme dives earlier than solar noon rather than during peak foraging times at midday.

This foraging strategy “allows them to spend almost all of their time underwater, foraging under high-light conditions, which is best for visual hunters,” says lead author Michelle Shero, an assistant scientist in the Biology Department at WHOI. “These animals are making very strategic decisions about when to make their long dives so they can best interact with the daily changing environment in the Antarctic, allowing them to maximize their prey.”

Funding: U.S. National Science Foundation and the Every Page Foundation.

Logistical support: U.S. National Science Foundation's U.S. Antarctic Program, Raytheon Polar Services Company, and Lockheed Martin ASC



Photo by: Miquel Garcia, © Aquasis

WHOI SCIENTISTS “READ” CHEMICAL CLUES LEFT BY CORAL REEF INHABITANTS

Chemical clues emitted by marine organisms may reveal what lives in a coral reef and whether it is healthy, but using seawater samples to isolate those markers is challenging. WHOI researchers have demonstrated a new way to extract and identify indicator compounds in seawater, according to a study published in the *American Chemical Society’s Journal of Proteome Research*.

Established methods concentrate and collect dissolved compounds from seawater on sticky membrane. However, this method misses many important nitrogen-, oxygen- and sulfur-containing compounds produced by marine organisms. Brianna Garcia, postdoctoral fellow investigator; Amy Apprill, associate scientist; Elizabeth Kujawinski, senior scientist; and their colleagues at WHOI tested a technique that modified dissolved metabolites before they were extracted from seawater into a form that is compatible with membrane materials and allows them to be concentrated and analyzed.

This study demonstrates a method for collecting previously overlooked, ecologically relevant compounds in coral reef ecosystems that could be used to monitor them for effects from climate change, natural disturbances, and disease activity.

Funding: U.S. National Science Foundation and NOAA’s Oceanic and Atmospheric Research Cooperative Institutes

WHOI AND BRAZIL-BASED NGO PARTNER TO HELP SAVE WEST INDIAN MANATEE

A WHOI physical oceanographer offered analysis and expertise in the legal case that arose when a West Indian manatee named Tico was carried by an ocean current from his habitat in Brazil and into waters under Venezuelan jurisdiction.

Tico had spent eight years in rehabilitation with the Brazil-based NGO Associação de Pesquisa e Preservação de Ecossistemas Aquáticos (Aquasis). Shortly after release into the wild, satellite tag data showed Tico traveling nearly 2,500 miles over 62 days from Icapuí, Ceará, Brazil, to La Blanquilla Island in Venezuela. Although some manatees are known to travel hundreds or even thousands of miles, Tico’s journey was extremely unusual in its speed and distance.

Aquasis reached out to WHOI postdoctoral investigator Iury Simoes-Sousa to help analyze and study Tico’s unusual route. Simoes-Sousa studies ocean currents, and he was able to identify a probable cause for the manatee’s concerning speed and direction: Tico was caught in the North Brazil Current, a fast-moving warm ocean current that flows along the coast of South America and is a key feature of the tropical Atlantic circulation.

Simoes-Sousa’s expertise in ocean currents helped Aquasis make the case that Tico had not undertaken his journey voluntarily and could be legally returned to Brazil for rehabilitation without breaking international law. Brazil’s environmental ministry approved an import license to bring Tico home.

Funding: WHOI research growth fund

Education Highlights

Education is central to WHOI's mission, with postdocs and students contributing to campus vibrancy and research innovation.

Over the course of 2024, senior scientist Rob Evans served as interim dean while a search was underway for a dean and a permanent vice president for academic programs. In November, after an extensive national search, WHOI appointed Diane Foster to this role. Foster comes to WHOI from the University of New Hampshire, where she was the director of the School of Marine Science and, previously, director of the Center for Ocean Engineering. Foster will start in January 2025.

THE SUMMER STUDENT FELLOWSHIP PROGRAM

Academic Programs received 471 complete applications for the 2024 Summer Student Fellowship (SSF). A cohort of 27 students spent 10 to 12 weeks at WHOI. Ten participants were funded by a grant from the U.S. National Science Foundation, while 17 were funded through endowed funds and gifts. Seventy percent of alumni of this competitive program, which provides meaningful mentorship in ocean science, have continued on to graduate school and 20 percent have entered the technical workforce.

Many of the students presented their work at national meetings:

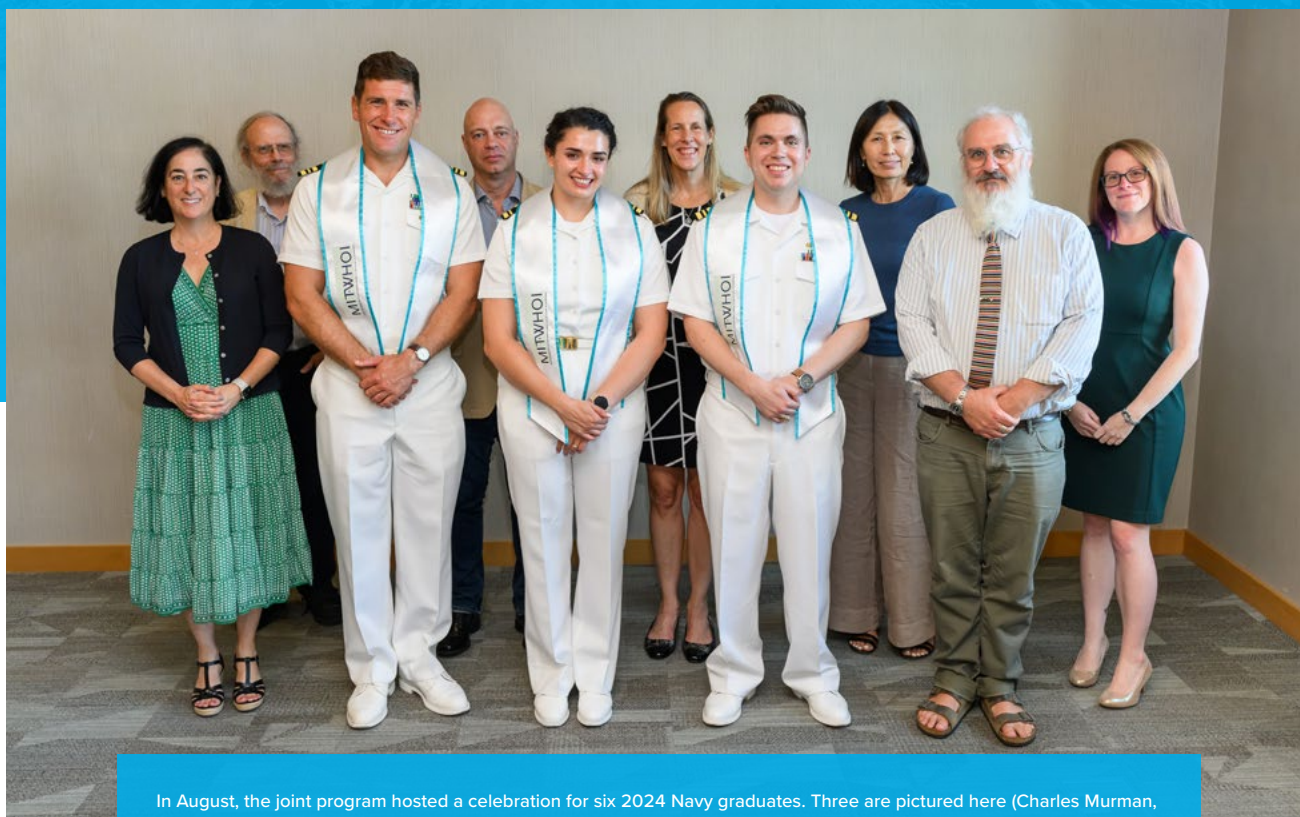
- ▶ Isis Mocino Sanchez, an SSF and guest student from the Universidad de Guanajuato in Mexico, received the Outstanding Student Presentation Award at the American Geophysical Union meeting for research on sea level rise in the Gulf of Mexico. Preliminary results of that research suggest that, on average, rates of sea level rise in the gulf over the past 20 years were about twice the rates for earlier periods of roughly the same duration.
- ▶ Dominic Italiane, an SSF from University of Massachusetts Boston, received an American Chemical Society Undergraduate Award in Physical Chemistry. Italiane is now back at WHOI as a research assistant.
- ▶ Livia Stein Freitas, an SSF from Grinnell College, was awarded the Henry M. and Theresa P. Walker Endowed Prize for Excellence in Computer Science for her summer research on combining machine learning with maritime weather data from the logbook records of New England whaling ships.

