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EOS IN THE NEWS



Undersea Discoveries

Jaya Roperez and Rochelle Wigley created seafloor maps of deep-sea trenches and a previously unconfirmed shipwreck on a recent cruise to the South Pacific



International Fellow

Erik Hobbie has been awarded two fellowships to conduct stable isotope research in China and Austria



NASA Launches Rocket in Search of Aurora Answers

Marc Lessard and UNH students developed six instruments to help measure ions and electrons associated with Alfvén waves



Branching Out: Novel Tree Syrups Could Make Forests, Farmers More Resilient

Heidi Asbjornsen and David Moore discuss the benefits of tapping multiple tree species



Think Cities Have Pothole Problems Now? Just Wait.

Jennifer Jacobs discusses the impacts of climate change on our roadways

HONORS, AWARDS, AND KUDOS

Congratulations to the Class of 2021 on your graduation! Best of luck on your path ahead.

Jennifer Jacobs was awarded the [2020 UNH Excellence in Research Award](#). Well done, Jennifer!

Graduate students Clarice Perryman and Alexandra Padilla were among the [2021-2022 recipients](#) of the prestigious Dissertation Year Fellowship. Congrats!

Giuseppe Masetti was [recently honored by NOAA](#) for his seafloor mapping efforts on the extended continental shelf. Nice work, Giuseppe!

Congratulations the following four students who have been awarded NASA Space Grant Summer Graduate Fellowships:

Clarice Perryman, NRESS
Advisor Dr. Ruth Varner,
Research Topic: Assessing the Temporal Variability and Environmental Controls of Microbial Mitigation of Peatland Methane Emissions

Haley Nolen, Molecular and Evolutionary Systems Biology
Advisors: Dr. Anissa Poleatewich and Dr. Tom Davis
Research Topic: Investigation of Beneficial Microbes to Promote Quinoa Cultivation in Space Agriculture

Emma M. Burkett, NRESS
Advisors Dr. Julia G. Bryce and Dr. Michael Palace
Research Topic: Through the Mist: Satellite Remote Sensing of Volcanic Ash with Ground-Truthed Ash Detection Modeling in the Aleutians

Logan Brown, Biochemistry
Advisor Dr. Krisztina Varga

Research Topic: Engineering a Highly Active Antifreeze Protein

UPCOMING SEMINAR

["Moving From STEM to STEAM - Using the Art of Storytelling in Science Communication to Breathe Life into Your Research Narrative"](#)

Speaker: Anne Jennison (Abenaki storyteller)

June 8, 4-5:30 p.m.

For students; space is limited

PREVIOUSLY RECORDED SEMINAR

[Celebrating Earth Day, Diversity, Hip-Hop, and Community Building](#)

NOTABLE OUTREACH

N.H. Sea Grant's annual Seaweed Mania! Workshops have gone virtual this year. [Watch these videos](#) to learn how to forage for seaweed and incorporate it into delicious meals.

MEETING SPACE AVAILABILITY

The School of Marine Science and Ocean Engineering is pleased to announce the availability of the UNH Pavilion for use by UNH organizations for meetings and small gatherings. The Pavilion is located at the Judd Gregg Marine Research Complex in New Castle, N.H.

The pavilion is open on three sides and has a beautiful southern view of the water. While primitive, there are plenty of picnic tables for seating, two propane grills, and overhead lighting. It is an ideal place to gather in person and remain socially distant. (Please note that all UNH COVID-19 guidelines must be followed.) You can learn about the Pavilion, its availability, and how to reserve by

visiting the [website](#). The Pavilion use is free of charge to UNH organizations. Reservations are required.

FAREWELLS

Farewell to Beket Tulegenov, who is leaving UNH. Best of luck in your next adventure, Beket!

Many of our friends and colleagues have chosen to retire in the near future, including Deb Brewitt, Bindy Camire, Jimmy Raeder, Jim Ryan, Faith Sheridan, Roy Torbert, Mark Twickler, and Mark Widholm. Wishing all of you a wonderful (and well-deserved) retirement, enjoy!

Please send any news items or suggestions for future Convergence content to Rebecca Irelan at rebecca.irelan@unh.edu.

Convergence is produced by the [Institute for the Study of Earth, Oceans, and Space](#).

