

# DEEPS

## Dispatch

The Newsletter of the  
Department of Earth,  
Environmental &  
Planetary Sciences

Judd A. and Marjorie Weinberg College of Arts  
and Sciences, Northwestern University | 2025

# A Message From The Chair



the Environmental Sciences Program with the Department of Earth and Planetary Sciences, we are bringing diverse scientific approaches towards understanding and solving some of the biggest challenges on our finite planet. The power of integrating across these disciplines is illustrated by recent dissertations predicting rainfall-triggered landslides, querying subsurface microbial function, and investigating how chemical weathering contributes to climate regulation. We are welcoming dozens of current environmental science majors to

their new departmental home, where they are finding familiar faces amongst our faculty. Matthew Hurtgen chaired our department, through pandemic restrictions and retirements, to this pivotal point. Yarrow Axford, Trish Beddows, Maggie Osburn and Rosemary Bush expended hard work that finalized the real-life existence of DEEPS. We hope you will enjoy reading about DEEPS research and educational endeavors here, in this newsletter, and do check out uplifting updates from our alumni; it's encouraging to see all the great and varied things our alums are doing in the world.

Welcome to the inaugural newsletter of Northwestern's Department of Earth, Environmental, and Planetary Sciences (DEEPS)! By integrating

## Suzan van der Lee

## DEEPS Dispatch 2025

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Edited by Yarrow Axford with layout design from  
Iliana Garner (BA '26)

Cover Photo: Bailey Nash (M.S. '25) admires a glacial valley in south Greenland, where DEEPS researchers cored a lake to reconstruct Holocene paleoclimate.  
*Photo by Grace Schellinger.*

*Congrats to PhD student Tirzah Abbott for winning the contest to name our newsletter!*

**We appreciate photo contributions from alumni, faculty, students, and all members of the DEEPS community.**

**Send images to**  
[deeps@northwestern.edu](mailto:deeps@northwestern.edu).

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**"We're all doing this to protect nature and learn more about it, and you really have to embrace that when you're doing fieldwork."**

*-Bela Filstrup (BA '26)*



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Learn about what our faculty members are up to.

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## Greetings from **The DEEPS Office**



Assistant Professor  
Elvira Mulyukova  
and her husband  
Boris Gutman  
welcomed Anton  
in 2024. *(Above)*

### Meet our **Budding Scientists**

Graduate student Albert  
Kabanda and his wife  
Esther welcomed Cheyenne  
Nabbanja in 2025. *(Above)*

## Welcome, **New Faculty**



**Dr. F.  
Gianluca  
Sperone**

Dr. F. Gianluca Sperone joined us as a temporary Lecturer in 2025 to teach spatial data analysis and geographic information systems (GIS) – infinitely useful skills for earth, environmental, and planetary scientists. Gianluca has degrees in geology, geography, and civil engineering, and expertise at the intersections of human health and the environment. His PhD work at Wayne State University in Detroit examined aging drinking water infrastructure.



## Dr. Wesley Scott

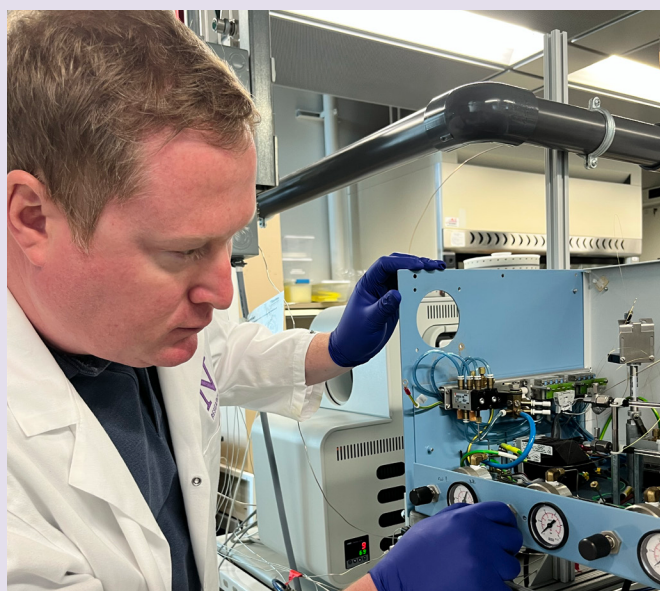
analyzed materials ranging from lake waters and sedimentary leaf waxes to ancient puma bones and modern fish tissue. His postdoctoral research at Carnegie Mellon pursued novel methods for detecting poly/perfluorinated alkyl substances (PFAS), which are a widespread health concern. His PhD work at the University of Pittsburgh used organic biomarkers in lake sediments to reconstruct Holocene environmental changes in Patagonia, Chile, over the last two millennia.

He brings a can-do attitude to everything from fixing finicky lab instruments to field work. We are delighted that Wes is part of our community.

We welcomed Dr. Wesley Scott to DEEPS in Fall, 2023. As a Research Assistant Professor and the operational director of the NU Stable Isotope Biogeochemistry Lab (NUSIBL), Wes keeps the many instruments in our department's complex stable isotope lab running, ensures that the lab is producing excellent data, and provides expert guidance for students in producing stable isotope measurements for their research. He also teaches a hands-on course on Stable Isotope Methods that provides students with unique opportunities to prepare diverse isotope samples and to grapple with real-world data.

"Working with students, seeing what our students go on to do, that's my favorite part of the job," he says. And what is his favorite instrument in our extensive stable isotope lab? "That would just be the one that's working the best at any moment in time," he quips.

Wes arrived at Northwestern with diverse experience in analytical geochemistry, having



# Faculty Highlights

### YARROW AXFORD

celebrated milestones for her research group. Pete Puleo (PhD '24) began as an assistant professor at Univ. Wisconsin-Whitewater, and Laura Larocca (PhD '21) at Arizona State Univ. Current grad students are on a roll: Mia Tuccillo was funded by NSF to investigate

climate change impacts on water sources in a Greenland town. Aidan Burdick is reconstructing abrupt warming at the start of the Holocene in New England and presented at AGU and AMQUA. Bailey Nash (MA '25) received an NSF graduate fellowship to assess whether arctic lakes might shrink in a warming

climate. Shayna Garla (BA '24) started a PhD program at Syracuse. Sophia Liu's (BA '24) microscopy skills generated amazing data. And David Drinko (BA '25) is heading to grad school at Ohio State. The group cored lakes in Arctic Canada, Greenland, Illinois, Wisconsin, Maine, and Vermont since the last newsletter. In personal news, Yarrow is relocating to Boston with her family, but she cherishes continued DEEPS friendships and collaborations.

### PATRICIA BEDDOWS

led the latest offering of the powerful Yucatán Peninsula immersive learning excursion in March 2024 (see article on page 11).