THE BLUE ECONOMY INTERNSHIP PROGRAM

This was the third year of our donor-supported Blue Economy Internship Program, a partnership with the University of Massachusetts Dartmouth (UMass) and Cape Cod Community College (4Cs) to create access pathways to ocean science. This internship program introduces undergraduate students to lab-based training, provides them with paid research experiences as they pursue their STEM degrees, and engages them with the local ocean and engineering “blue economy” in their own backyard. In 2024, the program hosted 10 students—6 from 4Cs and 4 from UMass.



Blue Economy students practicing ROV piloting, January, 2024
(Photo by Jayne Doucette, ©Woods Hole Oceanographic Institution).



In August, the joint program hosted a celebration for six 2024 Navy graduates. Three are pictured here (Charles Murman, Sara Vianco, and Christian Mier) with their WHOI and MIT advisors and graduate program staff. (Photo by Justin Knight, courtesy of Massachusetts Institute of Technology)

THE MIT-WHOI JOINT PROGRAM

In 2024, the MIT-WHOI Joint Program admitted 36 students into the doctoral program and six into the master's program for U.S. naval officers, bringing the student body number to 149. The program awarded 24 doctoral degrees and 11 master's degrees.

Current students and recent graduates continue to make an impact in research and outreach:

- ▶ Joint Program student Shawn Wang (class of 2024) was a presenter on MIT Abstracts, a monthly video series with worldwide reach for K–12 students sponsored by the MIT–Nord Anglia Education Collaboration. Wang is now a postdoctoral investigator at WHOI.
- ▶ Emma Bullock (class of 2024) was featured in *MIT News* for her research in extreme environments. She is studying the impacts of changing mineral levels in Arctic groundwater.
- ▶ Work from the thesis of Joint Program alum Lauren Dykman (class of 2023) is featured in a Progress Series article in the journal *Marine Ecology*. The research shows the pervasiveness of parasites in the ocean—in this case, at remote deep-sea hydrothermal vents.

Graduate students also continued to receive prestigious fellowships:

- ▶ The U.S. National Science Foundation Graduate Research Fellowship: Cassandra Bartels, Solomia (Mekia) Bushell, Ian Robertson, and Cristian Swift; honorable mentions: Amanda Pinson and Catherine Zhang
- ▶ Naval Sea Systems Command Science, Mathematics, and Research for Transformation (SMART) Scholarship: Adam Cohen
- ▶ Acoustical Society of America Daoma and Murray Strasberg Memorial Scholarship for Graduate Studies in Ocean Acoustics: Mark Goldwater
- ▶ National Oceanic and Atmospheric Administration Sea Grant Knauss Fellowship: Samantha Clevenger



Illustration by Felipe Gamonal at Instituto Milenio de Oceanografía
Photo by Daniel Hentz, ©Woods Hole Oceanographic Institution

THE POSTDOCTORAL SCHOLAR PROGRAM

Thanks to internal support provided by the WHOI endowment and current use gifts, we welcomed six new Postdoctoral Scholars in 2024, bringing our number to 14. The more than 80 postdoctoral researchers on campus bring a welcome intellectual vibrancy to WHOI's community. In recognition of the growth of this program, the Academic Programs Office added a new role, assistant dean of postdoctoral programs, to provide more support during a critical period of training and professional development. Appointed to this role in late 2024, Julie Huber, a senior scientist in the Department of Marine Chemistry and Geochemistry, was slated to begin on January 1, 2025.

The postdoctoral researchers at WHOI continued to exhibit their range as some of the finest early-career ocean scientists in the world:

- ▶ WHOI postdoctoral investigator Johanna Weston (Biology Department) published a new study on one of the unique organisms that call the ocean's deepest region, the hadal zone, home. The study describes the newly named *Dulcibella camanchaca*, the first large, active predatory amphipod from these extreme depths, collected from the Atacama Trench off Chile.



- ▶ Former WHOI postdoctoral investigator Bryan James and current WHOI postdoctoral investigator Yanchen Sun (Department of Marine Chemistry and Geochemistry) published a study on a new biodegradable material, a plastic like polymer that degrades even faster than paper in seawater. James and Sun worked with WHOI scientists Collin Ward and Chris Reddy and with Kali Pate, an undergraduate guest student, on a project funded by Eastman Chemical Company. These studies were conducted at the Environmental Systems Lab using a tank of continuously flowing seawater from Vineyard Sound. James is now an assistant professor at Northeastern University and continues to collaborate with WHOI scientists.

Other Highlights

HAPPY BIRTHDAY, ALVIN!

WHOI marked the 60th anniversary of *Alvin*'s commissioning on June 26, 1964, and its first free dive on August 4, 1964; the Institution also celebrated six decades of safe, successful scientific study enabled by the research submarine. Today *Alvin* is still in service to the scientific community, conducting about 100 dives per year on missions to study processes that create and shape Earth's crust, the chemical conditions that support life in extreme environments, and the vast diversity of life in the deep sea.

