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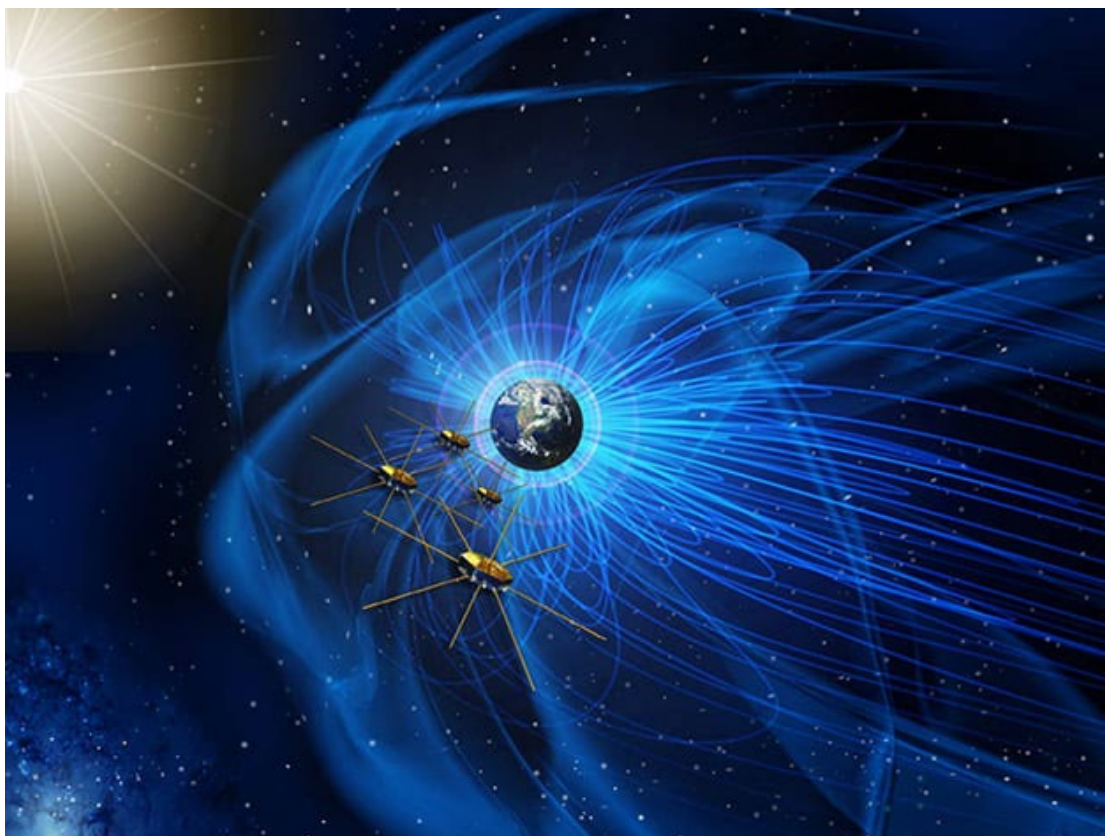


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## EOS IN THE NEWS

### [UNH Space Scientist Secures Four Research Grants Totaling \\$1.2M](#)

Argall to study space energy transfer and create 3D space visualizations for K-12 students



### [As N.H. Sea Levels Rise, Historians Are In A Race Against Time](#)

Meghan Howey and Michael Routhier are trying to document early historical

sites on the Seacoast before they are washed away.



## PHOTO FEATURE

Continuing CCOM's game of "Where is Larry now?" — Larry Mayer recently served as the Distinguished Alumni Keynote Speaker for the commencement ceremony at Scripps Institution of Oceanography.



