



Oregon State University
College of Earth, Ocean,
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April 28, 2021

Subcommittee on Education, Joint Committee on Ways and Means
Senator Lew Fredrick, Co-Chair
Representative Susan McLain, Co-Chair

Dear Co-Chairs Frederick and McLain, and members of the Joint Committee on Ways and Means, Subcommittee on Education,

I write in strong support of Oregon's Oceangoing Research Vessel Program that is part of the State Programs line item in the Higher Education Coordinating Committee support bill, **SB 5528**. As part of my testimony, I have included an updated brochure about the state-funded Oceangoing Research Vessel Program. As you can see, the program continues to grow and reach even more Oregonians from across the state. It is crucial that we continue to monitor changing ocean conditions and to train the next generation of scientists and educators to carry out this important work. Even in the face of restrictions from COVID-19 this last year, we managed to carry out some successful cruises that included research, education – including via a remote connection to shore – and outreach and engagement. I am teaching a class at OSU on “Coastal and Estuarine Oceanography” this term and just did a virtual field trip by connecting to OSU's *Research Vessel Oceanus* in real time during class so the students could experience work at sea. Dr. Annie Lindgren from Portland State University led this cruise, showing the reach across state.

I urge you to support continued funding of the Oceangoing Research Vessel Program, especially as OSU and Oregon prepare for the arrival of the newest research vessel in our nation's research fleet, the *R/V Taani*. You can read more about this OSU-designed vessel at:

<https://ceoas.oregonstate.edu/regional-class-research-vessel-rcrv>

Sincerely,

Dr. John (Jack) A. Barth
Professor
Fellow, The Oceanography Society
Fellow, The American Meteorological Society

COLLEGE OF EARTH, OCEAN, AND ATMOSPHERIC SCIENCES

OCEANGOING RESEARCH VESSEL PROGRAM



Oregon State
University

During its seven-year tenure, the Oceangoing Research Vessel Program has enabled authentic learning and research experiences for students throughout Oregon—from high schoolers to graduate students. These experiences help inspire careers in Earth sciences for students who may not otherwise have an opportunity to go to sea. Early engagement in science is important for creating pathways into STEM education programs, developing workforce-ready skills, and broadening participation across the sciences. In addition, the program creates cross-institutional exchanges vital for successful science and education. The research supported by this program helps Oregon address issues related to sustainable use of our ocean to benefit all Oregonians.

With the anticipated arrival of the state-of-the-art research vessel, *R/V Taani*, future participating students will have unprecedented access to advanced instrumentation and technologies, putting them at the leading edge of oceanographic science. We are excited at the prospect of engaging even more students from across institutions and throughout coastal communities.

This report highlights funded projects from the 2015–17, 2017–19 and 2019–21 biennium periods. It includes statistics and snapshots of a variety of cruises made possible from this program, including a group of community college students who aimed to capture the shadow of the historic eclipse, and students in the Research Experiences for Undergraduates program who collected sediment cores to learn about the end of the last ice age. Read on to learn more.

Jack Barth
Chair, Oceangoing Research Vessel Council
Professor, College of Earth, Ocean, and Atmospheric Sciences
Oregon State University

Background

During the 2013 legislative session, the Oregon Legislative Assembly enacted HB 3451, which established an Oceangoing Research Vessel Program at Oregon State University to assist in the research and study of the waters of the Pacific Coast. This state-funded program provides ship days to students and researchers from all of Oregon's public universities and natural resource agencies for the use of the *R/V Oceanus* to explore key coastal issues, including marine renewable energy and impacts from ocean changes due to ocean acidification and hypoxia. The multi-institutional Research Vessel Council enabled by the bill approved five proposals for the 2015–17 biennium, seven for the 2017–19 biennium and seven for the 2019–2021 biennium.