WHOI celebrated these milestones with a marketing campaign that engaged both devoted *Alvin* fans and general ocean enthusiasts. The campaign featured a dedicated *Alvin* 60th landing page and a range of content, including commemorative videos, exclusive merchandise, community-submitted videos, a downloadable coloring page, and celebrations with WHOI employees and the broader community.

On the anniversary of its commissioning, *Alvin* was diving in the Aleutian Margin off Alaska.

WHOI-LED OCEAN PAVILLION RETURNS TO THE UN CLIMATE CHANGE CONFERENCE

WHOI once again played a leading role in organizing and running the wCOP29 Ocean Pavilion at the UN Climate Change Conference, which was held in Baku, Azerbaijan, in 2024. Coordinating closely with Scripps Institution of Oceanography as a key partner and building on the success of previous years, the Ocean Pavilion served as a central hub for science-driven discussions, meetings with foundations and other research funders, policymaker engagement, and global collaboration on ocean-climate solutions. Throughout the two-week conference, more than 15,000 people visited the Pavilion, which hosted more than 60 panels, roundtables, and workshops. The conference also included a WHOI-led official side event and opportunities for WHOI participation in key discussions across the Blue Zone.

AN IMMERSIVE OCEAN TWILIGHT ZONE EXHIBIT IN WASHINGTON, D.C.

In the fall of 2024, an experiential exhibit called "Twilight Zone: Hidden Wonders of the Ocean" at ARTECHOUSE in Washington, D.C., offered a journey into a world of immersive video, original music, interactive technology, and extended reality, all drawn from the science on which WHOI's Ocean Twilight Zone Project is focused. The exhibit, developed in collaboration with WHOI, featured the abundant and diverse life that flourishes in the vast yet hard-to-reach region of the ocean where sunlight starts to disappear—between 200 and 1,000 meters (600 and 3,000 feet) below the surface.

In a venue just steps from the National Mall, the exhibit was anchored by a color-saturated video in 270-degree projection on 28-foot-high walls. It took visitors away from the surface ocean filled with phytoplankton to follow the billions of creatures that migrate daily into the twilight zone. While in Washington, the exhibit welcomed thousands of visitors. ARTECHOUSE reported that it received a 90 percent positive exit rating from visitors—the highest rating an ARTECHOUSE exhibit has received in a decade of creating immersive art and science exhibits.



Photo courtesy of ARTECHOUSE



A school of skipjack tuna (*Katsuwonus pelamis*) chases a lure above the northeast shelf break near Veatch Canyon, about 110 nautical miles (204 kilometers) southeast of Woods Hole, Massachusetts. (Photo by Ciara Willis, © Woods Hole Oceanographic Institution)

In Memoriam

Woods Hole Oceanographic Institution lost three beloved friends and supporters in 2024. Join us in remembering them and their dedication to WHOI and the ocean.



REX ADAMS
Corporation Member

PHILANTHROPIC FOCUS:
Unrestricted Fund

“Like many of our supporters, Corporation members like Rex are pulled into leadership roles by their interest in science, engineering, and the ocean. I so appreciate his passion and service to WHOI and the local Woods Hole community”

—Jamie Clark, Corporation chair



ALEXANDER HIAM
Corporation Member

PHILANTHROPIC FOCUS:
Unrestricted Fund, Edwin W. Hiam Award for Ocean Science and Technology

“My husband was a passionate naturalist and proud to continue his family’s legacy as the third generation of the Webster family to support WHOI through the Webster Foundation. As a Corporation member, he was a steadfast advocate for WHOI’s mission, taking particular pride in supporting innovative research through the Edwin W. Hiam Award for Ocean Science and Technology. Woods Hole Oceanographic Institution held a special place in his heart, as he loved all things connected to the sea.”

—Deirdre Hiam, spouse



GORDON SULLIVAN
Life Trustee, Corporation Member

PHILANTHROPIC FOCUS:
Unrestricted Fund, President’s Fund for Innovation

“Since World War II, WHOI has maintained a close collaboration with the armed services. As a trustee, General Sullivan carried forward this proud tradition of military advising and advocacy for the Oceanographic.”

—Court Clayton, WHOI chief development officer



The Power of Giving in 2024

“WHOI has opened a portal of unparalleled access to ocean science. This is going to be a wonderful tool for classroom educators and a gift to the next generation.” –Beth Willett

THE OCEAN LEARNING HUB

Gift from Rick and Beth Willett opens a portal of unparalleled access to ocean science

When Beth Willett became a member of WHOI's Corporation, one of the first things she wanted to do was help connect more K–12 students with the science and engineering happening at WHOI.

“Real science and data are important for teachers in the classroom,” Willett says. “The work WHOI does is inspiring to students, and I wanted to help bring it to a broader audience.”

Beth has a passion for making science, technology, education, and math (STEM) accessible to students of varying backgrounds. After a successful engineering career, she became deeply invested in education as the STEM chair and co-chair of the Wellesley Education Foundation and her involvement with her alma mater, Worcester Polytechnic Institute. She shared this passion with her late husband Rick, who passed away unexpectedly in 2022.

WHOI already had a wealth of educational content, drawn from nearly 95 years of ocean research, as well as a dedicated following of teachers who used it. The Willetts' gift enabled the Institution to adapt these resources for easier utilization by educators and students.

With the Willetts' gift, WHOI created the Ocean Learning Hub, an interactive digital platform designed to spark curiosity and deepen understanding of ocean science and engineering. The Ocean Learning Hub evolved from several educational resources produced at WHOI: Dive and Discover, a site initially launched in 2000 to document research cruises; Ocean Topics, started in 2004; and the Ocean Twilight Zone Project, *Oceanus* magazine, and other projects.

The new, completely redesigned site centralizes WHOI's educational material, improves discoverability,

employs a more comprehensive tagging system, and allows users to bookmark and then use its content directly in Google Classroom. Teachers can filter searches by education standards, grade levels, science practices, and ocean literacy principles. Visitors of all ages can dive into modules on plate tectonics, the history of oceanography, hydrothermal vents, ocean life, and more.

