

# Transforming Students Into Climate Leaders

Three programs provide research opportunities in Arctic, Andes

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STUDENT RESEARCHERS WILL STUDY ARCTIC SWEDEN'S THAWING PERMAFROST, THANKS TO ONE OF THREE NATIONAL SCIENCE FOUNDATION GRANTS THAT SUPPORT INTERNATIONAL RESEARCH EXPERIENCES. PHOTO BY RUTH VARNER.

The next generation of climate science researchers is getting its start at UNH, thanks to three new initiatives that will engage students with international research experiences at global flashpoints of our changing climate. The projects, all funded by the National Science Foundation (NSF), will send undergraduates, graduate students and faculty mentors from UNH, minority-serving institutions (MSIs) and international research centers to Sweden, Finland and Ecuador.

“As we’ve seen at the United Nations climate change conference in Glasgow, young people are uniquely engaged with issues related to climate change,” says [Julie Bryce](#), professor of Earth sciences and principal investigator of one of the grants. “These projects provide students with real-world opportunities to partner with international teams steering field and research projects geared toward documenting impacts of climate change. Their research will be valuable to help protect vulnerable populations and lands.”

**“These new student-centered research programs help our collective efforts to transform students into leaders in the study of our changing Earth system.”**

Bryce, who is also interim director of UNH’s [Leitzel Center](#), will lead a project called International Collaborative Experiences to Track Arctic Lake Systems, or ICE-TALKS. Funded with a nearly \$300,000 grant from NSF’s International Research Experiences for Students (IRES) program, ICE-TALKS will provide research opportunities in Sweden and Finland for nine UNH graduate students and nine undergraduate students from partnering MSIs. While the overarching goal of the project is to develop consistent observations of how Arctic lake systems are changing under thawing conditions, ICE-TALKS will also build students’ research skills — and enthusiasm — for understanding the role of climate change on our Earth.

“Research indicates that climate and environmental change are accelerating at these high latitudes, resulting in permafrost thaw,” says Bryce. “Documenting these changes, especially in lake environments that form when permafrost thaws, is essential to understand and predict the impact of climate change.” [Ruth Varner](#), professor of Earth sciences, and [Jessica Ernakovich](#), assistant professor of natural resources and the environment, are UNH collaborators on ICE-TALKS.

A second project, also funded by NSF IRES for nearly \$400,000, will take 18 UNH undergraduate and graduate students to the mountains and rainforests of Ecuador to explore that region’s water-related challenges from both science and policy perspectives. [Heidi Asbjornsen](#), professor of natural resources and the environment, leads the project, called the Andean-Amazonian Watershed Experience: Exploring Sustainability of Mountain Ecosystems in Ecuador, or AWESOME.



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ECUADOREAN ANDES, WHERE STUDENT RESEARCHERS WILL EXPLORE WATER-RELATED ISSUES. PHOTO COURTESY OF HEIDI ASBJORNSEN.

“The Andean-Amazonian region of Ecuador is experiencing a range of pressing water-related issues and policy responses, making it an ideal landscape for engaging students in international research experiences,” says Asbjornsen. “As our world becomes increasingly globalized and interconnected, providing opportunities for U.S. students to engage in international research and cultural exchange is essential to creating a globally aware and skilled workforce capable of tackling the challenges of the future.” In addition to Asbjornsen, UNH faculty members [Bill McDowell](#), professor of natural resources and the environment, [Tom Safford](#), associate professor of sociology, and [Catherine Ashcraft](#), assistant professor of natural resources and the environment, are co-investigators, along with Shadi Atallah of the University of Illinois.

When the ambitious EMergent Ecosystem Response to ChanGE, or [EMERGE](#), institute launched at UNH last year with a \$3.6 million NSF grant, it promised a research training component for early career researchers. EMERGE is currently recruiting 30 undergraduate and post-baccalaureate students for [paid research experiences](#) in the summers of 2022, '23 and '24, says Varner, who co-directs the multi-institution EMERGE and is a researcher in the [Earth Systems Research Center](#) of UNH's [Institute for the Study of Earth, Oceans, and Space](#). Students will develop projects that investigate how a rapidly warming Arctic is transforming permafrost peatlands into wetlands and will travel to Arctic Sweden to conduct their research.

“Being able to predict how ecosystems respond to climate change is a pressing societal need,” Varner says. “It’s imperative that we train the next generation of scientists to work across disciplines to tackle the complex research questions that face our world today.”

UNH scientists involved in EMERGE include [Steve Frolking](#), research professor in Earth sciences; [Michael Palace](#), associate professor in Earth sciences; and Ernakovich. Those involved in planning and implementing the early career researcher training programs are [Florencia Fahnestock](#), research scientist in Earth sciences (co-director of the EMERGE research experiences for undergraduates, or REU); [Melissa Aikens](#), assistant professor in biological sciences; [Kate Siler](#), program coordinator of UNH ADVANCE; and [Erik Froburg](#), education and outreach specialist, UNH’s [Leitzel Center](#).

“Hands-on research experiences and cultural exchanges help students to see the world and themselves in new ways,” says Ernakovich, who is involved in all three programs. “These new student-centered research programs help our collective efforts to transform students into leaders in the study of our changing Earth system.”

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