Her open-source “Cave Pearl” data logger project continues to gain strength, through problem-based learning in EARTH 360 (Fall 2023), and the project page reaching 1 million users in 2024. Trish is expanding her global reach, with the welcome of PhD student Maria Villareal in Fall of 2023. Maria is investigating submarine groundwater discharge, using Guam as a natural laboratory. Summer of 2024 featured a field campaign on Guam, with 50 Cave Pearl loggers deployed by Maria, and a workshop by Trish and Maria at the University of Guam teaching construction/coding/calibration of research-quality, robust environmental temperature loggers.

#### EMERITUS CRAIG BINA

retired to Emeritus status in August 2024. While no longer regularly teaching classes, Craig continues to pursue research. Current projects, in collaboration with colleagues at Charles University in Prague, include the nature of deep seismicity beneath northeast China and the role of volatiles in controlling Hellenic subduction seismicity. Results were presented at conferences in Austria, France, Greece, and Massachusetts in 2024. That summer, Craig also joined alumnus Jeremy Fein

(professor at Univ. of Notre Dame) on a field trip to the Sudbury impact structure in Ontario. Craig continues to serve on an editorial board for the Japan Geoscience Union and on an International Advisory Board for the Czech Academy of Sciences.

#### NEAL BLAIR

shares that Annie Edwards (BA '25) has been working on the organic geochemistry of Sangamon, Illinois, floodplain soils to understand the fate of eroded soil carbon on an agricultural landscape. She presented posters at an NSF-sponsored Critical Zone Network program workshop and the Fall 2024 AGU meeting.

#### DANIEL HORTON

and his Climate Change Research Group (CCRG) continue to pursue interdisciplinary and often policy-relevant Earth and environmental science research. PhD candidate Victoria Lang leads the group's urban air quality research, while PhD student Ann Sinclair investigates precipitation uncertainties in the context of landslide triggering. The CCRG graduated two more PhD's, Stacy Montgomery ('23), now a research scientist at Crosswalk Labs, and Chuxuan Li ('24), now a postdoc at UCLA. Former PhD Howard Chen

(PhD '22) was appointed assistant professor at Florida Tech. Postdoc Sara Camilleri (postdoc '22-24) recently departed to a consulting role at Ecostack Innovations, while former postdocs Ryan Harp (postdoc '20-21) and Jordan Schnell (postdoc '17-19) were promoted to research scientist positions at NOAA. Former CCRG undergrad researchers are too numerous to highlight, but one notable achievement is Christopher Callahan's recent appointment as assistant professor at the Univ. of Indiana. The CCRG recently won two grants from the Health Effects Institute, both focused on the study of urban transport emissions, air pollution, and the distribution and equity of associated impacts.

#### MATT HURTGEN

is excited to devote more of his time and energy to research after six eventful years as chair of the department. This includes returning to his scientific roots and investigating the role of sulfur in regulating the global carbon cycle within the low-sulfate oceans of the geological past. Informed by sulfur isotope patterns observed in modern lakes, his research seeks to clarify the significance of sulfur cycle disruptions and their links to environmental change in Cretaceous greenhouse climates. Stay tuned! Excitingly, Niloufar Sarvian (PhD '23), co-advised by Andy Jacobson and Maggie Osburn, successfully defended her dissertation exploring the relationship between Neoproterozoic ocean chemistry and the Sturtian Snowball Earth event. She has accepted a position as science lead at Quadrature Climate Foundation. Grad student Luca Podrecca (PhD '25), advised by Brad Sageman, published a manuscript investigating the relationship between rapidly changing environmental conditions and the sulfur isotope composition of pyrite and organic sulfur extracted from a Pleistocene-Holocene-aged sediment core recovered from coastal Scotland.

## STEVE JACOBSEN

leads a group that combines mineralogy with materials science and physical chemistry to understand the behavior of materials in extreme environments. As part of NASA's Project Artemis, grad students Laura Gardner (PhD '25) and Tirzah Abbott are working with scientists at Marshall Space Flight Center and the Austin TX startup, ICON technology Inc., to develop off-world construction technology with new simulants of the lunar regolith. In 2024, Tirzah organized the 4th Annual Women in Microscopy Conference, attracting 250 online attendees from over 30 countries. With support from DOE-NNSA, Hannah Bausch (PhD '25) completed her fourth experiment on the Z machine at Sandia National Labs, concluding a 5-year campaign using pulsed power to determine the behavior of iron oxides reaching P-T conditions beyond the center of the Earth. Hannah's work tests theories about ultra-low velocity zones at the core-mantle boundary and contributed to new experimental methods now employed by the NNSA labs. Steve collaborated with Prof. Rotta Loria (NU CEE) on electrodeposition of carbonates from seawater to cement loose sands, with applications to coastline restoration.

## ANDY JACOBSON

leads a lab that welcomed new members, including postdoc Chris Parendo, PhD students Katherine Almquist and Matt Semel, and undergrad majors Jonathan Chen and Rose Carlson. Agouron postdoctoral fellow Anna Waldeck is investigating the Ca, Sr, and clumped isotope systematics of whiting events in Fayetteville Green Lake. PhD student Chuyan Wan attended multiple conferences to present her research using Ca and Sr isotopes to investigate ocean acidification during OAEs and the PETM. PhD student Allegra Tashjian is conducting mesocosm experiments at the Chicago Botanic

Garden to test CO<sub>2</sub> removal by enhanced basalt weathering. Andy presented research at the North American Paleontological Convention using Ca isotopes to trace biomineralization crises during major C cycle perturbations. The Washington Post interviewed Andy and Grace Andrews (PhD '17), about CO<sub>2</sub> removal by ocean alkalinity enhancement. Andy received a highly competitive \$5M DOE Negative Carbon Shot award to investigate CO<sub>2</sub> drawdown in the US Midwest through enhanced carbonate mineral weathering.

## EMERITUS DONNA JURDY

marked the 'Great North American Eclipse' of April 2024 by giving a public lecture in the path of totality. Her talk in Carmel, Indiana, discussed the search for extraterrestrial life and enjoyed rapt attention from 250 people packed into an auditorium. She reports this was her second largest talk audience, "still topped by the AAPG lecture tour." Donna sought additional celestial adventures in summer 2024 with a visit to New Mexico. At the UFO festival in Roswell, she reminisced with other researchers about Northwestern astronomy professor J. Allen Hynek, the pioneer who devised the "Close Encounters" UFO classification and both advised on and appeared in the film of the same name. Near Socorro at the Very Large Array telescope

facility, she enjoyed a specially arranged tour with scientists that included discussing acquisition of radar data and walking on the 80-foot diameter dish of the space telescope, 90-feet high.