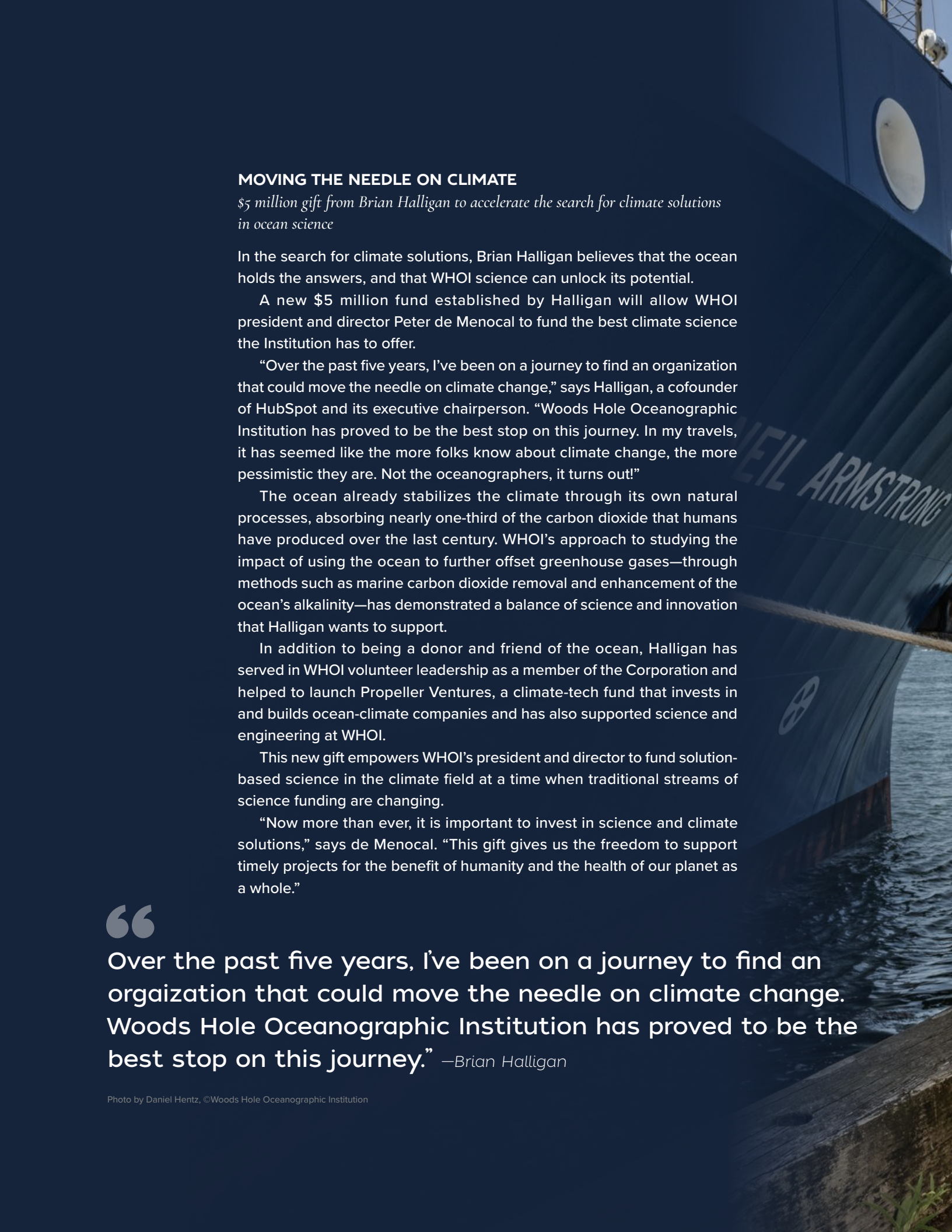
One of the hallmarks of the new site is that it was reconceived through collaboration with educators, who offered their insights into class planning and student needs and alignment of the content with national science education standards.

“Teachers were involved in every step of this redesign,” says Grace Simpkins, a WHOI Sea Grant senior marine education specialist who identified educators to review the site. “The iterative process of working with multiple teachers has resulted in a site that is going to make their jobs so much easier.”

The Ocean Learning Hub was also designed to be user-friendly for middle school students (grades 5–8). Research shows that this is a critical time for young learners as they become aware of their own academic strengths and weaknesses; many, assessing themselves to be unskilled, lose interest in science at this point. Offering vivid imagery, engaging videos, interactive activities, and accessible explanations of big ocean topics, the Hub aims to rekindle that interest.

“Anytime you connect students with a resource like this, what you're really allowing them to do is dive deep and go wherever their curiosity will take them,” Simpkins says.

“WHOI has opened a portal of unparalleled access to ocean science,” says Beth Willett. “This is going to be a wonderful tool for classroom educators and a gift to the next generation. I know the Ocean Learning Hub will bring ocean science to classrooms all over the world.”



MOVING THE NEEDLE ON CLIMATE

\$5 million gift from Brian Halligan to accelerate the search for climate solutions in ocean science

In the search for climate solutions, Brian Halligan believes that the ocean holds the answers, and that WHOI science can unlock its potential.

A new \$5 million fund established by Halligan will allow WHOI president and director Peter de Menocal to fund the best climate science the Institution has to offer.

“Over the past five years, I’ve been on a journey to find an organization that could move the needle on climate change,” says Halligan, a cofounder of HubSpot and its executive chairperson. “Woods Hole Oceanographic Institution has proved to be the best stop on this journey. In my travels, it has seemed like the more folks know about climate change, the more pessimistic they are. Not the oceanographers, it turns out!”

The ocean already stabilizes the climate through its own natural processes, absorbing nearly one-third of the carbon dioxide that humans have produced over the last century. WHOI’s approach to studying the impact of using the ocean to further offset greenhouse gases—through methods such as marine carbon dioxide removal and enhancement of the ocean’s alkalinity—has demonstrated a balance of science and innovation that Halligan wants to support.

In addition to being a donor and friend of the ocean, Halligan has served in WHOI volunteer leadership as a member of the Corporation and helped to launch Propeller Ventures, a climate-tech fund that invests in and builds ocean-climate companies and has also supported science and engineering at WHOI.

This new gift empowers WHOI’s president and director to fund solution-based science in the climate field at a time when traditional streams of science funding are changing.

“Now more than ever, it is important to invest in science and climate solutions,” says de Menocal. “This gift gives us the freedom to support timely projects for the benefit of humanity and the health of our planet as a whole.”

“

Over the past five years, I’ve been on a journey to find an organization that could move the needle on climate change. Woods Hole Oceanographic Institution has proved to be the best stop on this journey.” —Brian Halligan





Photo courtesy of Steven Grossman

GROSSMAN CATALYST FUND: A \$10 MILLION GIFT FOR OCEAN INNOVATION

Boater and oceanography enthusiast Steven Grossman supports innovative WHOI projects with \$10 million donation

Steven Grossman spent his career in the packaging industry, dedicating his time outside of work to his family and boating, their shared passion. For more than two decades, the Grossman family spent weeks at a time on their 117-foot vessel *Arcadia*, logging more than 100,000 nautical miles worldwide. Their capstone voyage took them through the Northwest Passage in the Canadian Arctic; Grossman also considers coastal Greenland and Scotland's remote archipelago St. Kilda two of their most memorable destinations.