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Undersea Discoveries

Researchers create seafloor maps around deep-sea trenches, shipwreck

Wednesday, May 26, 2021

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CCOM RESEARCHERS JAYA ROPEREZ AND ROCHELLE WIGLEY SPENT A MONTH ABOARD THE *DSSV PRESSURE DROP* TO MAP FASCINATING FEATURES ON THE SOUTH PACIFIC SEAFLOOR.

When scientists discovered the world's deepest-known shipwreck and explored the trenches in the lowest points of the ocean this spring, they relied on detailed seafloor maps created by UNH researchers to navigate around safely.

Jaya Roperez, a graduate student and marine surveyor at the [UNH Center for Coastal and Ocean Mapping](#), and Rochelle Wigley, the project director for the Nippon

Foundation / [General Bathymetric Chart of the Oceans \(GEBCO\) Training Program](#), spent a month aboard a ship near Micronesia and the Philippines, where they mapped the seafloor to help scientists explore three fascinating undersea features: Challenger Deep, the deepest point on Earth and part of the Mariana Trench; the Philippine Trench, the third-deepest point on Earth; and the previously unconfirmed wreckage of the USS Johnston, a WWII battleship from the Battle Off Samar that is the deepest-known wreck at about 6,400 meters — almost 4 miles — below the ocean surface.



Rochelle Wigley and Jaya Roperez worked long hours mapping the seafloor in the south pacific this spring.

The expedition took place aboard the DSSV Pressure Drop, a vessel owned by deep sea explorer Victor Vescovo. The ship carried with it a submersible vessel, the DSV Limiting Factor, capable of diving to 11,000 meters — almost 7 miles down — with a crew of two in its tiny cabin. At least 30 scientists and crew members took part in the overall expedition.

For Wigley, it was a golden opportunity to go to sea for the first time in almost a dozen years — and at a time when many other ocean scientists were hampered by COVID-19 travel restrictions. She and Roperez worked long overnight shifts, using cutting-edge multibeam echosounder technology to visually capture the seafloor features and create extremely detailed maps for the crew that would descend to the depths the following day.

The Challenger Deep and Philippine trench had been previously mapped by the DSSV Pressure Drop, but the team wanted to confirm the deepest points, particularly in the Western Pool region for the Challenger deep, where they wanted to land the submersible vessel.

While traveling between each dive site, Roperez and Wigley also surveyed during transits and collected additional data to help create charts of previously unmapped regions of the Pacific Ocean seafloor. To date, less than 20 percent of the world's oceans have been mapped. [The Nippon Foundation - GEBCO Seabed 2030 Project](#), with its ambitious goal of mapping the entire ocean floor by the year 2030, provided the financial support for Wigley and Roperez, through the alumni-led Map the Gaps Non-profit, to participate in this expedition, and the Project will receive the data they collected.

"We didn't want to waste the transits, because each little bit of data is like a puzzle piece that adds to the overall picture," Wigley says. "It was fascinating to be there when brand new data were collected, looking at all the changes across the Pacific Ocean like seamounts and incredibly deep trenches — the seafloor was incredibly variable. It was also really great to work with the team and the cutting edge technology onboard and to better understand the data collection processes."

For Roperez, this was her third mapping expedition aboard the Pressure Drop. In March 2019, she took part in a 24-day transit mapping trip from Capetown, South Africa, to Fremantle, Australia, during which they surveyed the deepest point in the Indian Ocean. Later that year, Roperez helped out with an 11-day transit mapping trip from Newfoundland, Canada, to Svalbard, Norway, to survey the deepest point in the Arctic Ocean.

What made this recent expedition unique and even more exciting, she says, was the discovery the USS Johnston, which scientists had previously suspected to be in that region but had not confirmed its presence.

"I initially told Victor (Vescovo) that it would be very hard to see the shipwreck just with the multibeam echosounder data alone, but that perhaps we could find clues from the backscatter, in my mind considering the wreck was in pieces on a soft-material seabed," Roperez recalls. "We ran over the suspected location multiple times in different directions and some survey lines picked it up — lucky us!" Vescovo then used the submersible vessel to dive on the shipwreck and found the bow, which confirmed that it was indeed the USS Johnston from the WWII Battle Off Samar in the Philippines, and was thus classified as the deepest-known wreck in the world.