## RECENT EVENTS

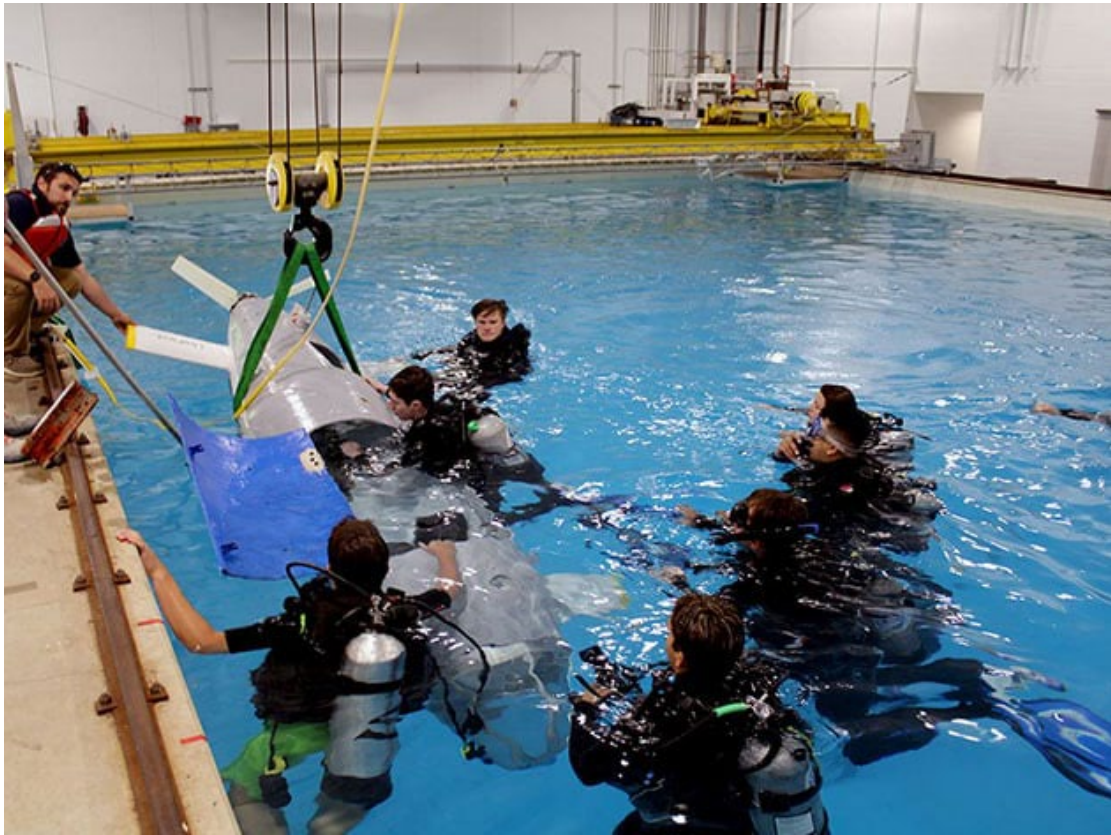
In early June, UNH hosted its one-week [Marine Acoustics Short Course](#) run by Tony Lyons, Associate Director for Research in our Center for Acoustics Research and Education, and Research Professor in CCOM. Guest speakers gave lectures and demonstrations that provided a comprehensive introduction to a broad array of both fundamental and advanced topics in marine acoustics, sonar systems and signal processing used in these systems. Thanks to all the speakers and attendees for making this year's short course a success!



On June 16, our **JEDI-EOS (Justice, Equity, Diversity, and Inclusion)** team had about 20 students from different undergraduate programs across EOS enjoying breakfast and visiting the labs of OPAL, ESRC, and SSC for Morse Hall tours. One of the highlights was the ultrasonic scavenger hunt led by Gabe Vanegas from CARE: with the help of a spectrogram app, the students were chasing through the building to decode a 'secret' ultrasonic message transmitted by hidden MP3 players. Thanks to everyone who organized, presented, and attended.



The student team at Sanborn Regional High School Submarine Group visited UNH's Ocean Engineering tank last week to test out the submarine that they have been refurbishing for the upcoming International Submarine Races in Washington, D.C. These scuba-certified students were given a tour of the facilities by UNH Marine Science researchers before testing their sub in our tank. Photo by Sarah Bufano.