Ultimately, these experiences helped shape Grossman's perspective on the importance of protecting and studying the ocean.

"The inlets, the sands, the bays, the rivers, the streams—these are the quiet and powerful connections to the ocean that I have always found so beautiful," Grossman says. "To see any of those components decimated by sewage or plastic or through global warming just doesn't sit right with me. I want to do what I can to help."

This summer, the Grossman Family Foundation gave WHOI a \$10 million gift to develop the Grossman Catalyst Fund, providing seed funding for innovative oceanographic research and technology projects across the Institution. The grant program will fund research projects that are most likely to win additional

philanthropic or government support, says Sam Harp, WHOI's vice president for advancement and marketing. The first grants will be issued early next year.

During the last decade, Grossman, his wife Teresa Pickman, and his sons Ethan and Leslie Grossman, through their foundation, have provided other gifts in support of WHOI projects, including coral reef studies and Arctic research. Grossman initially learned about the work of WHOI scientists and engineers from stories highlighted in the Institution's print magazine, *Oceanus*.

"I read it, I found it fascinating, and I presented WHOI's research to our foundation as a possible future bequest option," he says.

Grossman was born in Brooklyn in 1939. He later moved with his family to the south shore of Long Island, where his sea-loving father purchased a boat. As a teenager in the 1950s, Grossman occasionally "would go to Freeport Point Shipyard, where they built wooden boats." He graduated from the University of Vermont and in the 1960s joined his family's business, Southern Container Company, a U.S. custom corrugated packaging and paperboard business started in 1904 by his grandfather. In 1987, Grossman became the company's CEO.

Now semi-retired, Grossman remains focused on his philanthropic foundation. He also continues to spend days enjoying the ocean. In August, he and his wife took ownership of a 39-foot sailboat they named *Wisp*, which they plan to use for day trips from their seaside Connecticut home.

**THE KECK FOUNDATION: WOODS
HOLE OCEANOGRAPHIC INSTITUTION
ANNOUNCES \$1.6 MILLION GRANT TO BUILD
REVOLUTIONARY ANTARCTIC ICE SHELF
MONITORING SYSTEM**

One of the most vexing challenges in climate science decision-making is accurately quantifying melting Antarctic ice shelves and predicting the rise of global sea level. Now WHOI has been awarded a \$1.6 million grant from the W. M. Keck Foundation to develop a revolutionary autonomous mooring system for studying this melt.

Led by WHOI scientists Catherine Walker and Weifeng (Gordon) Zhang, the project will create a prototype Self-deploying Autonomous Mooring System (SAMS). The cutting-edge device will be capable of autonomously navigating beneath Antarctica's floating ice shelves to deploy its built-in measuring systems and conduct long-term observations in these hostile, difficult-to-reach locations.

"The response of Antarctic ice shelves to continued warming is one of the biggest question marks in understanding what drives global sea level rise," says Walker. "So far, scientists have been able to send underwater vehicles under ice shelves to make measurements for relatively short periods. What we really need are continuous long-term observations to fill that gap in our knowledge about the planet."

Because low-lying coastal zones around the world that are most exposed to sea level rise are also home to billions of people as well as property and infrastructure worth trillions of dollars, rising seas pose one of the most significant threats that humanity could face in the coming century. In addition, freshwater from melting ice sheets could disrupt systems that help regulate Earth's climate.

Acting as a giant safety valve around the Antarctic coast, ice shelves restrain the rest of the vast continental ice sheet from flowing into the ocean. As the atmosphere and ocean surrounding Antarctica warm, its floating ice shelves melt faster and weaken, allowing more ice to slip into the sea, further raising sea levels and freshening ocean water, which can affect global ocean circulation. Measuring water properties underneath the ice shelf and quantifying melt at the base of the shelf is crucial to improving the predictions that inform societal decisions about how to prepare for future environmental change.

SAMS will be designed to travel deep underneath floating ice shelves and tens of miles horizontally to

reach cavities between the ice and the seafloor, where it will anchor itself and remain stationed for years at a time. Over the course of its deployment, SAMS will collect data about the ocean and ice that reveal the patterns and the amount of melt occurring and the ocean's role in driving or responding to variability in ice melt. The system is also designed to transmit data back to shore in order to provide researchers with unprecedented near-real-time insight into ice-ocean interactions as they happen. This information will significantly refine understanding of these complex processes in difficult-to-reach places and their potentially far-flung impacts on people around the world.

"Development of SAMS represents a significant leap forward in underwater technology and ocean-observing capabilities, especially in extreme environments," says Rick Murray, formerly deputy director and vice president for science and engineering and now senior scientist emeritus in the Department of Marine Chemistry and Geochemistry. "This investment by the Keck Foundation will open new possibilities for research in some of the most challenging but crucial parts of our planet."



The Self-deploying Autonomous Mooring System (SAMS) supported by the W.M Keck Foundation will autonomously navigate beneath floating ice shelves to conduct long-term observations in these hostile, difficult-to-reach locations. (Photo by Chris Linder, © Woods Hole Oceanographic Institution)

“PART OF THE WHOI FAMILY”

Fye Society Members Cathy and Dennis Anton

In the mid-1980s, Cathy and Dennis Anton visited family in Falmouth and sought out activities that would capture their young son’s interest. They ended up at the Woods Hole Oceanographic Institution’s Visitor Center in Woods Hole Village. The experience was transformative. “All it took was one visit and we were hooked,” Dennis recalls. From then on, whenever they traveled to Cape Cod, WHOI became a staple of their trip.

The couple met at Assumption College, where Dennis was a student and Cathy was employed while attending Clark University. Dennis, a former administrator in youth and elder services and an avid reader of *Oceanus*, keeps up with the latest science and developments at WHOI. “I’ve always had a tremendous respect for the ocean. It may have started as fear or awe, but at its core, there’s a deep respect,” he says.

After the death of Cathy’s brother, Kenneth Benton, a polymer research chemist, the couple decided to honor his memory by making an estate gift to WHOI. Cathy explains, “He loved learning and sharing his knowledge. It felt like the perfect place to give.” They were struck by the contrast between Cathy’s brother, who never worried about funding his projects, and the scientists at WHOI, who balance research with raising funds. “That kind of passion is remarkable,” Cathy adds. “It was a big factor in our decision.”

Throughout their many visits to WHOI, the couple had the chance to tour the R/V *Neil Armstrong* and meet with several scientists, whose enthusiasm and innovation left a lasting impression on them. With her background in human resources, nonprofit leadership, and higher education, Cathy recognizes the importance for an organization of having a staff who feel truly valued. “WHOI must be doing something right when people take the time to explain and share their work in such detail,” she notes. “Of all the scientists and staff we’ve met on Cape Cod, whether retired or actively employed, their enthusiasm and sense of community stands out. That’s no small thing.”