Summary of Projects

2015–17 proposals:

- “Coastal Ocean Carbon Cycling during Wintertime Conditions” led by Dr. Miguel Goñi (OSU), 5 days
- “Tracking Ocean Acidification, Hypoxia, and Zooplankton Community Response through Experiential Research Education” led by Dr. Kim Bernard (OSU), two 4-day cruises
- “Biodiversity, Zonation and Oceanography of Oregon’s Circalittoral Zone” led by Dr. Craig Young (UO), 5 days
- “An Environmental History of the Columbia River” led by Dr. Maureen Walczak (OSU), 5 days
- “Building the STEM Pipeline through Oceangoing Research and Near-Peer Mentoring” led by Ms. Tracy Crews (OSU), 3 days

2017–19 proposals:

- “Coastal Ocean Carbon Cycling during Wintertime Conditions” led by Dr. Miguel Goñi (OSU), 5 days
- “Linn-Benton Community College – Eclipse Balloon Proposal for OSU Shipboard Launch,” Dr. Jack Higginbotham (OSU) on behalf of Co-PI Parker Swanson (Linn Benton Community College), 2 days on *R/V Pacific Storm*.
- “Inclusion of Oceanography in the Aquatic Microbiology Laboratory Course” led by Dr. Andrew Thurber (OSU), 2 days (1 day in 2018 combined with Niezgoda cruise)
- “Measuring the Freshwater Budget of the PNW Ocean with Stable Isotope Ratios” led by Mr. Kyle Niezgoda (Graduate Student, OSU), 5 days
- “Building the STEM Pipeline through Oceangoing Research and Near-Peer Mentoring” led by Ms. Tracy Crews (OSU), 4 days
- “Filling the Gaps: High-Resolution Seafloor Mapping for Critical Areas along the Southern Oregon Coast” led by Mr. Scott Marion (ODFW), 5 days
- “Integrating Research and Undergraduate Education: Assessing the Biodiversity, Physiology and Ecology of Oxygen Minimum Zone Inhabitants off the Coast of Oregon” led by Dr. Annie Lindgren (PSU), 5 days

2019–21 proposals:

- “Diversifying the STEM Pipeline through Oceangoing Research and Near-Peer Mentoring” led by Ms. Tracy Crews (OSU), 4 days
- “Establishing long-term context for and drivers of our present regional wave climate via coarse-sediment coring off central Oregon” led by Drs. Burke Hales and Maureen Walczak (OSU), 5 days
- “Vertical migration of Dungeness crab (*Cancer magister*) and pink shrimp (*Pandalus jordani*) larvae under current and future ocean acidification scenarios” led by Dr. Leif Rasmuson (ODFW), 5 days
- “Taking OSU Microbiology Students to Sea: Integrating Microbial Oceanography in the ‘Aquatic Microbiology Laboratory’ Course” led by Dr. Andrew Thurber (OSU), 2 days
- “Cascadia High-resolution Observation of Paleo Systems (H.O.P.S.)” led by Drs. Brendan Reilly and Maureen Walczak (OSU), 5 days
- “Integrating Research and Undergraduate Education: Assessing the Biodiversity, Physiology and Ecology of Oxygen Minimum Zone Inhabitants off the Coast of Oregon” led by Dr. Annie Lindgren (PSU), 4 days
- “Shiptime support for Oregon Shelf Invertebrates, an open-source identification guide to benthic biodiversity in Oregon waters” led by Dr. Craig Young (UO), 3 days

Project Spotlights

Eclipse Chasing



Students from Linn-Benton Community College partnered with NASA’s Oregon Space Grant Consortium, Oregon State University, and Montana State University to launch a high-altitude balloon to capture the shadow of the 2017 eclipse. While technical challenges prevented the team from completing its scientific mission, the hands-on experience was vital for participating students. Co-Principal Investigator Jack

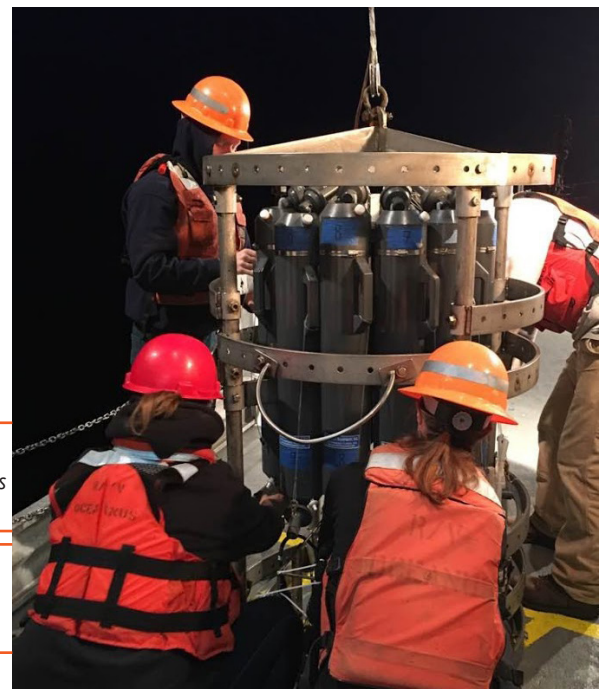
Higginbotham says of the project, “The experience proved to be very stimulating for all involved. All the student participants have gone on to upper-division studies in the OSU College of Engineering. Two students have served as interns at NASA facilities, and one of those is now a ‘Pathways’ trainee for a full-time NASA engineering career, while she completes her undergraduate studies.”

