

## Dear Fellow Explorers,

Happy New Year! 2024 is shaping up to be a very exciting and productive year for the OECI. The plans for the 2024 field season are developing with stops in American Samoa and Palau for Ocean Exploration Trust's E/V *Nautilus*. The application of our technology development and education programs will both benefit from and have significant impacts in the exploration of these new (to OECI) regions. Similarly, we are excited about the upcoming field season in the Gulf of Mexico where the OECI continues to support NOAA's Mesophotic and Deep Benthic Community (MDBC) restoration plans. Keep your eyes on this space to join in all of the exploration as it happens.

I want to thank NOAA Ocean Exploration for hosting the OECI in Silver Spring, MD, earlier this month, where individuals gathered to develop plans for the FY2025 field season as well as think about larger goals for the coming five years of OECI efforts. The lively discussions we had have me more excited than ever about the future of ocean exploration and reaffirmed for me the incredible talent, experience, and collaborative nature of the individuals and teams that make up the OECI and NOAA. My new year's resolution is simply to keep the wheels turning on our innovation machine for ocean exploration as we 'dive' into 2024.

Deepest regards,

Adam

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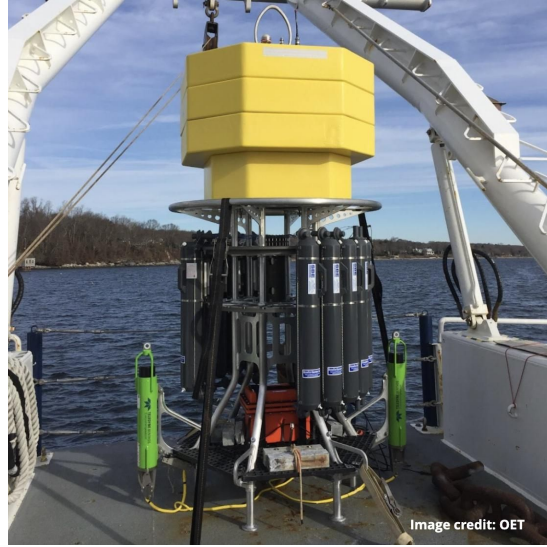
## OSM-OECI connections

Over 6,000 attendees will convene in New Orleans, LA, from February 18-23, 2024, to participate in the 2024 Ocean Sciences Meeting. We encourage you to engage with the many OECI-funded and/or related presentations, posters, and exhibits that will be taking place during the event (some of which are listed/linked [here](#)).

## E/V *Nautilus* Expedition Summary: Hawai'i Mapping (NA157)

On November 7-17, 2023, E/V *Nautilus* conducted a telepresence-enabled expedition to map and characterize offshore environments

south of the Main Hawaiian Islands. During 10 days at sea, the expedition used the [deep-water mapping capabilities of E/V Nautilus](#) alongside the [Deep Autonomous Profiler \(DAP\) Lander](#) to survey unmapped or poorly mapped seafloor southwest of Hawai'i. The expedition was an interagency collaboration between the National Oceanic and Atmospheric Administration (NOAA), Bureau of Ocean Energy Management (BOEM) and US Geological Survey (USGS) that leveraged the technologies of the Ocean Exploration Cooperative Institute to address priorities of these individual agencies and the [US National Strategy for Ocean Mapping, Exploration and Characterization](#).



The original goal of the expedition was to fill seafloor mapping gaps located near the edge of the US Exclusive Economic Zone south of Hawai'i. However, severe weather conditions did not allow for operations to occur in this area. As a result, the expedition shifted its focus to areas around the Geologists Seamounts, where 5,911 square kilometers of seafloor were mapped over the course of the expedition.

The expedition included seven deployments of the *DAP Lander* down to depths of 4,600 meters for a combined time of over 23 hours. Continuous video, CTD environmental and passive acoustic data was collected on the seafloor and throughout the water column during each deployment, in addition to a total of 166 water samples for the study of eDNA, 140 nutrient, and 14 particulate organic samples. In addition to surveying deep ocean environments, the expedition included topside surveys of seabird diversity and abundance, a first for E/V Nautilus operations.

Please visit the [Nautilus Live website](#) for more information about this expedition ([NA157](#)) and other ocean exploration activities!