Dennis echoes this sentiment, emphasizing that WHOI’s welcoming spirit extends beyond its staff. “What’s even more special is the way WHOI treats its members—it makes us feel like part of the WHOI family.”



By making a gift to WHOI through their estate plan and annual giving, supporters like Cathy and Dennis are investing in groundbreaking ocean research and a community dedicated to exploring and protecting our ocean for generations to come.



WHOI must be doing something right when people take the time to explain and share their work in such detail. Of all the scientists and staff we’ve met on Cape Cod, whether retired or actively employed, their enthusiasm and sense of community stands out.”

—Cathy Anton

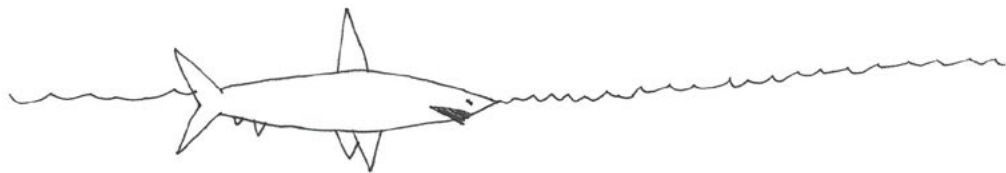
A GIFT FOR THE SHARKS

Of our 7,500 donors in 2024, this Annual Fund letter from Gus Garry was one of our favorites.

february 1 2024

Dear who i, This is gus. I hope
That you had one of the best years
of your life and I want you to please
~~use~~ use this \$190 to help sharks as much
as you can. ~~I~~ I would love to help
as much as I can to help sharks, If there
is any way I can tell me.

LOVE, gus Garry



"Sharks have just as much right to
earth as humans do even more!!!"

gus  garry

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Gentoo penguins (*Pygoscelis papua*) return to their colony on New Island, Falklands, after a foraging trip. WHOI postdoctoral investigator Francesco Ventura was in the Falklands to monitor the seabirds breeding there. Counting penguins throughout their breeding areas allows scientists to measure their population dynamics and investigate how changes in environmental conditions impact their numbers. (Photo by Francesco Ventura © Woods Hole Oceanographic Institution)

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A stream flows through the Arctic coastal plain of Alaska. In this region, near the Chukchi Sea, permafrost can reach hundreds of meters deep. WHOI postdoctoral scholar Roger Creel took this photo while hunting for tundra boulders, enigmatic rocks whose origin and path to the tundra are unknown. Creel and pictured colleagues—Phillip Wilson, University of Alaska Fairbanks, and Allie Balter-Kennedy, Lamont-Doherty Earth Observatory—will date samples from these boulders to help understand how Earth's ice sheets have changed over the last 100,000 years. (Photo by Roger Creel © Woods Hole Oceanographic Institution)

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A black-browed albatross (*Thalassarche melanophris*) chick on New Island, Falklands. After learning to fly, this chick will remain at sea for several years. WHOI postdoctoral investigator Francesco Ventura photographed this chick while working on a study that has observed this colony for more than two decades. Ventura and other researchers monitor the seabirds' movement at sea during foraging and migration. Many have returned to the same nest with the same partner, since the start of the project, meaning they are older than most of the researchers studying them. (Photo by Francesco Ventura © Woods Hole Oceanographic Institution)

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It is a privilege to thank our generous donors who have committed \$50,000 or more in unrestricted funding to deepen WHOI research and innovation.

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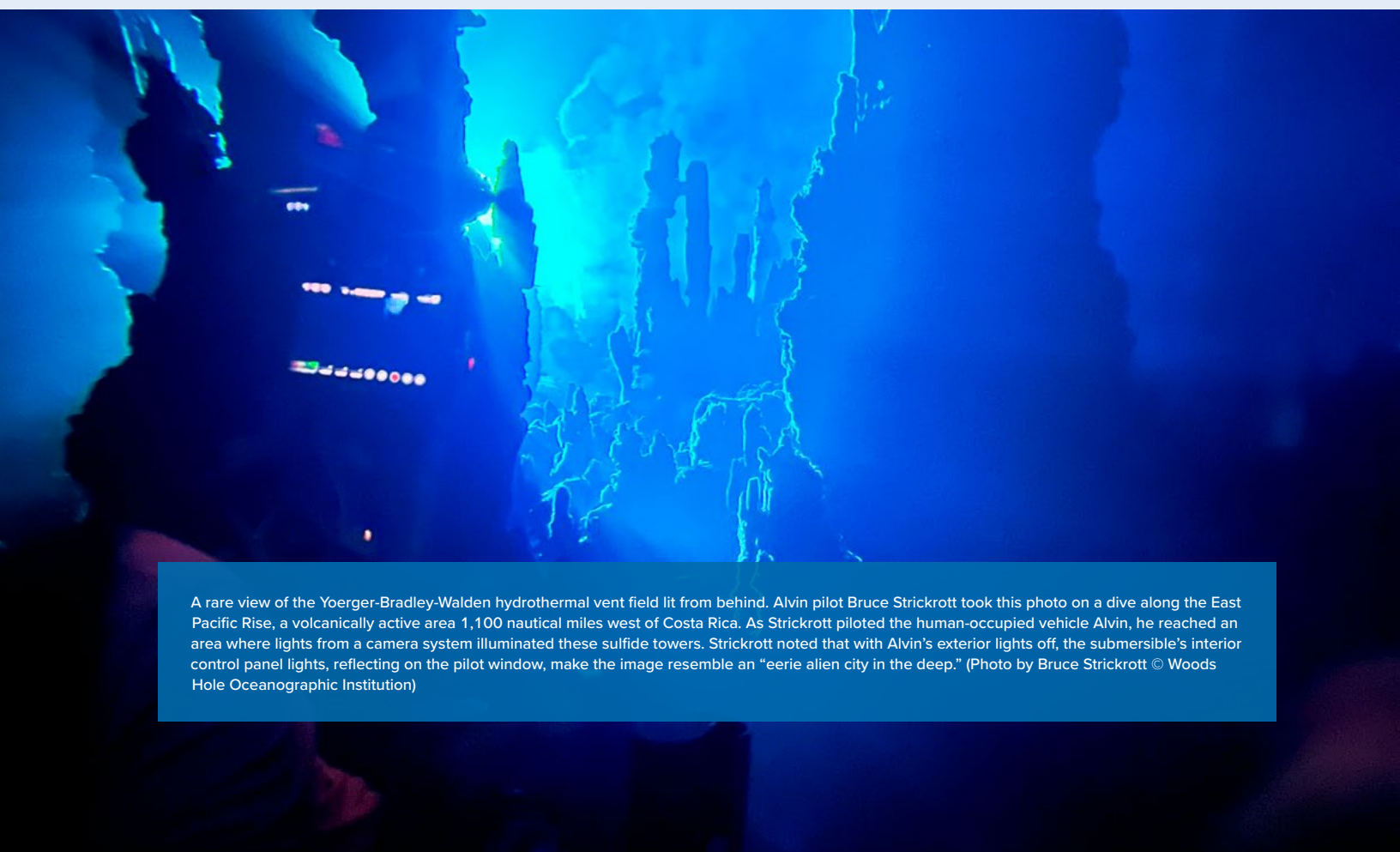
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A rare view of the Yoerger-Bradley-Walden hydrothermal vent field lit from behind. Alvin pilot Bruce Strickrott took this photo on a dive along the East Pacific Rise, a volcanically active area 1,100 nautical miles west of Costa Rica. As Strickrott piloted the human-occupied vehicle Alvin, he reached an area where lights from a camera system illuminated these sulfide towers. Strickrott noted that with Alvin's exterior lights off, the submersible's interior control panel lights, reflecting on the pilot window, make the image resemble an "eerie alien city in the deep." (Photo by Bruce Strickrott © Woods Hole Oceanographic Institution)