## ELVIRA MULYUKOVA

leads a Rock Physics and Planetary Dynamics group that uses the atomic-scale physics of mineral grains to interrogate large-scale processes that shape rocky planets – like mantle convection, plate tectonics, and earthquake cycles. PhD student Dylan Chambers focuses on subduction dynamics and its impact on habitability near trenches, tracking carbon as it escapes off the slab and feeds the microbes possibly living beneath the volcanic arc. PhD student Thomas Subak explores how the newly formed rocks in the Earth's lithosphere deform, recrystallize, and eventually turn into a localized and seismically active tectonic plate boundary. PhD student Maxwell Collins studies the dynamics of the icy shell of Europa, one of Jupiter's moons, to see how salt impurities affect ice mechanics, thus affecting the potential for habitability in Europa's subsurface ocean. Recent undergraduate student researchers, including Emma Havens (BA '24), Esther Miller, and Elizabeth Cogan, have explored early continent formation on Earth, thermal evolution of Venus,



and the conditions for existence of liquid water at the surfaces of rocky planets.

#### **EMERITUS EMILE OKAL**

continues to pursue research in tsunami science, earthquake seismology, acoustics, and atmospheric waves. In the past year, he was invited to professional meetings in Chile, Turkey, Costa Rica, and France, which discussed, among other things, tsunami risk in the Caribbean and in the present Aegean seismic swarm. Emile delivered the Roger Revelle Memorial Lecture of UNESCO in Paris in June 2024. On the more leisurely side, he continues to chase eclipses, this last April by boarding a commercial flight overtaken by the Moon's shadow over Southeastern Missouri, and visited Africa's Afar junction, where Earth's next ocean is in the process of forming.

#### **MAGGIE OSBURN**

leads an Isotope Geobiology Lab that has been bustling. Since the last newsletter they waved congrats to new PhDs Matt Selensky ('23) and Floyd Nichols ('24), who successfully defended theses on cave geomicrobiology and organic matter preservation in Mars analog hypersaline lakes. Osburn lab "wondergrads" continued to flourish with Zoe Vincent (BA '23), Abby Hsiao (BA '23), and Mia Thompson (BA '23) graduating with honors in 2023 and Franny Bengtson (under the advisement of Research Faculty Brad Stevenson) in 2024. The lab welcomed new grad students Esmée Kuiper, Anurup Mohanty, and Dominique Kelly. In 2023, DEEPS received transformative NSF funding to purchase new peripheral instruments for the Stable Isotope Biogeochemistry Lab. In addition to lab pursuits, the Osburn team has spent lots of time on field campaigns to Mammoth Cave National Park, the desert southwest, and the Black Hills of South Dakota to sample microbial biofilms, sediments, and groundwaters. In 2024 Maggie was elected Chair of

the Organic Geochemical Division of the Geochemical Society as well as future chair of the Gordon Conference on Geobiology. Maggie also completed the Chicago Triathlon in honor of her late mentor Jan Amend.

#### **BRAD SAGEMAN**

has continued researching Ocean Anoxic Events (OAEs) and other deep time biogeochemical perturbations. This work combines geochronologic and chemostratigraphic tools to gain deeper insights into the mechanisms that drive OAEs. This research expanded in the past decade to include application of Ca isotope analyses to assess paleo-ocean acidification, a collaborative effort with Andy Jacobson. Andy's expertise in studies of radiogenic isotope geochemistry and rock weathering made the project possible and also led in a new research direction – investigating enhanced rock weathering as a potential carbon dioxide removal (CDR) strategy. Both projects were supported by NU's Trienens Institute for Sustainability and Energy, and a large DOE grant on the potential of carbonate mineral weathering for CDR was selected for funding in 2024. Andy and Brad co-taught a new course on "The Scientific Foundations of Decarbonization" in Spring 2025. Brad continues to serve as our Director of Undergraduate Studies, as well as Academic Director for the Masters of Science in Energy and Sustainability program, which he helped develop with colleagues from the Trienens Institute.

#### **EMERITUS SETH STEIN**

shares that in 2023 he and Carol Stein moved to their retirement home in Traverse City, a beach community in northern Michigan known for natural beauty, cherries, and wine. They both attended the GSA meeting in Pittsburgh, where Carol received the Association for Women Geoscientists Excellence award. Next up was their 40th (at least) AGU meeting in San

Francisco, where they celebrated Molly Gallahue's (PhD '23) Natural Hazards Section Award for Graduate Research, and hosted a seismology group farewell party at the lounge on top of the Marriott hotel. Back in their new home, Seth is working on a second edition of his seismology text and continuing papers and projects with recently graduated students. He leads hiking trips for and serves on the board of the local chapter of the North Country Trail Association, and serves on the advisory committee for the Brown Bridge Quiet Area.

#### **SUZAN VAN DER LEE**

leads a seismology group that teamed up with interdisciplinary scholars to facilitate digital archiving of analog legal, genome, and seismic data, such as stored in emeritus Emile Okal's microform archive. Her group welcomed new grad student Lucas Schirbel, who collaborates with undergrad interns Eva Sharman and Zoe Henke to resolve mysterious anisotropy near the East African Rift System (EARS). Lithospheric structure of the EARS is being imaged by grad student Albert Kabanda, who traveled to Uganda with colleague Yoweri Nseko to retrieve 19 broadband seismometers that collected data there for two years. Ann Thomas is wrapping up her machine-learning-assisted research into Chicago area earthquakes and uncovered evidence of recent, undetected earthquakes in the Sandwich Fault zone of northern Illinois. Ann also led the impressive extension in 2023 of the NU-Geopaths pilot program, which inspired renewed funding for 2024-2026 NU-Geopaths. Undergrad Victor Agaba (NU-BA '25) continued to develop our uncertainty-aware method for estimating earthquake faulting mechanisms from body waves in a single seismogram, and postdoc Caio Ciardelli (postdoc '21-24) stepped up to teach EARTH 350. Caio and Yoweri collaborate on imaging the South American mantle.

# Faculty Awards

## YARROW AXFORD

Named William Deering Professor in Geological Sciences, Weinberg College of Arts & Sciences (2024)

## PATRICIA BEDDOWS

Community Building Award, Weinberg College of Arts & Sciences (2024)

## ROSEMARY BUSH

Northwestern Canvas Hall of Fame: Community and Accessibility Award (2024)

## DAN HORTON

Faculty Early Career Development (CAREER) Award, National Science Foundation (2023)

## DAN HORTON

Robert and Maude Gledden Visiting Fellowship, University of Western Australia (2024)

## DAN HORTON

Weinberg College Excellence in Mentoring Undergraduate Research Award (2025)

## MAGGIE OSBURN

Weinberg College Excellence in Mentoring Undergraduate Research Award (2023)

## MAGGIE OSBURN

Northwestern Canvas Hall of Fame: Most Innovative Course Site (2024)

## MAGGIE OSBURN

Sulzman Award for Scientific Excellence through Education and Mentoring, Biogeosciences Division, American Geophysical Union (2023)

## SUZAN VAN DER LEE

Elected Fellow of the American Academy of Arts and Sciences (2023)

## SUZAN VAN DER LEE

Named Sarah Rebecca Roland Professor, Weinberg College of Arts & Sciences (2023)

## SUZAN VAN DER LEE

Elected Fellow of the American Geophysical Union (2024)





# THANK YOU TO OUR ALUMNI

With the integration of Earth, Environmental, and Planetary Sciences, we are a bigger and stronger program – and your alum network has grown. Welcome! And thank you. Alum support enriches the department in so many ways, like our Yucatan trip and other examples on these pages.