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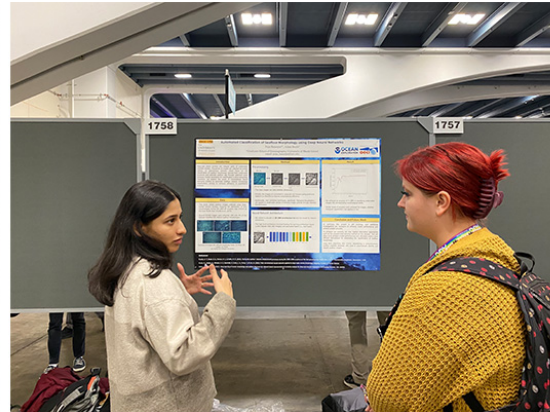
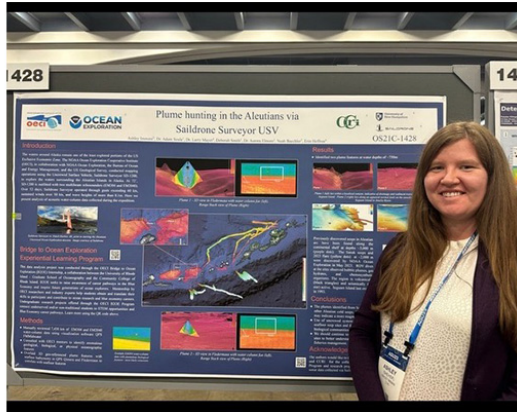
## CloudMap Project Update

A fundamental component of ocean exploration is the bathymetry of the seafloor, which provides a base map for all other studies. Generating a stable, reliable estimate of seafloor depths from raw data is not trivial, and requires specialized software and training for the operators. Since it may not be possible to have specialists on board each expedition, there is significant benefit in having the data leave the ship for a cloud-based storage, and allowing the specialists to operate on it from shore. Keeping the data in the cloud also makes it simpler to manage the data, and move it through all stages of its life cycle.

The CloudMap project aims to facilitate a cloud-based, data processing future by demonstrating a prototype bathymetry processing scheme blending micro-service components for the overall process and advanced Virtual Reality interaction techniques in the local environment. A key advantage of being in the cloud is that the processing can be transparently (to the operator) spread out over multiple computers which can be recruited to the effort for just as long as they're needed, and then released, keeping costs down. Orchestrating this effort is the task of the job scheduler, which has been the focus of the CloudMap team (at the University of New Hampshire) since the last update. Written mostly in Go, the scheduler adapts to local data density, keeps track of which areas need recompute, automatically reschedules computation if the data in any area changes, and interacts with the Kubernetes-based computation engines to make sure that the processing task always has enough resources to complete against a strict interaction deadline

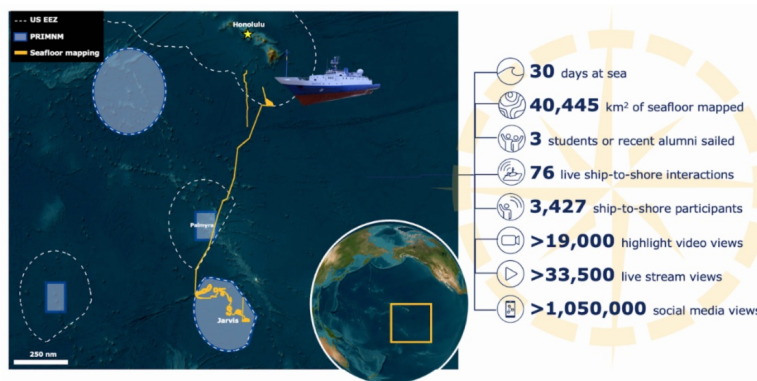
(e.g., so that the estimates of depth can update 0.1-0.5s after a change in data).

## OECI Student Connections at AGU



OECI students presented at the American Geophysical Union (AGU) Conference in San Francisco, CA in December 2023. Featured above, Ashley Immani, a URI Graduate and Community College of Rhode Island student participating in the OECI's Bridge to Ocean Exploration (B2OE) program, presented on her B2OE project reviewing water column data from the SAILDRONE Surveyor project. In review of this data, Ashley identified two features that are possible plumes/seeps. Her poster presentation was displayed in the Ocean Sciences section of the poster hall and had numerous visitors. The second student, Puja Banerjee, a URI PhD student under Dr. Adam Soule, presented a poster on the automated classification of seafloor morphology using deep neural networks, a project to classify seafloor type by using machine learning algorithms. Puja previously worked on a project under OECI to develop an algorithm to identify "highlight" sections of ROV video imagery.