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“In my second full year at the helm, I’ve been blown away by the commitment of my fellow trustees, life trustees, and Corporation members who continue to serve as stewards of this amazing institution.”

—Paul Salem, WHOI board chair

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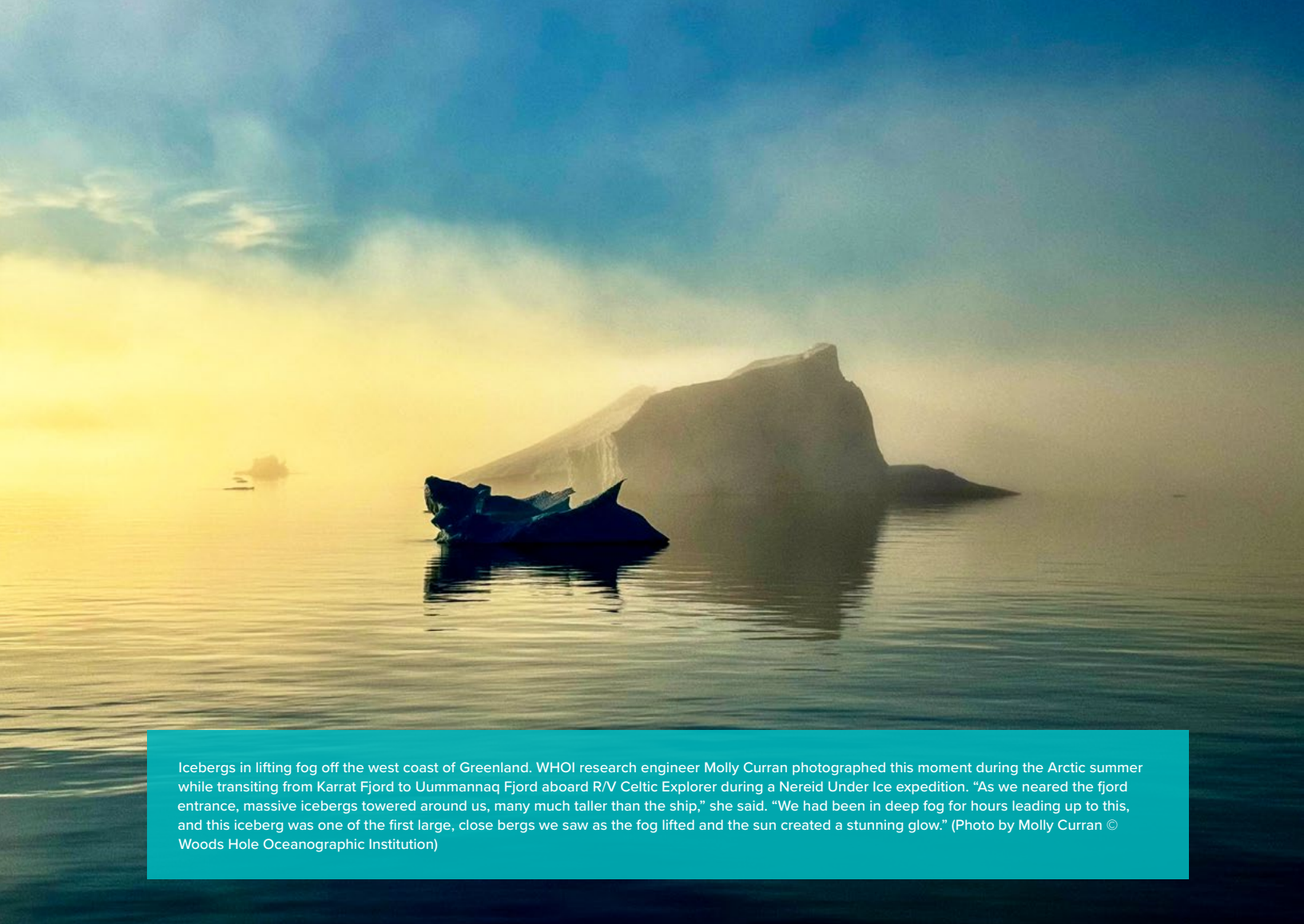
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A green turtle (*Chelonia mydas*) hatchling takes to sea for the first time on the shores of Poilão Island, part of the Bissagos Archipelago off the coast of Guinea-Bissau in West Africa. This small, uninhabited island is an important nesting site for sea turtles. It also holds deep spiritual significance for local tribes. Visitors must complete a sacred rite of passage to travel there. When WHOI postdoctoral investigator Francesco Ventura arrived to study the population dynamics of these turtles, he and the science party thanked the guardian spirit of the island for letting them study these majestic creatures. (Photo by Francesco Ventura © Woods Hole Oceanographic Institution)

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Icebergs in lifting fog off the west coast of Greenland. WHOI research engineer Molly Curran photographed this moment during the Arctic summer while transiting from Karrat Fjord to Uummannaq Fjord aboard R/V Celtic Explorer during a Nereid Under Ice expedition. "As we neared the fjord entrance, massive icebergs towered around us, many much taller than the ship," she said. "We had been in deep fog for hours leading up to this, and this iceberg was one of the first large, close bergs we saw as the fog lifted and the sun created a stunning glow." (Photo by Molly Curran © Woods Hole Oceanographic Institution)

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The polyp of an oval mushroom coral (*Lobactis scutaria*) in the coral nursery at the Maui Ocean Center in Ma'alaea, Maui, Hawai'i. MIT-WHOI Joint Program student Nadège Aoki and a team of WHOI scientists, engineers, students, and technicians led by WHOI scientists Aran Mooney and Amy Aprill spent two months at the nursery playing the sounds of healthy Hawaiian reefs to coral larvae to test whether it would induce them to settle. This method has shown promise in repopulating Caribbean reefs. (Photo by Nadège Aoki © Woods Hole Oceanographic Institution)

2024

Financial Statements

We are pleased to present the 2024 audited financial statements of the Woods Hole Oceanographic Institution. We are grateful to our many funders, both private and public, for their support of WHOI's mission of ocean research, exploration, and education.