Assistance for undergraduates to purchase hiking boots, clothing, or sleeping bags for their first field experiences.

Tech for virtual offerings of our weekly seminar series.

Soil corers, salinity meters, and Munsell charts for an Urban Ecology course.

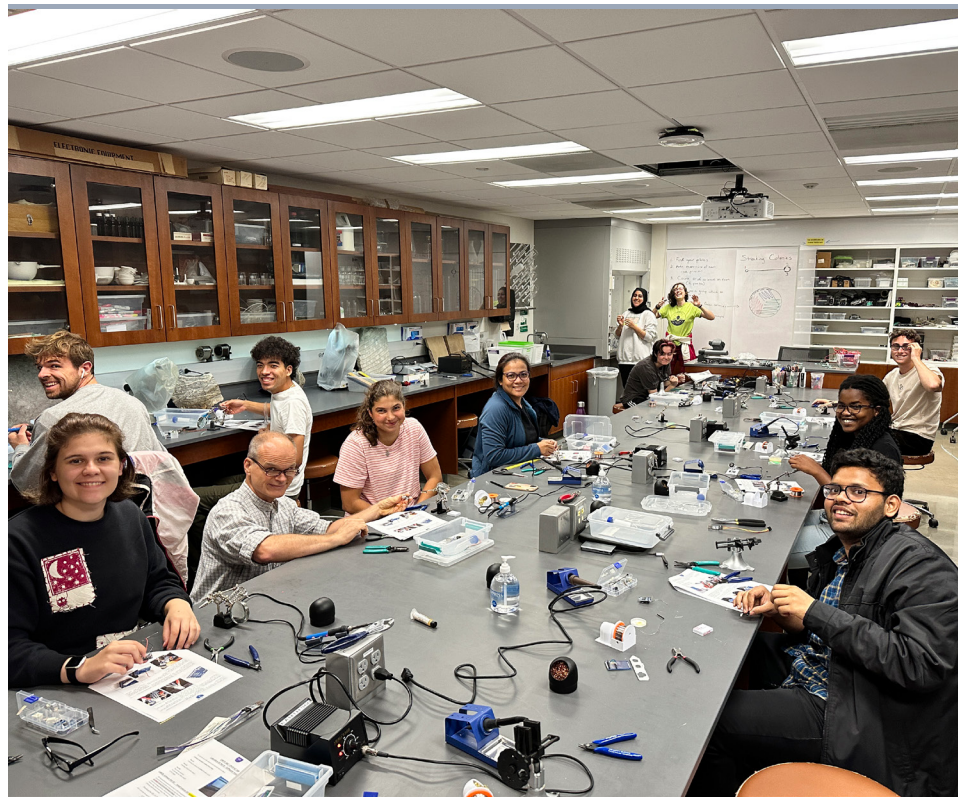
A Wilderness First Responder course for DEEPS students and staff doing field work in remote locations, from Uganda to Greenland.



Van transportation and shared lodging to introduce undergraduates to the GSA Fall Meeting.

Student funding to present research at the AGU Fall Meeting in Washington, D.C.

Hands-on materials for many courses – from casts of fossil skulls to software licenses.



Please keep your news coming in. We love seeing you and hearing about your adventures.

# Spring break, Yucatan style



When Shailen Chugh explored the Yucatán Peninsula, he realized how much geology he'd only learned from textbooks. As a fourth-year Earth and Planetary Sciences major planning to pursue a PhD, he had never collected samples in the field.

"No matter what I do [in the future], I'm going to be dealing with samples from the field," Chugh said.

By collecting water samples, surveying caves, and mapping coastlines, Chugh and fellow students applied classroom knowledge through hands-on fieldwork. The 10-day spring break trip, fully funded by the department and led by Professor Patricia Beddows, introduced

students to field research in one of the most geologically dynamic regions in the world.

Second-year PhD student Anurup Mohanty said his favorite part of the trip was snorkeling in cenotes, natural sinkholes formed by collapsed limestone. He was able to see and feel the differences in salinity and temperature where freshwater meets saltwater—all while swimming alongside fish.

After a long day in the field, Chugh said students liked to unwind by playing Bananagrams. For Bela Filstrup, a third-year undergraduate in the Earth and Planetary Sciences department, the best part of the trip was getting to meet others in the program.

"I had a couple of the undergraduates in my classes, but this was the first time we really talked," Filstrup said. "Now I feel like I can go up to any of them—even the grad students who were on the trip—and say hi."

# We Thank Our Donors!

Jan, 2023 - Jun, 2025

Donors listed in **bold** have generously supported us across multiple years.

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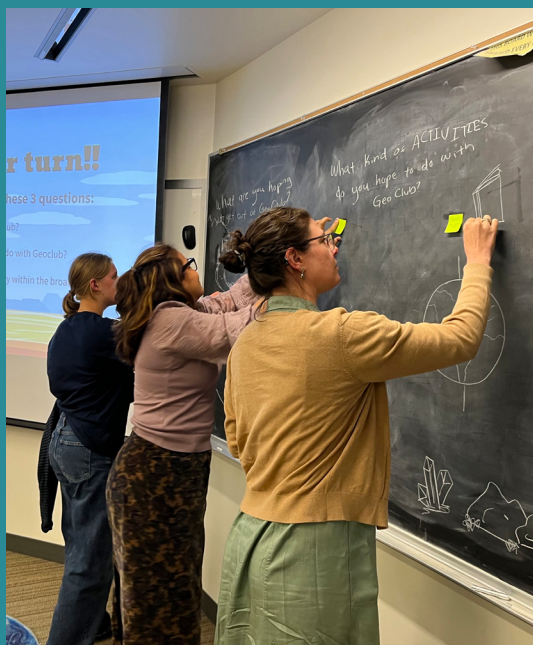
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Thomas Jones and Toby Turner MNG Trust



Prof. Maggie Osburn and a group of enthusiastic undergrads reignited the NU Geoclub in Fall 2024. The group focuses on excursions, service, and community building, with events that aim to be barrier-free, exciting learning experiences. In the fall the club went to the Field Museum, and spring goals included rock hunting and getting out into nature. Geoclub is deeply engaged in service, including beach cleanups, trail building, and invasive species work. Bi-weekly meetings welcome majors and non-majors alike to enjoy science-themed games, educational presentations, info sessions, pet rock painting, and (of course) snacks. Follow them on Instagram for current activities (@geoclub.nu).



# GEOCLUB

is back!