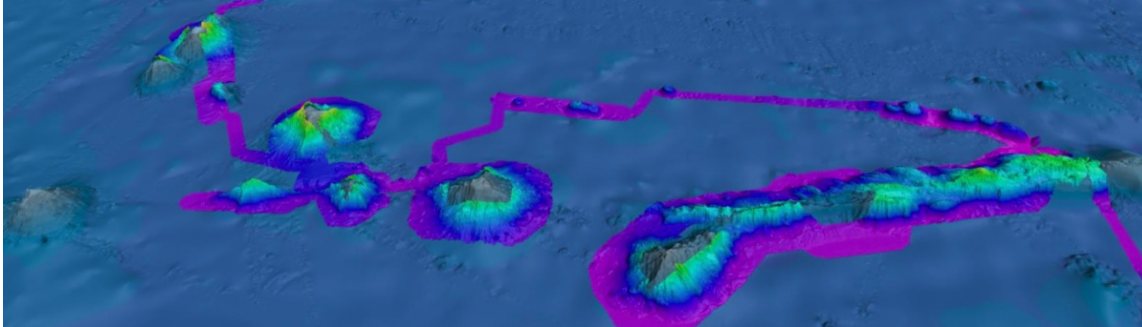
## E/V Nautilus Expedition Summary: Jarvis Mapping (NA158)



From November 19-December 19, 2023, E/V *Nautilus* conducted a [telepresence-enabled expedition to map the deep seafloor around Jarvis Island](#). Funded by NOAA Ocean Exploration via the Ocean Exploration Cooperative Institute,

the expedition used E/V *Nautilus'* sonars to map the seafloor during transits between Hawai'i and Jarvis, in addition to dedicated mapping surveys in the Jarvis Unit of the Pacific Remote Islands Marine National Monument (PRIMNM). During 30 days at sea, the expedition mapped 40,445 km<sup>2</sup> of seafloor, including 32,408 km<sup>2</sup> in the US Exclusive Economic Zone around Hawai'i, Palmyra and Jarvis, as well as 19,549 km<sup>2</sup> inside PRIMNM. Mapping inside the Jarvis Unit of PRIMNM revealed a series of complex topographical features that were not previously charted in this region, including numerous cratered seamounts, steep ridges, and mounds. None of these areas have been explored visually to date, and data collected on this expedition will provide the foundation for future deep-sea explorations in the region including an ROV expedition aboard E/V *Nautilus* scheduled for July-August 2024.





## Announcements, Events, and Opportunities



### 2024 E/V Nautilus Expeditions Call for Science Input

In 2024, E/V *Nautilus* will conduct several telepresence-enabled, multidisciplinary expeditions to explore the deep sea throughout the Pacific. The Ocean Exploration Trust (OET) seeks input on expedition planning by identifying exploratory interests, mapping priorities, ROV dive targets, physical sample requests, and technology integrations. **Please use this [online form](#) to provide your input by February 1, 2024.** Information received will be used to open up opportunities for collaboration and refine expedition plans, which will be discussed during community webinars preceding each expedition.

OET plans to continue operating E/V *Nautilus* in the Central and Western Pacific for several years to come in partnership with NOAA Ocean Exploration via the Ocean Exploration Cooperative Institute, and other partners. NOAA Ocean Exploration, in conjunction with other federal agencies, plans to bring NOAA Ship *Okeanos Explorer* to the Central and Western Pacific in 2024-2026, and will coordinate exploration efforts with OET for the benefit of the broader ocean exploration community. Priorities submitted through this call may therefore be shared with NOAA Ocean Exploration for coordinated planning.



### 2024 NOAA Ocean Exploration Explorer-In-Training Program

A core part of the NOAA Ocean Exploration mission is to train the next generation of ocean explorers through internship and fellowship opportunities for students and early career professionals. One of the many ways that the office addresses this goal is through a partnership with the [Cooperative Program for the Advancement of Earth System Science \(CPAESS\)](#), a community

program of the [University Corporation for Atmospheric Research \(UCAR\)](#), to coordinate opportunities for students to gain valuable experience in ocean exploration.