Our scientists, engineers, technical, and support staff continued to deliver on the Institution's mission with an increase of 6.8 percent to our total funded sponsored research portfolio. Sponsored research funding increased across major funding agencies, with the National Science Foundation leading the way. Ship operations increased by 22.1 percent, as both vessels were fully operational in 2024. Our investment portfolio experienced positive returns in the face of inflationary pressures, ending 2024 with a market value of \$524.4 million. The defined benefit plan obligations of the Institution decreased considerably from \$57.1 million to approximately \$37.0 million; the primary driver being interest rates remaining low and some impact from higher than expected returns. We are grateful to our trustees for their generosity and fiduciary guidance.

STATEMENT OF FINANCIAL POSITION

As of December 31, 2024, WHOI's total assets were \$793.7 million, total liabilities were \$166.7 million, and total net assets were \$627.1 million. Net assets represent the accumulated financial strength of a not-for-profit organization and are an important gauge of its ability to carry out its mission. The investment portfolio, \$524.4 million, represents 66.1 percent of the total assets as of December 31, 2024.

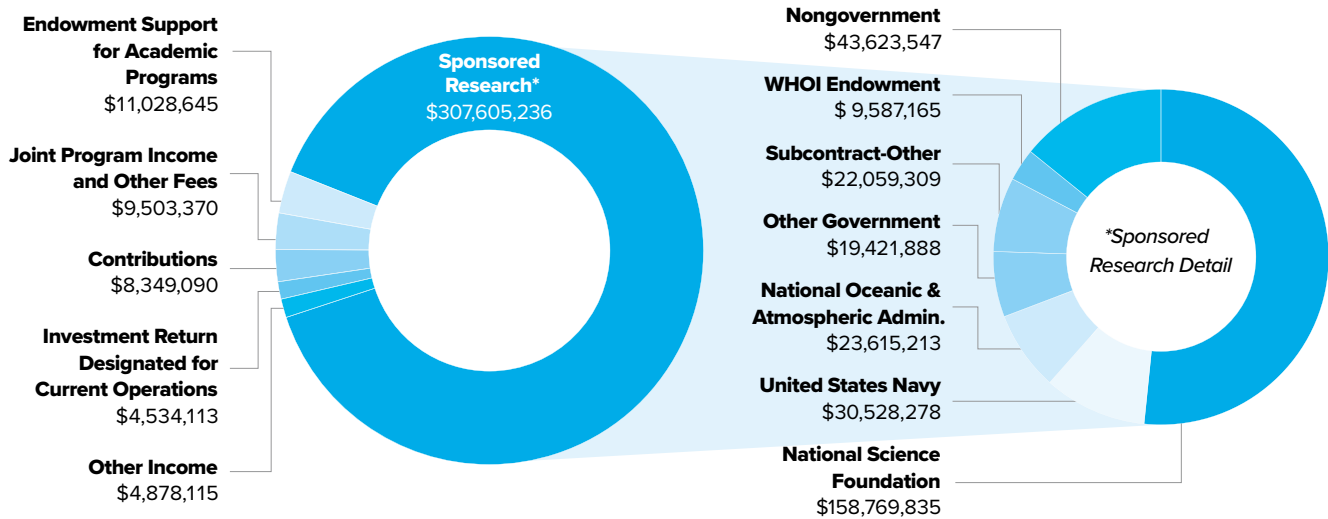
STATEMENT OF ACTIVITIES

WHOI's total revenues without donor restrictions increased by \$25.5 million, from \$323.6 million in 2023 to \$349.1 million in 2024; the Institution's change in net assets from operating activities was a loss of \$4.8 million. Our \$22.5 million of endowment income and appreciation was distributed to operations as follows:

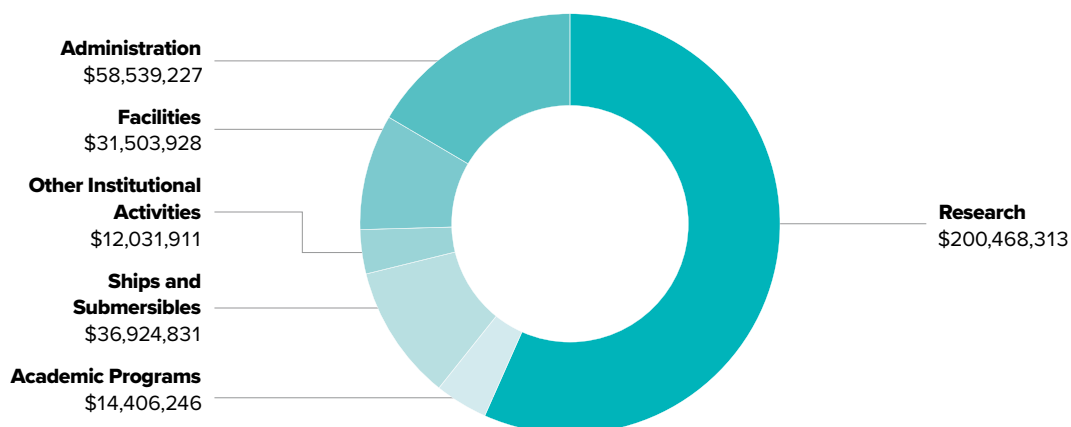
- Education: \$9.8 million
- Research: \$8.2 million
- Unrestricted: \$4.5 million

The Institution had facilities and administration costs of \$90 million; approximately 80 percent of that amount, \$72.3 million, was recovered from government and nongovernment research, including \$2.9 million in interest associated with the Series 2018 Bonds. The remaining 20 percent represented institutional expenses. The Institution's fundraising continued to be successful in 2024, with philanthropy playing a crucial role in advancing our research and educational objectives. A total of 7,785 supporters contributed nearly \$73 million in new commitments, including \$30 million in bequest intentions. The ongoing generosity of WHOI's donors continues to fuel the momentum for WHOI's Vision 2030 and has set the stage for public announcement of the ongoing campaign in 2025.

REVENUES: \$345,898,571



EXPENSES: \$353,874,458





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