# Meet The 2024 Nemmers Prize in Earth Sciences Recipient



## And Dive Into Earth's Subsurface

The 2024 recipient of NU's \$300,000 Nemmers Prize in Earth Sciences is an innovator of methods and explorer of hidden worlds: esteemed geochemist Barbara Sherwood Lollar of the University of Toronto. An international fellow of the National Academy of Sciences and the National Academy of Engineering, and a fellow of the Royal Society of Canada and Royal Society of London, Dr. Sherwood Lollar has fundamentally advanced understanding of subsurface water on Earth – its depth, abundance, chemistry, and role in life. Her work has also illuminated the diverse geochemical strategies used by Earth's microbes, with implications that range from astrobiology to tackling modern-day environmental problems.

To celebrate her diverse scientific contributions and to share our collective

enthusiasm for Earth's carbon and water cycles, DEEPS hosted Nemmers Prize-related events throughout spring 2025. A full-day symposium for the Northwestern community, "Earth Science Solutions for a Changing World," featured Dr. Sherwood Lollar as keynote speaker and highlighted the importance of fundamental research in understanding and addressing some of society's biggest challenges, from climate change and decarbonization to the quests for clean water and critical minerals. Prof. Maggie Osburn also offered a related graduate seminar titled "The ground beneath your feet – subsurface real estate, residents, and resources." The seminar opened participants' eyes to the role of the subsurface in our future, and dug into subsurface science topics ranging from CO<sub>2</sub> injection to microbial life.

"Barbara's work has changed the way we think about water on the planet and opened new ways to use isotopes to understand contaminant transport. And she's a master at bringing the right people together at the right time to tackle important topics," said Prof. Osburn, who hosted Dr. Sherwood Lollar and organized the symposium. "Having her on campus at this pivotal moment for our program and for the planet is inspiring for us all."

DEEPS is proud to honor an outstanding earth scientist from any nation every two years with the Nemmers Prize. The Prize is supported through a bequest to NU from Erwin Esser Nemmers and Frederic Esser Nemmers. Nominations can be submitted at <https://www.nemmers.northwestern.edu/earth-sciences/>.

# Connecting Scientists Across an Ocean



Connection and collaboration are so important in science. DEEPS itself could have been shaking with seismic energy in October 2024, when we hosted the unique international Nemmers Workshop on East African Rift Seismicity. Prof. Suzan van der Lee and UC Santa Cruz earthquake physicist Emily Brodsky (our 2022 Nemmers Prize laureate) brought together eighteen earthquake scientists to create new connections and collaborations aimed at understanding the very active seismicity in a geologically fascinating and populous part of the world. Participants included prominent seismologists from universities and observatories in Ethiopia, Uganda, the Democratic Republic of Congo, and Rwanda, and graduate students from across the U.S. The event was made possible with funding from NU's Nemmers Prize in Earth Sciences and the Seismological Society of America.

We're delighted DEEPS hosted this impressive group from so many countries. "What a pleasure sharing great ideas," said one participant. Said another, "We're on fire!"

## Practicing Visionary Imagination

Now, more than ever, there is a pressing need to exercise our imagination muscles—to learn what is possible, how we can change the future, and what our responsibility is to future generations. In March 2024 Assistant Professor Elvira Mulyukova and colleague Erin Courtney (Dept. of Radio, Television, and Film) hosted a workshop on "Imagining Science" at the Chicago Botanic Garden, with funding from the Northwestern Institute for Complex Systems. The workshop brought together scientists, science fiction writers, and academically diverse students and faculty to practice imagining things much bigger than our everyday lives. How can we look at fossils to infer what roamed the Earth millions of years ago?

How can we predict the behavior of materials deep within planetary interiors? How can we reverse humanity's impact on global climate? How can we predict habitats for life on other planets?

Attendees learned fundamentals of Earth and planetary sciences and of writing scientific fiction, and by the end of the day each participant had written a short sci-fi piece. The event was funded by the Northwestern Institute on Complex Systems.



# Degrees Conferred

## Doctoral Degrees Conferred

### 2023

**MOLLY GALLAHUE**

*Exploring the Causes of the Discrepancy Between Probabilistic Seismic Hazard Maps and Observed Shaking Data.*

Advisor: Seth Stein

**ANASTASIA MONTGOMERY**

*An Analysis Of Urban Air Quality and Health Impacts Using High Resolution Chemical Transport Model Simulations.*

Advisor: Daniel Horton

**NILOUFAR SARVIAN**

*Towards an understanding of Ca and Sr isotopes in Neoproterozoic Carbonates.*

Advisor: Matthew Hurtgen

**MATTHEW SELENSKY**

*Querying Microbial Community Structure and Function in the Shallow Subsurface: Observations from Three North American Cave Systems.*

Advisor: Magdalena Osburn

### 2024

**CHUXUAN LI**

*Augmentation and Use of WRF-Hydro to Predict Rainfall-Triggered Landslide Susceptibility at Regional Scales.*

Advisor: Daniel Horton

**FLOYD NICHOLS**

*Examining Lipid Biosignatures and Organic Carbon in Mars-Analog Hypersaline Lakes.*

Advisor: Magdalena Osburn

### 2025

**PETER PULEO**

*Seasonally Resolved Paleoclimate Reconstructions in Greenland Over the Past 14,000 Years Using Lake Sediments and Novel Oxygen Isotope Proxies.*

Advisor: Yarrow Axford



# *Earth and Planetary Sciences Bachelor's Degrees Conferred*

## 2023

Emma Hope Estberg  
Abby E Hsiao  
Tessa Belle Seifried  
Dana Maureen Small  
Mia Lixing Thompson  
Catherine Eloise Updegraff  
Zoe G Vincent

## 2024

Emma L Havens  
Ryan Henry Lopez  
Taymae Mimouni  
Aidan Paul Ocampo  
Claire Minasian Throckmorton

## 2025

Shailen Chugh  
Annette Chinglin Edwards  
Suyang Li  
Katherine Crystal Ergil  
Gabriela Rebecca Tucker

# *Environmental Sciences Bachelor's Degrees Conferred*

## 2023

Isabel Azpiroz  
Joseph Michael Cavazos  
Fatima R Cubillas Flores  
Hannah Noelle Dembosky  
James Henry Gray  
Christian Lee Healy  
Abby E Hsiao  
Minjee Jung  
Edward Noah Ko  
Ginny Gajin Lee  
Kyra E Lin  
Johanna Locher-Kingsfield  
Elena Featherstone Maberry  
Ashton Morgan Merbach  
Wyatt Daly Colwell Mosiman  
Sydney Hilliard Schulman  
Tessa Belle Seifried  
Hannah Seo  
Isaiah Tolbert  
Teresa Truong  
Catherine Eloise Updegraff  
Zoe G Vincent  
Albert Y Wang  
Ella Larson Weaver  
Rebecca Shipley Wilson

