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IN THE NEWS



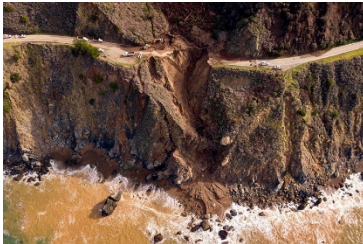
Stormy Weather

Banafsheh Ferdousi was awarded \$800,000 from NASA to study space storms



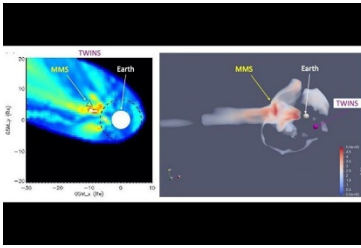
Can You Hear Me Now?

Jennifer Miksis-Olds co-authored new research published in *Science* on the impacts of human activity on ocean soundscapes



Texas Blackouts Point to Coast-to-Coast Crises Waiting to Happen

Jennifer Jacobs weighs in on the fragility of the nation's roads



Heated Particle Highway to Earth

Amy Keesee's research based on NASA's TWINS data reveals the transportation structure of charged particles from the sun



Warming Waters Cause Increase in Invasive Green Crabs

Jennifer Dijkstra, Nathan Furey, and Gabriela Bradt are studying the impacts of climate change on marine species

KUDOS

ESRC graduate students Jack Hastings and David Moore were jointly awarded the Graduate Student of the Year Award by the Granite State division of the Society of American Foresters. Congratulations, Jack and David!

SEMINARS

[Forest Ecosystems and the Winds of Change: Forests as a Cog in the Earth's Climate System](#)

Speaker: Scott Ollinger, Professor of Ecosystem Ecology and the Director for the ESRC

March 3, 2-3 p.m.

Part of the Ecological Landscape Alliance Conference

[Flux Transfer Events in Mercury's Magnetosphere](#)

Speaker: Weijie Sun, Research Fellow, Department of Climate and Space Sciences and Engineering - University of Michigan - Ann Arbor

March 3, 3-4 p.m.

Part of the 2021 Space Science Seminar Series

[Demystifying the Scholarly Publishing Landscape](#)

Speakers:

Patti Condon, Assistant Professor, Research Data Services - UNH Library

Eleta Exline, Associate Professor, Scholarly Communication - UNH Library

Emily Poworoznek, Associate Professor, Engineering and Physical Sciences - UNH Library

March 3, 3:10-4:30 p.m.

Part of the RCR Spring 2021 Seminar Series

Partitioning Sources of Soil Respiration in Thawing Permafrost Using Carbon Isotopes

Speaker: Elaine Pegoraro, Postdoctoral Scholar, Soil Biogeochemistry and Climate Change - Lawrence Berkeley National Laboratory

March 4, 3:40 p.m.

Part of the [Chapman Colloquium](#) in the Earth Sciences Department

[The Impact of Noise on Auditory Perception, and a Unique Sensory Solution](#)

Speaker: Norman Lee, Assistant Professor of Biology - St. Olaf College

March 9, 12-1 p.m.

Part of the Environmental Acoustics Seminar Series

[Communicating with Policy Makers](#)

March 9, 12:40 – 2 p.m.

Part of the UNH Research Communications Academy

[New Faculty at UNH](#)

Speakers:

Nathan Laxague, Assistant Professor of Ocean Engineering

Lindsey Williams, Senior Fellow of Coastal Policy and Engagement for N.H.

Sea Grant/SMSOE

March 16, 3-4 p.m.

Part of the SMSOE Seminar Series

How Plate Tectonics Drove Continental Climate Change in Australia

Speaker: Beth Christensen, Professor and Environmental Science Founding Chair - Rowan University

March 18, 3:40 p.m.

Part of the [Chapman Colloquium](#) in the Earth Sciences Department

[Machine Learning Algorithms for Geomagnetically Induced Currents in Alaska and New Hampshire](#)

Speaker: Amy Keese, Associate Professor of Physics and Astronomy - UNH

March 24, 3-4 p.m.

Part of the 2021 Space Science Seminar Series

Rivers Flow Not Past, But Through: A Fluvial Perspective on Earth's Carbon
Speaker: Mark Torres, Assistant Professor, Department of Earth,
Environmental, and Planetary Science - Rice University
March 25, 3:40 p.m.
Part of the [Chapman Colloquium](#) in the Earth Sciences Department

Previously Recorded

[Celebrating Women Ocean Mappers and Their Stories](#)

Speakers:

Josie James, Portsmouth-based author
Florencia Fahnestock, Research Scientist in ESRC
Elizabeth Weidner, Ph.D. student in CCOM

[Creating Better Posters](#)

Speaker: Zen Faukes
Part of the UNH Research Communications Academy

STUDENT SUMMER OPPORTUNITIES

[2021 NASA Planetary Science Summer School](#): Applications open through
April 1.

[2021 N.H. Sea Grant Doyle Fellowship](#): Priority applications due March 12.

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

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Stormy Weather

Research scientist awarded \$800,000 by NASA to study space storms

Wednesday, February 24, 2021



Banafsheh Ferdousi, a research scientist in the [UNH Space Science Center](#), has received approximately \$800,000 from NASA to study space weather that impacts our technology and infrastructure here on Earth.

The four-year grant is part of NASA's [Living With A Star Program](#), whose mission is to learn more about the variabilities in the sun that affect Earth and our solar system.

Ferdousi's research focuses on space magnetic storms caused by the solar wind that can generate electrical currents here on Earth — these are called geomagnetically induced currents, or GICs. GICs can travel through long conductors like railroads, power lines and underground pipelines, wreaking havoc as they move through them. Scientists are seeking ways to more accurately forecast GICs to help mitigate their impacts to technology and infrastructure.