Near-peer Mentoring

Starting in 2016, Oregon Sea Grant initiated at-sea research experiences for high school and undergraduate students aboard Oregon State University research vessels utilizing a “near-peer” mentoring structure, which has led to demonstrated increases in STEM-related skills and student interest in STEM. These student-focused research cruises offer the opportunity for high school students to explore their interests, while providing college and post-baccalaureate students the chance to advance their skills and further their training. High school educators have reported positive experiences in being involved in the mentorship process:

“This experience was one of the most rewarding and impactful of my career. Looking at data is not the same thing as collecting it, and I’ve learned so much about what goes into obtaining marine data.”-High school science teacher

“The experience has inspired me to start looking beyond my own classroom, identify what is not reaching the students and strive for a way to bring deeper meaning and stronger connectivity to mathematics.” -High school math teacher



Cascadia HOPS Cruise

A weeklong CEOAS paleoceanographic expedition aboard R/V *Oceanus* was christened Cascadia HOPS (High-resolution Observations of Paleo Systems). Scientists aboard *Oceanus*, including Maureen Walczak, Joe Stoner and graduate student Deepa Dwyer, collected seafloor sediment samples using a variety of sediment coring systems to learn about the history of the Pacific Northwest in times before humans inhabited the region.

One unique aspect of the cruise, apart from paying homage to a key beer ingredient, was the public outreach the science team conducted while on board. They maintained a blog (read it at paleomag.ceoas.oregonstate.edu/hops), took extensive photos and videos, hosted a live chat from sea, and welcomed public attendance (remotely, of course) in daily science briefings on the ship, among other activities. The cruise was a resounding success, collecting more than 20 cores, including the longest cores ever obtained aboard *Oceanus*.



Participating Institutions and Students

Biennium	High School	High School Teacher	Community College	Under-graduate	Graduate	Early Career Ocean Professional*
13-15				19	8	
15-17	4			26	18	2
17-19	2	3	18	22	9	5
19-21	4	1	1	12	12	6
Total	10	4	19	79	47	13

* Early Career Ocean Professionals include scientists who are generally within 10 years of their highest professional degree. Many of these young scientists led their first oceanographic research expedition under the Oceangoing Research Vessel program.

Participating Institutions and Agencies:

- 4-year: OSU, UO, PSU, WWU
- Community Colleges: Clatsop, Oregon Coast, Linn Benton, Southwestern Oregon
- High Schools: Warrenton, Newport, North Bend, Bandon, Taft, Oregon City, Beaverton, Toledo, Waldport
- Oregon Department of Fish and Wildlife

During a September 2016 visit to Portland by the R/V *Oceanus*, ship tours were attended by 66 students, 24 teachers and 75 members of the public.

During a July 2020 research cruise during the COVID-19 pandemic, 20 high school students shared in the onboard research via Zoom.

Oceangoing Research Vessel Council members

Dr. Jack Barth, Chair
Oregon State University

Dr. Caren Braby
Oregon Department of Fish and Wildlife

Mr. Andy Lanier
Oregon Department of Land Conservation and Development

Dr. Jonathan Allan
Oregon Department of Geology and Mineral Industries

Ms. Lori Pillsbury
Oregon Department of Environmental Quality

Ms. Kristen Wilkin
Clatsop Community College

Dr. Craig Young
University of Oregon

Mr. Kaya Johnson
Oregon State University

Captain Todd Bridgeman
NOAA Marine Operations Center, Pacific