## 2024

Samantha Morgan Anderer  
Katherine Elizabeth Austin  
Max Sullivan Bennett  
James Ross Berg  
Jamie Carol Dickman  
Madison Marie Dieffenbach  
Shayna Caitlyn Garla  
Lori Hannah Gerstenfeld  
Tyler C Greenfield  
David Maxwell Jones  
Audrey Jones Klopfer  
Ji Eun Koo  
Russell John Leung  
Hannah Lipman  
Shannon Shuting Liu  
Sophia Lizzie Liu  
Ryan Henry Lopez  
Julia Louise Lynn  
Jonah Zane Michel  
Volodymyr I Nevirkovets  
Joseph Ethan Pollack  
Collin Michael Porter  
Aniya Amari Rios  
Rosemary Anna Sissel  
Malcolm Owen Alonso Turner

## 2025

Max Atticus Weldon  
Kelly Alvarez  
Sara Azimipour  
Anthony Barba-Perez  
Nicholas William Francis  
Caroline Camille French  
Athena M GoingSnake  
Hope Lindsey Hessler  
Cassie Chia-Sin Lee  
Saskia Linton  
Henry Russell Lukela  
Eden Macknin  
Adetomiwa Ademilade Omolade-Adunbi  
Lena Camille Parnassa  
Camille Isabelle Reinoso  
Simon Micah Roston  
Kelly Briggs Ryan  
Anna Felicia Simmons  
Sara Yen  
Roy Zhu  
Daniel Harry Zitomer  
Alessandra Marie Zuleta  
Khadija Ahmed  
Madeleine Maria Urbina Bagnall  
David John Drinko  
Reed B Malcolm

# Student Awards

## *Annual Departmental Recognitions*

Horace A. Scott Graduate Award for research: Stacy Montgomery (2023), Peter Puleo (2023), Chuxuan Li (2024), Floyd Nichols (2024), Luca Podrecca (2025)

Graduate Service Award: Luca Podrecca (2023), Ann Thomas (2023), Chuyan Wan (2024), Meera Shah (2025)

Marion Sloss Award for outstanding graduate teaching assistant: Laura Gardner (2023), Chuxuan Li (2023), Floyd Nichols (2023), Victoria Lang (2024), Ann Thomas (2024), Chuyan Wan (2024), Bailey Nash (2025)

Earth & Planetary Sciences Seymour Schlanger Undergraduate Award: Mia Thompson (2023), Zoe Vincent

(2023), Taymae Mimouni (2024), Annie Edwards (2025)

Earth & Planetary Sciences Junior Research Achievement Award: Aidan Ocampo (2023), Emma Havens (2023), Shailen Chugh (2024), Jonathan Chen (2025)

Environmental Sciences Program Senior Thesis Award: Albert Wang (2023), Minjee Jung (2023), Shayna Garla (2024), D. Max Jones (2024), Cassie Chia-Sin Lee (2025)

Environmental Sciences Program Community Award: Isaiah Tolbert (2023), Athena GoingSnake (2025)

Undergraduate Service Award: Amelia Freeland (2025)

Environmental Sciences Program Senior Marshals: Catherine Updegraff (2023), Madison Dieffenbach (2024), Athena Goingsnake (2025)

Earth & Planetary Sciences Senior Marshals: Zoe Vincent (2023), Aidan Ocampo (2024), Shailen Chugh (2025)



## *Additional Student Awards & Honors*

Franny Bengtson, David Shemin Prize for Basic Research, NU Biological Sciences Program (2024)

Franny Bengtson, Best Presentation, NU Undergraduate Research and Arts Expo (2024)

Jonathan Chen, Goldwater Scholarship (2025)

Shailen Chugh, 3rd prize, Ignite Off! Competition, U.S. Dept. of Energy Workforce Development for Teachers and Scientists program (2023)

Chiara Corbo, Student Travel Grant, American Geophysical Union (2024)

Molly Gallahue, Natural Hazards Section Award for Graduate Research, American Geophysical Union (2023)

Albert Kabanda, Tectonophysics Section Outstanding Student Presentation Award, American Geophysical Union (2023)

Victoria Lang, 1st Place student poster award, International Society of Exposure Science Annual Conference (2023)

Victoria Lang, Northwestern University Presidential Fellowship (2025)

Bailey Nash, Graduate Research Fellowship, National Science Foundation (2023)

Floyd Nichols, Future Faculty Diversity Program Awardee (2024)

Kyan Shlipak, GeoHealth Section Outstanding Student

Presentation Award, American Geophysical Union (2024)

Ann Sinclair, Precipitation Technical Committee Award, American Geophysical Union (2024)

Ann Thomas, Environmental Scholarship from the Alliance of Hazardous Material Professionals - Chicago Chapter (2023)

Mia Tuccillo, Doctoral Dissertation Research grant recipient, National Science Foundation Office of Polar Programs (2023)

Mia Tuccillo, NU Buffett Center Global Impacts Fellowship (2023)

Maria Villareal, Harold T. Stearns Fellowship Award, Geological Society of America (2024)

# Alumni Highlights

## **PAM JANSMA (PhD '88) & GLEN MATTIOLI (PhD '87)**

are settled in Denver. Pam has long been Dean of the College of Liberal Arts and Sciences at the University of Colorado Denver and was recently appointed Interim Provost. Following the merger of IRIS and UNAVCO to form the EarthScope Consortium, Glen is now Vice President of Instrumentation for EarthScope.

## **JEREMY FEIN (PhD '89)**

is a professor in civil and environmental engineering and earth sciences at the University of Notre Dame. He is still loving research (in geomicrobiology) and teaching, which includes a geology field trip course to the Upper Peninsula of Michigan ("thanks to Craig Bina for introducing me to those rocks"), Ireland, and the Galápagos Islands.

## **LOREN HENNING (MS '89)**

had a fulfilling 33 year career at the EPA both as a project manager for complex groundwater contamination sites, and then as a manager for 26 years. He retired in February 2025. Loren is married with two children. He has been in the San Francisco Bay Area for almost 30 years and is looking forward to life after work.

## **GARY ACTON (PhD '90)**

has been working on his tennis skills in preparation for retirement from the International Ocean Discovery Program (IODP) at Texas A&M University in 2025, after which he hopes to find time "to complete all those papers I started with advisors and colleagues at Northwestern, some 35 years ago."

**GEORGE HELFFRICH (PhD '90)** retired from ELSI/Tokyo Tech in

2019 and organized a rerun of the (in)famous Helgeson/Thompson yacht-based NATO high-pressure metamorphism field trip in the Cyclades/Aegeans shortly thereafter. He is now living in Portugal. He sends greetings along with Cheril Cheverton (staff 1980s).

## **KATERINA PETRONOTIS (PhD '91)**

is retiring in March after 30 years with IODP, following the demobilization of the JOIDES Resolution. She and Gary Acton plan to visit family and friends in Greece and elsewhere, and keep their dogs entertained. She adds, "We could not have been this successful in our careers without the knowledge and skills we gained at Northwestern!"

