



DEPARTMENT OF
**GEOGRAPHY, GEOLOGY,
AND THE ENVIRONMENT**
Illinois State University

GLACIAL DEPOSITS

VOLUME 49 • December 2024



Students participating in the study abroad program in Japan



Research in Iceland



Volcanic Processes field trip



Students at the 2024 Tri-State Geological Field Conference



Geography Club group hike

In this issue

Message from the chair.....	2
Student ambassadors are hard at work.....	3
Congratulations graduates.....	3
Current faculty and staff.....	4
Faculty spotlight.....	6
Faculty awards and recognition.....	7
Geology Club happenings.....	8
Geology Club reflection.....	8
New Stevenson Center director.....	8
CAS Hall of Fame inductee.....	9
Research collaboration.....	9
ISU scientist prospects for strategic minerals.....	10
2024 Foster Lectures.....	10
Summer research in Iceland.....	11
Sedimentary Geology field trip report.....	11
Personal impact.....	12
Students explore quaternary landscapes of western Tennessee.....	12
Fourth Volcanic Processes field trip.....	13
Japan Field Explorations 2024.....	14
Becker, Ferry recognized as Alumni Day honorees.....	16
Geographers travel to Italy for field work.....	16
Department hosts the USGS Digital Mapping Techniques Workshop Series.....	17
Awards and scholarships.....	18
Bryce Heiniger.....	18
Conference attendance, presentations, awards, and recognition.....	18
CuRE grant in stratigraphy facilitates experiential learning.....	19
Ijigabe awarded NABG and AWWA Scholarships.....	19
Fall 2024 FIREBird and BirdFEEDER grant winners announced.....	20
Students awarded FIREBird grants for Icelandic research.....	20
Departmental Undergraduate Research and FIREBird grants.....	21
Internship and presentation summary.....	21
U.S. Forest Service internship.....	22
Summer internship opportunity: Sibanye-Stillwater, geology intern.....	22
2023-24 donors.....	23

Message from the chair

Greetings from Geography, Geology, and the Environment! I hope this message finds you in good health and good spirit as we transition into 2025. Last year was a good one for the department. I am pleased to report the department is thriving despite a challenging budget period.

Student enrollment continues to grow. Our programs serve 275 students, representing an increase of 10% over the 2023 enrollment. The sustained growth is a direct result of the collective effort of the faculty and staff to connect with students. Students are engaged and active in the programs, which can be seen in the stories presented throughout this issue.



Our faculty had a productive 2024. Dr. Alec Foster was tenured and promoted to associate professor. Drs. John Kostelnick and Wondy Seyoum returned from sabbatical. During the summer, John was named the director of the Stevenson Center. This year, Dr. Matt Himley and Dr. Dave Malone are on sabbatical, and Dr. Catherine O'Reilly is in her third year with the National Science Foundation. Dr. Lisa Tranel was appointed as a Provost Fellow for 2024-25 and was also recognized with the College of Arts and Sciences Outstanding Service Award. Dr. Tenley Banik was recognized with the College of Arts and Sciences Outstanding Teacher Award. Dr. Melissa Heil was recognized as one of the 2023-24 Research Initiative Award winners. Dr. Kostelnick was named the 2024 Distinguished Geographer by the Illinois Geographical Society.

Last year, the department received over \$54,000 from alumni and friends of the department during the Birds Give Back campaign. In a period with budget uncertainty, these generous gifts ensured the department could support student success programs, such as funding student scholarships, providing funds for student research and travel to professional meetings, and offsetting the costs of field experiences and study abroad courses. I am also pleased to report the establishment of a new fund that will provide graduate students scholarships, and we hope to award the first scholarships to students enrolling in fall 2025. Thank you to everyone who contributes time, expertise, experiences, and monies to support our programs. These gifts are integral to the success of our students and department and allow the department to explore a variety of unique and exciting opportunities that will further enhance our academic standing, value, and relevance in years to come.



Felmley Hall Annex 420

If you are an alum of our programs, you may remember working in FHS 420 on the fourth floor of Felmley Science Annex. Recent renovations to the room have been completed, and we have a much-improved research space for faculty and students to use.

The department continues to excel, with faculty, staff, and students contributing to the teaching and scholarly mission of the department. This volume of *Glacial Deposits* highlights many of our students and faculty accomplishments, and I hope you find it informative and insightful.

On July 1, 2024, I transitioned from interim to permanent chair of the department. I am honored to continue serving as the chair and look forward to meeting and working with you.

Dr. Eric Peterson

Student ambassadors are hard at work

This semester, our department student ambassadors worked hard to encourage prospective students about the opportunities that majoring in the Department of Geography, Geology, and the Environment offers. Our ambassadors: Indira Robinson (ESSS), America Rosales (ESSS), Jack Calomino (geography education), Emily Laureano (earth and space science education), and Preston Kietzman (geology), cultivated an engaging environment for prospective and current students. To start the semester, the ambassadors coordinated a meet-and-greet event at Fusion Brew, which was a great success. Other events hosted for our students this semester included decorating the second

floor of Felmley Hall for Homecoming week, hosting a trivia night, and hosting a scary movie night during the week of classes before Halloween. The ambassadors also hosted tutoring hours each week to assist students in the department. As the fall 2024 semester ended, we said goodbye to Robinson, who graduated this semester, and Calomino and Laureano, who will be student teaching in the spring. Incoming ambassadors Clara Graham, Breena Aguirre, and Grace Haack will have large shoes to fill in the spring. We look forward to having our ambassadors continue to provide an encouraging and engaging role for current and prospective students next semester.