*Please send any news items or suggestions for future Convergence content to Rebecca Irelan at [rebecca.irelan@unh.edu](mailto:rebecca.irelan@unh.edu).*

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# UNH Space Scientist Secures Four Research Grants Totaling \$1.2M

**Argall to study space energy transfer and create 3D space visualizations for K-12 students**

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Sunday, June 25, 2023



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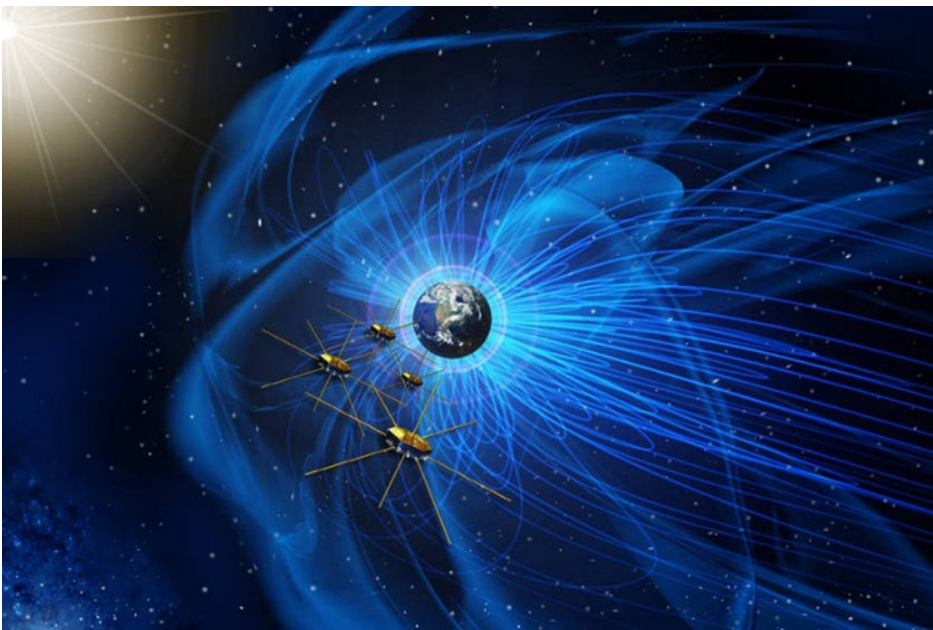


PHOTO BY: NASA

A physicist with the [UNH Space Science Center \(SSC\)](#) has been selected to lead two research projects and will co-lead two additional projects to study space energy transfer and to create three-dimensional space visualizations for K-12 students. UNH will receive approximately \$1.2 million for its role in these four projects.

[Matthew Argall](#), an assistant research professor of physics in the SSC, is the principal investigator on a NASA-funded project titled, “Enhancing visualizations for public relations and outreach using [Magnetospheric Multiscale Mission \(MMS\)](#) reconstructions of magnetic reconnection.” The MMS Mission, in which UNH faculty, engineers and scientists (including Argall) played prominent roles, produced first-of-its-kind 3D measurements of space plasma processes and magnetic reconnection — when the magnetic field lines in the Earth’s magnetosphere break or merge with other field lines from the sun and release huge amounts of energy, causing space weather storms that produce beautiful displays of Northern Lights, but can also interfere with our technology. With this new funding, Argall will use these 3D data from MMS to create virtual reality simulations of the outer space environment to help teach the next generation about energy in space. Argall will support a UNH post-doctoral researcher and collaborate with colleagues from the [UNH Data Visualization Research Laboratory](#) on this project.



**MATTHEW ARGALL (CENTER) WILL STUDY SPACE ENERGY TRANSFER AND CREATE 3D SPACE VISUALIZATIONS IN FOUR NEW RESEARCH GRANTS TOTALING \$1.2M.**

“This research project will help fulfill a long-standing goal of mine to bring space closer to home for a more immediate impact on my community,” he says. “I am excited for my son to try on the VR headset, play with space plasmas, and learn about magnetic reconnection in a way kids learn best: by exploring.”