"With this research, we'll be able to model the disturbance all the way from the solar wind to the ground."

With this grant, Ferdousi and researchers at the University of Alabama, Huntsville will use a computer model that simulates our planet's magnetosphere, ionosphere, and thermosphere to determine deviations in the Earth's magnetic field on the ground. She plans to link this information together with magnetotelluric data that describes underground electrical conductivity to form a more complete picture of potential GIC paths across the U.S.

"Geomagnetic storms are not rare events; they happen all the time," Ferdousi says. "We've been lucky that many of the most extreme storms occurred during a time when we were less dependent on technology." For example, she explains, in 1859, the most powerful geomagnetic storm to date disrupted telegraph systems — the only technology that spanned the globe at that time. In 2012, satellites around the sun detected a coronal mass ejection comparable in size to that of the 1859 event, but it ejected away from the Earth. Had it aimed at our planet instead, the National Academy of Sciences estimated that it would have caused widespread power outages and had a significant economic impact.

Ferdousi is confident that scientists can help power companies prepare for such events. "Just as we produce weather forecasts, we can also produce space weather forecasts based on measurements of the solar wind and the magnetosphere," she says. "With this research, we'll be able to model the disturbance all the way from the solar wind to the ground."

[The UNH Institute for the Study of Earth, Oceans, and Space](#) is UNH's largest research enterprise, comprising six centers 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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GRANTS AND CONTRACTS NEWS



University of New Hampshire

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Can You Hear Me Now?

Research indicates oceans need healthy soundscapes

Thursday, February 4, 2021

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JENNIFER MIKSIS-OLDS, DIRECTOR OF THE UNH CENTER FOR ACOUSTICS RESEARCH AND EDUCATION, IN THE FIELD CONDUCTING ACOUSTIC RESEARCH TO DEVELOP A DEEPER UNDERSTANDING OF THE EFFECT OF HUMAN ACTIVITY ON SOUNDSCAPES IN THE WORLD'S OCEANS.

Since the beginning of the Industrial Revolution, the world's oceans have become substantially busier and noisier. Increased shipping, fishing and recreational crafts are just a few ways in which humans and their inventions have added to the noise levels.

New research indicates this escalation in sound can potentially have negative impacts on the ocean soundscape upon which marine life and its ecosystems rely. UNH scientists are part of the international team exploring possible solutions to reduce that noise and return the soundtrack of the healthy ocean.

"[This work] identifies ocean users that have already made a positive, progressive difference in addressing the challenge and proposes action that will guide future ocean users to being sound environmental stewards."

"What is unique about this work is that it goes beyond just pointing out and describing the societal concern of rising sound levels," said Jennifer Miksis-Olds, research professor and director of UNH's [Center for Acoustics Research and Education](#). "It identifies ocean users that have already made a positive, progressive difference in addressing the challenge and proposes action that will guide future ocean users to being sound environmental stewards."

The [paper](#), published in the journal *Science*, brought together a global team of researchers to look at how changing ocean soundscapes affect wildlife, from invertebrates to whales. They gathered, assessed and consolidated evidence from more than 10,000 papers that see how anthropony, or sounds generated by humans, can potentially adversely affect marine animals at multiple levels, including their behavior, physiology and, in extreme cases, survival.

"Underwater soundscapes are not an aspect of the ocean that people naturally relate to because humans are visual creatures, but sound is the dominant sensory mode for life underwater, and the masking of biologically significant sounds by elevated sound levels can be detrimental to the health of ocean creatures," said Miksis-Olds.

Climate change is also a contributor to the deterioration of marine habitats, such as coral reefs, seagrass meadows and kelp beds, and has further silenced their characteristic sound — the soundtrack of a healthy ocean — that guides the larvae of fish and other animals home. It is no longer audible for many ecosystems and regions. The paper highlights new knowledge gained during the human lockdown under COVID-19 as evidence for the potential rapid recovery of ocean soundscapes when human activity is reduced.

"The deep, dark ocean is conceived as a distant, remote ecosystem, even by marine scientists," said Carlos M. Duarte, professor of marine science at King Abdullah University of Science and Technology (KAUST) and lead author. "However, years ago as I was listening to a hydrophone recording acquired off the U.S. West Coast, I was surprised to hear the clear sound of rain falling on the surface as the dominant sound in the deep-sea ocean environment. I then realized how acoustically-connected the ocean surface, where most human noise is generated, is to the deep sea; just 1,000 meters, less than 1 second apart!"

The researchers hope this study inspires management to increase actions to mitigate the impacts of noise from humans and their activities on soundscapes. They identify a number of options, like regulating speed and noise in major shipping routes as well as reducing the emissions of chemical pollutants and greenhouse gases, which they say could have

immediate effects and allow marine animals to reestablish their use of ocean sound as a central ecological trait in a healthy ocean.

The [Institute for the Study of Earth, Oceans, and Space \(EOS\)](#) is UNH's largest research enterprise, comprising six centers 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.

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INSTITUTE FOR THE STUDY OF EARTH, OCEANS, AND SPACE (EOS)



University of New Hampshire

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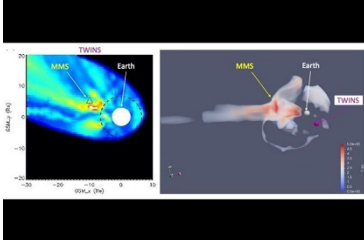


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Heated Particle Highway to Earth



Amy Keesee's research based on NASA's TWINS data reveals the transportation structure of charged particles from the sun

Read about it online in NASA's blog [The Sun Spot](#)



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Jennifer Dijkstra, Nathan Furey, and Gabriela Bradt are studying the impacts of climate change on marine species

Read the article online in the [Union Leader](#)