## **PO-FEI CHEN (PhD '02)**

is a seismology professor and amateur table tennis player in Taiwan. He deployed a temporary SmartSolo array to monitor the aftershocks of the Mw7.4 Hualien earthquake on April 2, 2024, and the Mw6.1 Dapu earthquake on January 20, 2025. His students know that if they beat him in table tennis, they can earn free credits—even though this practice is unprecedented.

## **STACY MONTGOMERY (PhD '23)**

was recently promoted to director of research and development at Crosswalk Labs.

## **AUDELIZ MATIAS (PhD '05)**

is currently Interim Dean of the School for Graduate Studies at Empire State University.

## **ROB LOCKLAIR (PhD '07)**

did brief postdocs at NU and Johns Hopkins University. For the past 16 years, he has been employed in Houston by Chevron

Corporation. He has a daughter in elementary school, a wife who works on organic geochemistry, a cat that is afraid of him, and a dog that can't be further than 2 feet from him.

## **HEATHER BEDLE (PhD '08)**

earned tenure in the School of Geosciences at the University of Oklahoma, and was awarded the Edith Kinney Gaylord Presidential Professorship.

## **JASON FLAUM (PhD '08)**

began a new career as a research sedimentologist at the U.S. Geological Survey in 2020, after 12 years in industry. Along with the career change came a move to Denver, where Jason and his family are enjoying the outdoors year-round. His oldest child, Jeremiah, who was born during Jason's final year at NU, will return to Illinois in Fall 2025 to attend Augustana College.

**JONG-SIK RYU (postdoc '09-11)** is an associate professor of earth and environmental sciences at Pukyong National University, South Korea.



Xiaoting Lou and Simon Lloyd, and offspring, met up in London Spring 2023.

**JOEL MOORE (postdoc '08-11)**  
is a professor in the Department of  
Geosciences at Towson University.

**RICH BARCLAY (PhD '11)**  
has been a research geologist  
at the Smithsonian's National  
Museum of Natural History since  
2012. He recently finished the  
seven-year Fossil Atmospheres  
Project, experimenting with  
gingko growth in elevated  
carbon dioxide. Now he is  
investigating the recovery of  
Paleocene ecosystems in the  
Rocky Mountain west after the  
K-Pg extinction, expanding on  
work featured in the NOVA series  
"The Rise of Mammals."

**ALLEGRA MAYER (BA '13)**  
earned her Ph.D. in soil  
biogeochemistry at UC Berkeley  
(in the office just downstairs  
from Jenny Mills). Having  
finished a postdoc, she is now  
a staff research scientist at  
Lawrence Livermore National  
Laboratory. She continues to  
think a lot about carbon cycling  
and climate mitigation, and  
is seriously training for one  
marathon per year.

**NORA RICHTER (BA '14)**  
recently moved from a postdoc  
position in the Netherlands  
to start a research fellowship  
in Switzerland at Eawag, a  
freshwater research institute. Her  
latest project studies methane  
cycling in lakes both in the  
present and over the last 100 to  
10,000 years.

**DANA JOHNSON (BA '16)**  
is soon to finish her PhD in soil  
science at the University of  
Wisconsin-Madison. She studies  
how ecosystem disturbances  
affect soil microbial communities  
and soil nutrient cycling.

**EMILY WOLIN (PhD '16)**  
attended farrier school and  
recently started her own farrier  
business, Eclipse Hoofcare, in  
New Mexico.



Basia Gawin rocking the iconic National Park Service uniform at Mammoth Cave National Park.

**LAUREL CHILDRESS (PhD '16)**  
became supervisor of science  
services for the Gulf Coast  
Repository of Texas A&M  
University in January 2025. She  
provides scientific expertise  
and leadership for the Gulf  
Coast Repository, which stores  
and curates 151 km of marine  
sediment cores for the U.S. NSF,  
and she supervises the GCR's staff  
scientists and data analysts.

**BASIA GAWIN (BA '17)**  
worked for a biotech company  
in Chicago before finding her  
true calling when she spent  
five months at Great Smoky  
Mountains National Park as  
an intern for the National Park  
Service. Since then, she spent

three years as a park guide and  
visitor use assistant at Mammoth  
Cave National Park and at the time  
of this writing is a park ranger for  
the U.S. Fish & Wildlife Service at  
Ottawa National Wildlife Refuge  
in Ohio.

**GRACE ANDREWS (PhD '17)**  
has been dedicated to advancing  
the science of marine carbon  
dioxide removal. After serving as  
vice president and head of science  
at Project Vesta, she founded and  
is executive director of Hourglass  
Climate, a nonprofit research  
organization.

**CHRISTOPHER CALLAHAN  
(BA '18)**  
earned his Ph.D. at Dartmouth



Jeremy Brooks standing on an alpine glacier near Skagway, Alaska in 2022.

College and conducted postdoctoral research at Stanford University. He will be starting as an assistant professor at the O'Neill School of Public and Environmental Affairs at Indiana University this fall.

#### **HANNAH DION-KIRSCHNER (BA '18)**

will finish her PhD in biogeochemistry at Caltech in 2025, and will return to Chicago for a postdoc at the University of Chicago this fall. Her PhD research investigated the role of the terrestrial biosphere in carbon cycling.

#### **KARALYN BERMAN (BA '18)**

recently started a new position as associate legal counsel at the Illinois Power Agency, supporting the development of renewable energy generation in Illinois. She's based in Chicago with her two cats, Maggie and Pepper. After NU, she studied environmental law at Vanderbilt University, and held summer positions working for clean water and conservation causes.

#### **MATT JONES (PhD '18)**

continues his research for the Energy Resource Program of the US Geological Survey in Reston,

Virginia. The past year brought many opportunities for research travel, including an IODP-themed lecture series at 6 US universities and visits to CO<sub>2</sub> injection sites in Iceland. He enjoyed reconnecting with NU alumni at conferences and was impressed by their accomplishments and leadership in geoscience.

#### **MELISSA CHIPMAN (postdoc '17-18)**

is an assistant professor in earth and environmental sciences at Syracuse University, where she leads the Arctic Paleoecology and Paleoclimatology Research Group.

#### **BEN LINZMEIER (postdoc '17-19)**

is an assistant professor in earth sciences at the University of South Alabama.

#### **DANIEL PETERS (BA '19)**

lives in Austin and is working as a senior air quality data analyst at the Environmental Defense Fund. His recent research focuses on reducing toxic air pollution from refineries and petrochemical facilities. Daniel is part of Austin's music scene, performing with a bossa nova band, and he released his first EP in 2024.

#### **JEREMY BROOKS (BA '20)**

is a PhD student in geoscience at the University of Wisconsin-Madison, studying sub-glacial processes. He has enjoyed doing PhD field work in Alaska, Iceland, and Wisconsin (including the Baraboo Hills - a place he first visited during the Earth 201 field trip). Jeremy was recently a visiting graduate fellow at Los Alamos National Laboratory, where he worked on ice sheet model development.