Since 2009, NOAA Ocean Exploration and CPAESS/UCAR have hosted over 170 [Explorers-in-Training](#). The program equips participants with skills to meet the current and future demands of the ocean exploration workforce, providing meaningful experiential learning opportunities that support NOAA Ocean Exploration's mission and inspire ocean literacy for the next generation.

The program features two internship options: (a) 2 to 4-week expedition-based opportunities and (b) 10-week summertime opportunities. The 10-week internships give students an opportunity to develop their skills and knowledge through long-term projects supported by NOAA Ocean Exploration mentors. The 2 to 4-week expedition-based internships involve participation in specific NOAA Ocean Exploration-supported expeditions, giving participants the chance to contribute to mission efforts while gaining tangible skills that can benefit their future pursuits. **For 2024, both 10-week summer internships and 2 to 4-week expedition-based opportunities will be available, however, you may only apply to one internship program** (i.e., any one of the 10-week internships or the 2 to 4-week ocean mapping internship).

The Explorer-in-Training Program offers multiple internship themes to reflect NOAA Ocean Exploration's diverse expertise, work products, and services. For more details, and links to apply, please visit the [Explorer-In-Training webpage](#).

Applications for the **2 to 4-week expedition-based opportunities** will be accepted on a **rolling basis**, with a **priority deadline of January 31, 2024**. Applications for the **10-week shore-based opportunities** will be **accepted until January 31, 2024**.

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## Undergraduate Scholarships Opportunities with NOAA

The [Serrano EPP/MSI Undergraduate Scholarship](#) provides funds for two years of undergraduate study to rising junior undergraduate students majoring in Science, Technology, Engineering and Mathematics (STEM) fields that directly support NOAA's mission. Participants conduct research at a NOAA facility during two paid summer internships at NOAA facilities. Since 2001, 219 students have completed the program and over 75% go on to graduate school. There are typically ~10 students/cohort. The student must be attending a Minority Serving Institution to apply - see details on eligibility on the [program webpage](#). For inquiries, please contact: [EPP.USP@noaa.gov](mailto:EPP.USP@noaa.gov).

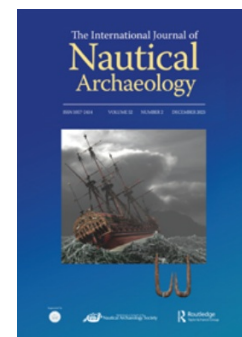
The [Hollings Scholarship Program](#) provides successful undergraduate applicants with awards that include academic assistance (up to \$9,500 per year) for two years of full-time study and a 10-week, full-time paid (\$700/week) internship at a NOAA facility during the summer between the first and second years of the award. The internship provides the scholars with hands-on, practical experience in NOAA-related science, research, technology, policy, management, and education activities. There are typically 120+ students per cohort, and there are over 2000 alumni, and over 75% go on to grad school. For details on eligibility requirements and other information, please review the [program's FAQs](#).

**Applications for both programs with the NOAA Office of Education will be accepted until January 31, 2024.**

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## Community-Driven Marine Archaeology: NOAA Ocean Exploration Operations in the Pacific Basin 2024-2026

Individuals are encouraged to review [this recent article](#) published in the *International Journal of Nautical Archaeology*. It details the tools, technologies, and typical datasets collected by NOAA Ocean Exploration's program, as well as opportunities for the Asia-Pacific community of archaeologists, historians, and resource managers to contribute to research prioritization efforts and participate in live, publicly accessible telepresence-enabled operations.



## 2024 (virtual) OECl Blue Economy Career Exploration Fair

For a third year, the OECl will again host a virtual **Blue Economy (BE) Career Exploration Fair** as part of its **Bridge to Ocean Exploration (B2OE) Program**. In addition to a broad introduction to BE industries, event participants will be able to speak with a suite of engaging panelists in small groups and ask questions, learn more about skills required for BE positions, and understand the personal career journeys of all panelists.

This year, the OECl is hosting **two virtual events**, one on **Tuesday February 27, and the other on Thursday, February 29, 2024**. Each online event will last approximately 2 hours (2:30-4:30pm ET) and will feature different BE sector representatives. Participants are encouraged to register for both sessions if they can.

**Registration is required** to participate in this **free, online event**, which is geared toward **undergraduate, graduate, and community college students**. Please follow [this link](#) to register to participate in one or both online sessions.

**Please save the date(s) and share details within your networks!**



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