Argall was also selected to lead a project titled, “The evolution of kinetic entropy and its connection to energy transfer in



fundamental processes,” with funding provided by a NASA Heliophysics Guest Investigator award. By applying a newly developed theory of entropy — how ordered or disordered space plasmas are — to the data amassed by NASA’s MMS Mission, this new project will help scientists better understand the powerful forces of energy transfer that occur in our near-space environment and that can affect astronauts in space and technology here on Earth. This project will also support a UNH graduate student, and will be conducted in collaboration with colleagues from West Virginia University and the University of Maryland.

“Studying entropy with MMS is exciting because it is a fundamental parameter but normally thought of as a state variable, meaning it describes an entire system,” says Argall.

“MMS, however, is a tiny point within the systems it was designed to study. Our recent theoretical work developed local measures of entropy that we can study with MMS. With this new project, we will use entropy to make fundamental discoveries of energy transfer during magnetic reconnection.”

Related to this topic of entropy and energy transfer, Argall is a co-principal investigator on two additional research grants:

“Understanding energy conversion in magnetotail reconnection using kinetic entropy,” funded by the NASA Early Career Investigator Program; and “Energy Conversion Beyond the First Law of Thermodynamics in Non-Equilibrium Plasmas,” funded by the National Science Foundation (NSF) Magnetospheric Physics. Argall will collaborate with colleagues from West Virginia University and the University of Maryland on these projects as well.

The [UNH 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 approximately 100 principal investigators managing more than 400 individual grant awards, and with annual expenditures exceeding \$77 million, EOS fosters an intellectual and scientific environment that advances visionary scholarship and leadership in world-class and graduate education.