#### **LUCY YANG (BA '20)**

is research and communications associate in the executive office of the World Resources Institute (WRI). Among other projects, she collaborated with WRI President & CEO Ani Dasgupta in researching and writing his forthcoming book, "The New Global Possible: Rebuilding Optimism in the Age of Climate Crisis," available September 2025.

#### **JIUYUAN WANG (PhD '21)**

completed an Agouron fellowship at Yale University in 2024, and accepted a faculty position at Peking University in China. His research continues to focus on the carbon cycle in deep time and the co-evolution of life and environment.

Jiayuan is vice president of the Northwestern Alumni Club in Beijing and launched “NU Insights,” a knowledge-sharing series for alumni that has hosted distinguished visitors including numerous deans from Northwestern.

**LAURA LARocca (PhD ‘21)**

is an assistant professor in the School of Ocean Futures at Arizona State University, where she continues to investigate the future of Earth’s cryosphere and has developed courses on paleoclimate and science communication. Laura is enjoying veggie gardening and hiking in Arizona during the months of the year when we’re bundled up for snow in Evanston.

**REGAN STEIGLEDER (BA ‘21)**

has played professional soccer for Swedish club KIF Örebro DFF and as a defender in jersey #2 for the Kansas City Current. She has also kept a foot in geoscience, working as an account manager for the radiocarbon dating lab Beta Analytic.

**TIA CHUNG-SWANSON (BA ‘21)**

and former TIMS lab manager is a PhD student in Earth Systems Science at UC Irvine.

**ANNIE CLAIRE NELSON (PhD ‘22)**

did postdoctoral research at Columbia University’s Lamont Doherty Earth Observatory, and soon after co-founded Cella Mineral Storage, a Kenya-based decarbonization start-up company focused on mineral trapping of carbon in basalt at elevated temperatures.

**BORIS ROESLER (PhD ‘22)**

did postdoc research at the University of Tokyo’s Earthquake Research Institute. He is now an assistant professor at the Center for Scientific Research and Higher Education at Ensenada, Mexico, where he also administers the strong motion seismic network RESNOM.

**HOWARD CHEN (PhD ‘22)**

is assistant professor of planetary sciences at Florida Institute of Technology. He was delighted to report this winter that his first undergraduate research assistant had just published a paper, an exciting milestone. And Howard got married in 2023!

**NILOU SARVIAN (PhD ‘23)**

is a science lead at Quadtrature Climate Foundation.

**PETE PULEO (PhD ‘24)**

is assistant professor in the Geography,

Geology and Environmental Science Department at the University of Wisconsin-Whitewater, where he teaches a wide range of earth science topics and continues to collaborate with scientists at NU.

**SARA CAMILLERI (postdoc ‘22-24)**

returned to Malta in 2024, and has been embracing island life with family and friends. She is a senior environmental scientist at Ecostack Innovations, where she has been leading consultancy and innovation projects focusing on interactions between biodiversity, climate and health, both locally and within Europe.

**SHAYNA GARLA (BA ‘24)**

recently began graduate studies in Arctic climate and paleoclimate at Syracuse University. Her adviser is Melissa Chipman, who did her postdoctoral research at NU. Shayna joined current PhD students Mia Tuccillo and Bailey Nash (MA ‘25) to assist with field work in Greenland in summer 2024.

**MEAGAN ANKNEY**

Former Research Associate and TIMS lab manager, is a Chemist II at the Wisconsin State Laboratory of Hygiene.



# In Memorium

Peter Vail (PhD ‘56), W. Maurice Ewing Professor Emeritus of Oceanography at Rice University, passed away in December 2024 at the age of 94. Vail earned his M.S and Ph.D. degrees at NU under the mentorship of Larry Sloss and William Krumbein. He had a long career at Exxon and its precursor companies before becoming a professor at Rice, and his work on seismic stratigraphy and eustatic cycles was highly influential. His recognitions included the Penrose Medal from the Geological Society of America and the Benjamin Franklin Medal in Earth and Environmental Science. (Photo from Rice University)

# Lauren Westenberg (BA '15)



*Lauren studied Environmental Science and completed the EPC minor and ISEN certificate at Northwestern. After graduating, she earned a Master's in geography from McGill, then a JD and Master's in agricultural law from Vermont Law. Based in D.C., she now runs a law firm supporting farmers and food systems organizations navigating federal policy shifts.*

**How did you get interested in the environment? How did Northwestern help you grow that interest?**

I grew up on a small sheep farm in Minnesota—a hobby farm, but a pretty diverse little operation. I got really interested in environmental issues, especially where they intersect with policy, when I was pretty young. That's what led me to Northwestern.

What I really loved about Northwestern was its interdisciplinary approach to environmental problems. I got to learn the hard sciences and pair that with classes in global environmental history.

**What is your favorite memory from your time at Northwestern?**

We did a really fun event my senior year for the anniversary of Earth Day. I think John Denver had done a concert at Northwestern around

the time Earth Day first started. To celebrate, we threw a big party. We organized the whole thing ourselves: we tie-dyed tshirts, we put together a band and did a performance, and we had this big gathering in Tech. Undergrads working on anything environmentally related could set up booths and present their research. It was a really cool, cross-department effort that brought everyone together.

**What advice would you give to a DEEPS student today?**

When I think about my career trajectory, I've never picked a job title I wanted. I've always focused on questions that spark my curiosity. Once I find a question I care about, it helps me figure out what skills I already have, what I need to learn, and what kinds of people and spaces I want to be around to work on that question.

# Grace Andrews (PhD '17)



*Grace earned her PhD and MS in Earth and Planetary Sciences from Northwestern, completing her thesis on the carbon cycling of glaciated landscapes across modern and geologic timescales. She is the founder and executive director of Hourglass Climate, a nonprofit advancing marine carbon dioxide removal technologies.*

**What projects are you working on right now with Hourglass?**

We're running several marine carbon dioxide removal field trials to test promising solutions and gather data on their safety and effectiveness.

At the same time, we build tools for project planning, permitting, and carbon removal measurement. One project I'm excited about is a web tool to help developers and registries assess if marine carbon removal projects are done safely—bringing more rigor and transparency to the field.

**How did your PhD research inform your career path?**

During my PhD at Northwestern, I studied carbon cycling under glaciers over geologic timescales. I didn't realize it then, but this is one of the best natural examples for a group of carbon removal strategies.

Chemical weathering controls

CO<sub>2</sub> levels and happens faster in places like Greenland than expected. Though it's cold, glaciers grind rocks into fine particles, which speeds up weathering.

That's exactly what enhanced rock weathering technologies do today. My research was essentially studying nature's version of these emerging technologies—something that's become central to my career.

**What is your favorite memory from your time at Northwestern?**

Some of my favorite memories are from the department field trips. The Earth and Planetary Sciences Department did amazing trips up to Michigan to see some of the most incredible, world-class rock outcrops. I collected samples on those trips, and I still have them—right now, they sit on my mantle in my living room. I see those rocks every day.



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