"I'm really thankful to CCOM, Map the Gaps and Seabed 2030 for giving me these wonderful opportunities," Roperez says. "I consider myself so lucky to be able to map the deepest point on Earth and a previously undiscovered shipwreck, to see how they actually do the manned submersible dives and to be part of something great and worth reminiscing about when I'm older."

The [Institute for the Study of Earth, Oceans, and Space \(EOS\)](#) is UNH's largest research enterprise, comprising six center with a focus on interdisciplinary, high-impact

research on Earth and climate systems, space science, the marine environment, seafloor mapping, and environmental acoustics. With more than \$60 million in external funding secured annually, EOS fosters an intellectual and scientific environment that advances visionary scholarship and leadership in world-class research and graduate education.

- WRITTEN BY:

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CENTER FOR COASTAL & OCEAN MAPPING / NOAA JOINT HYDROGRAPHIC CENTER



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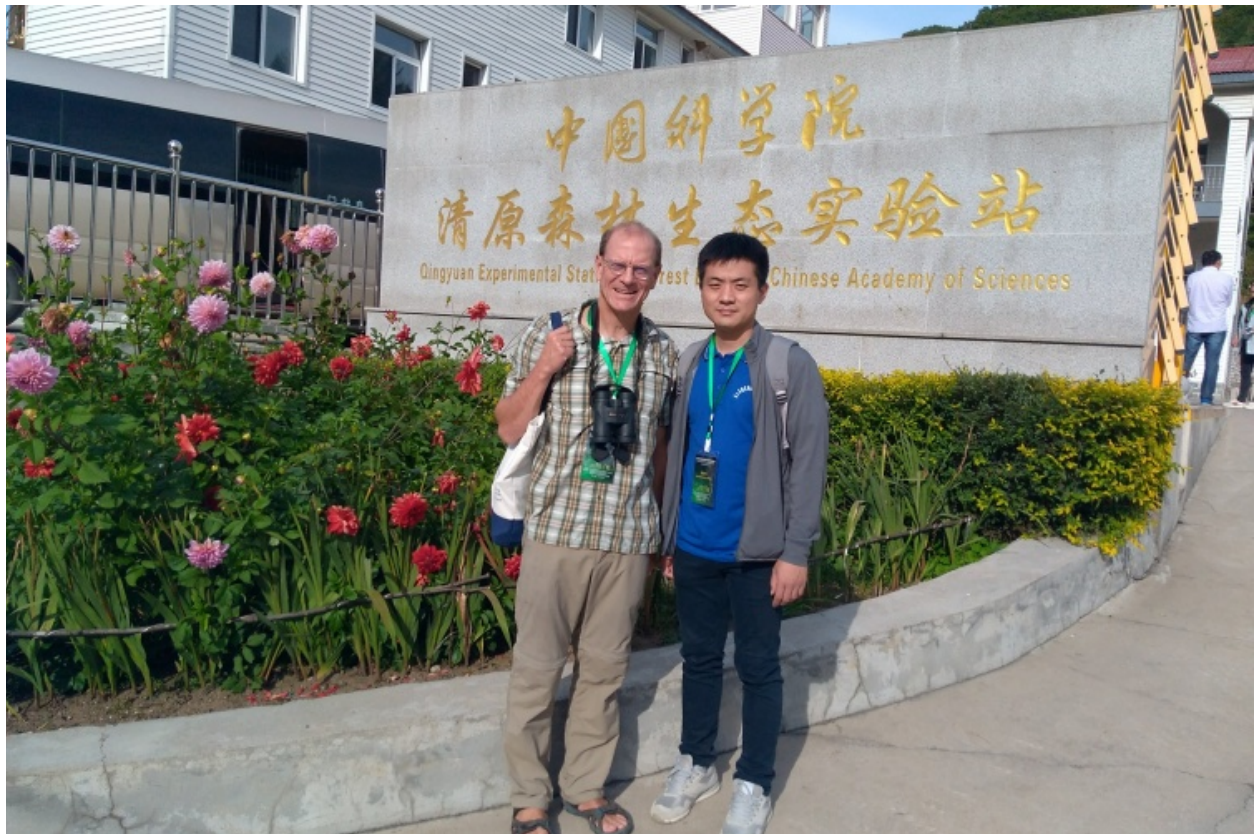
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International Fellow