**WRITTEN** [Rebecca Irelan](#) | Institute for the Study of Earth,

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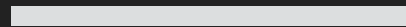
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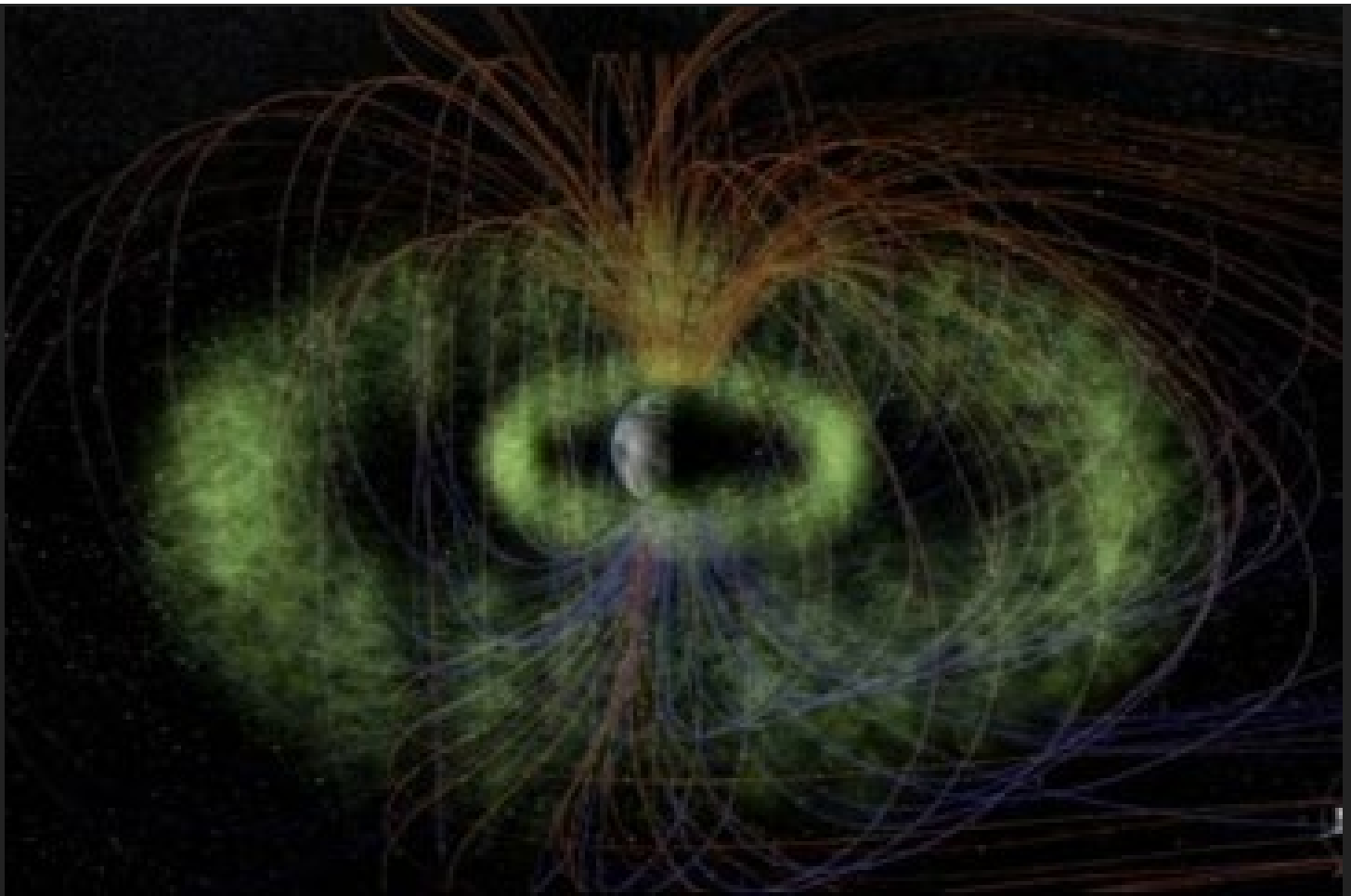
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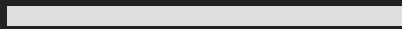
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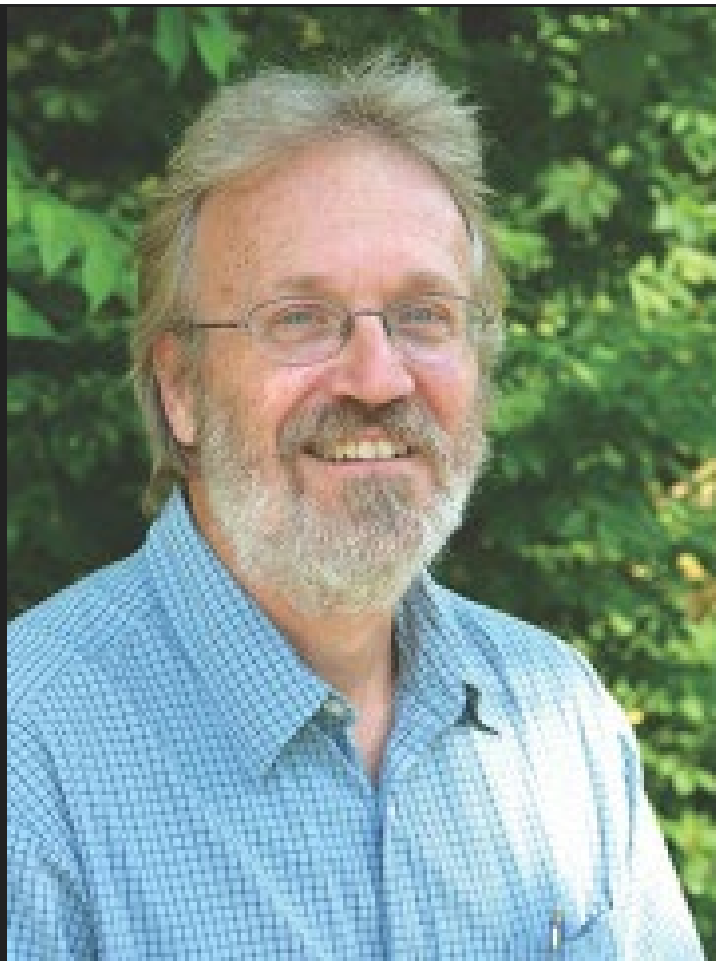




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