Erik Hobbie receives two fellowships to study stable isotopes in China and Austria

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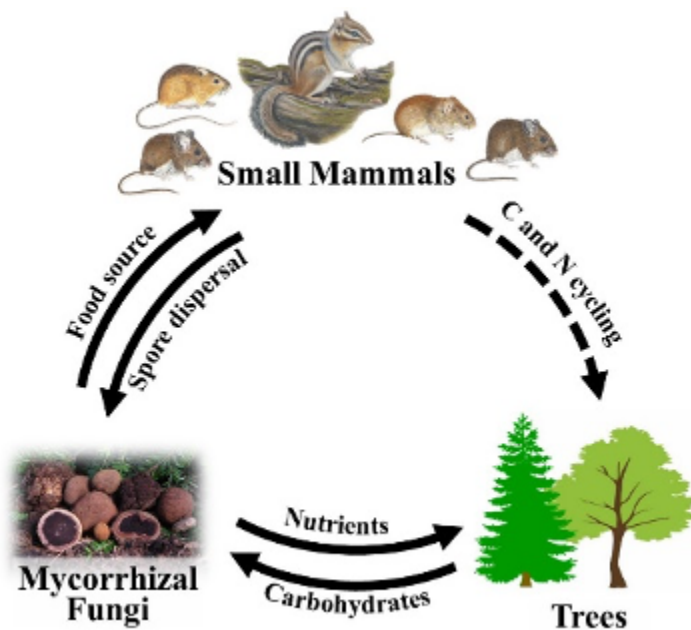
NO STRANGER TO INTERNATIONAL TRAVEL FOR HIS RESEARCH, ERIK HOBBIE STANDS NEXT TO A COLLEAGUE AT THE QINGYUAN EXPERIMENTAL STATION IN CHINA DURING A PREVIOUS FELLOWSHIP ABROAD.

Erik Hobbie, a research scientist in the [UNH Earth Systems Research Center](#), has been awarded two fellowships to continue his stable isotope research abroad in China and Austria.

The first fellowship will take place later this year at the Institute of Applied Ecology, a division of the Chinese Academy of Sciences in Shenyang, China. During his tenure, Hobbie will work with a team of colleagues and graduate students to assess changes in forests using stable isotope

technology, with a particular focus on how forests are responding to the high levels of nitrogen deposition in China. The fellowship is part of efforts by regional and national Chinese governments to promote foreign scholars to visit and to build connections for Chinese scientists to get international experience. Hobbie first visited Shenyang in 2018 during a [previous fellowship](#) at Kyoto University in Japan and has hosted three visiting scientists from China in the last four years.

“It’s an exciting time to be in China as the government is putting lots of resources into increasing their scientific capacity. They realize that their rapid development of the past 30 years is causing many environmental issues” Hobbie says.



INTERACTIONS AMONG
TREES, SMALL MAMMALS, AND SYMBIOTIC FUNGI. CREDIT: RYAN STEPHENS

Hobbie has also been awarded a Fulbright Fellowship to work at the Natural History Museum in Vienna, Austria, from March - June, 2022. While there, he will study how small mammals help to maintain healthy forest ecosystems through eating and dispersing fungi, like mushrooms and truffles. Trees rely on these fungi to obtain nutrients and in return supply the fungi with sugars. These fungus-root relationships are damaged by the high levels of nitrogen deposition recently experienced in China and that began to increase in Europe after World War II. The museum’s mammal collections go back to the 1930s, when nitrogen deposition levels were low. These specimens will be used by Hobbie to test how diets of mushroom-eating mammals may have changed in response to rising levels of nitrogen deposition in European forests. The mammals’ diets can be assessed by measuring isotopic ratios of carbon and nitrogen in hair samples, specifically in essential and non-essential amino acids of the hair protein. This research builds from ongoing collaborations of Hobbie with UNH mammologist Becca Rowe and post-doctoral associate Ryan Stephens.

"During the Fulbright, I will also be working closely with a research group at the University of Natural Resources and Life Sciences in Vienna, as they have the expertise to do the compound-specific measurements on amino acids that we can't do at UNH. The Fulbright will be a unique opportunity to use museum specimens as a window into the past to answer ecological-scale research questions that link trees, symbiotic fungi, and small mammals."

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University of New Hampshire

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