From left, Dr. Jonathan Thayn, Preston Kietzman, Jack Calomino, and Emily Laureano worked at the student recruitment table at a student open house event in the Bone Student Center for prospective students.

Congratulations, GRADUATES!

The following students graduated in fall 2023, spring, summer, and fall 2024.

Earth Space Science Teacher Education

Jack Bradford (fall '24)
Lauren Christians (fall '23)
Logan Dooley (spring '24)
Emily Gordon (fall '24)
Julia Lavelle (fall '24)
Austin Poschner (fall '23)
Graham Radabaugh (spring '24)
Zach Shugart (summer '24)
Cody Thomas (fall '24)

Environmental Systems Science and Sustainability

Emily Bogdanic (spring '24)
Lauryn Cartee (spring '24)
Haley Cepek (spring '24)
Amanda Darcy (fall '24)
Caitlin Dowdle (fall '24)
Lauren Durham (spring '24)
Madison Hunding (summer '24)
Kajol Karwal (summer '24)
Lee Maru (fall '23)
Meghan McConaughy (spring '24)
Jared Oldenburg (fall '24)
Taddy Pettit (summer '24)
Indira Robinson (fall '24)
Sam Sanchez (fall '24)
Braiden Soltow (fall '23)
Carter Spoden (spring '24)
Olivia Stoll (fall '24)

Keirsten Wells (spring '24)
Patrick Ziebell (summer '24)

Geography

David Adelman (fall '24)
Michael Arrich (summer '24)
Scott Boyce (summer '24)
Hailey Burnett (spring '24)
Sam Carver (summer '24)
Jordyn Crouse (spring '24)
Calvin Croy (summer '24)
Liv Durica (fall '23)
Grace Durosinmi (fall '23)
Aaron Englebreetsen (summer '24)
Skylar Florez (summer '24)
Ethan Geisler (spring '24)
Alex Giantamidis (fall '24)
Owen Gifford (summer '24)
Mark Goldenberg (fall '24)
Grant Harvey (spring '24)
Bryce Heiniger (fall '24)
Jill Jackson (spring '24)
Steven Kretz (fall '24)
Blair Krickl (fall '23)
Beck Masi (spring '24)
Lindsey Mullen (summer '24)
Jack Panozzo (summer '24)
Sean Roberts (fall '23)
Jack Santillan (summer '24)
Jamie Twadell (fall '23)
Samuel Verdico (fall '23)
Alex Wimmer (summer '24)

Geography Social Science Teacher Education

Courtney Bowe (fall '24)
Tommy Konwent (fall '23)
Lian Leatherman (fall '24)
MK Panek (spring '24)
William Rohrman (spring '24)
Hunter Swanson (fall '24)

Geology

Brodan Belcher (fall '24)
William Finucane (spring '24)
Anthony Gaeti (spring '24)
Ryan Helgersen (spring '24)
Noah Klauss (fall '24)
Nate Lee (spring '24)
Joseph Moll (spring '24)
Celeste Saul (spring '24)
Colin Smith (spring '24)
Lula Staley (summer '24)
David Strubing (spring '24)

Hydrogeology

Aminat Abdulsalam (summer '24)
Benedicta Akrofi (spring '24)
Andrew Dooley (spring '24)
Youmi Hong (fall '23)
Alex Schwartz (fall '24)

CURRENT *faculty*



Dr. Tenley Banik
Associate Professor of
Geology; Petrology,
Volcanology, Geochemistry



Adam Bauer
Instructional Assistant
Professor of Geography



Dr. Amy Bloom
Instructional Assistant
Professor of Geography;
IGA Co-Coordinator



Dr. James Day
Professor of Geology;
Paleontology,
Paleoecology,
Paleogeography



Dr. Alec Foster
Associate Professor
of Geography; Urban
Environmental Change,
Urban Sustainability,
Environmental Justice



Dr. Melissa Heil
Assistant Professor of
Geography; Human
Geography, Urban
Geography, Urban Planning



Dr. Matt Himley
Professor of Geography;
Nature-Society, Political
Ecology, Latin America



Dr. John Kostelnick
Professor of Geography;
GIScience, Cartography,
GEOMAP Director, IGA
Coordinator



Dr. Daniel Kpienbaareh
Assistant Professor of
Geography; GIS/Remote
Sensing Applications,
Natural Resource
Management, Sustainable
Agriculture, Sub-Saharan
Africa



Dr. David Malone
Distinguished Professor
of Geology; Structure,
Stratigraphy, 3-D Mapping



Dr. Catherine O'Reilly
Professor of Geology;
Biogeochemistry, Water
Quality, Hydrogeology



Dr. Reecia Orzeck
Associate Professor of
Geography; Political
Economy, Historical and
Social Geography,
Middle East



Dr. Eric Peterson
University Professor of
Geology and Department
Chair; Hydrogeology, Karst
Hydrology



Dr. RJ Rowley
Professor of Geography;
Sense of Place, Cultural
Geography, Internship
Coordinator



Dr. Wondwosen Seyoum
Associate Professor of
Geology; Hydrogeology,
Remote Sensing,
Hydrologic Modeling



Dr. Aondover Tarhule
Professor of Geography,
University President



Dr. Jonathan Thayn
Professor of Geography;
Landscape Ecosystem
Function Modeling, Remote
Sensing, Latin America



Dr. Lisa Tranel
Associate Professor of
Geology; Earth Surface
Processes; Tectonics and
GIS Applications

CURRENT *staff*



Karen Dunton
Administrative Aide



Barbara Fiest
Civil Service Extra Help



Paul Meister
Coordinator of Academic
Services in Geology,
GEO 102 Instructor



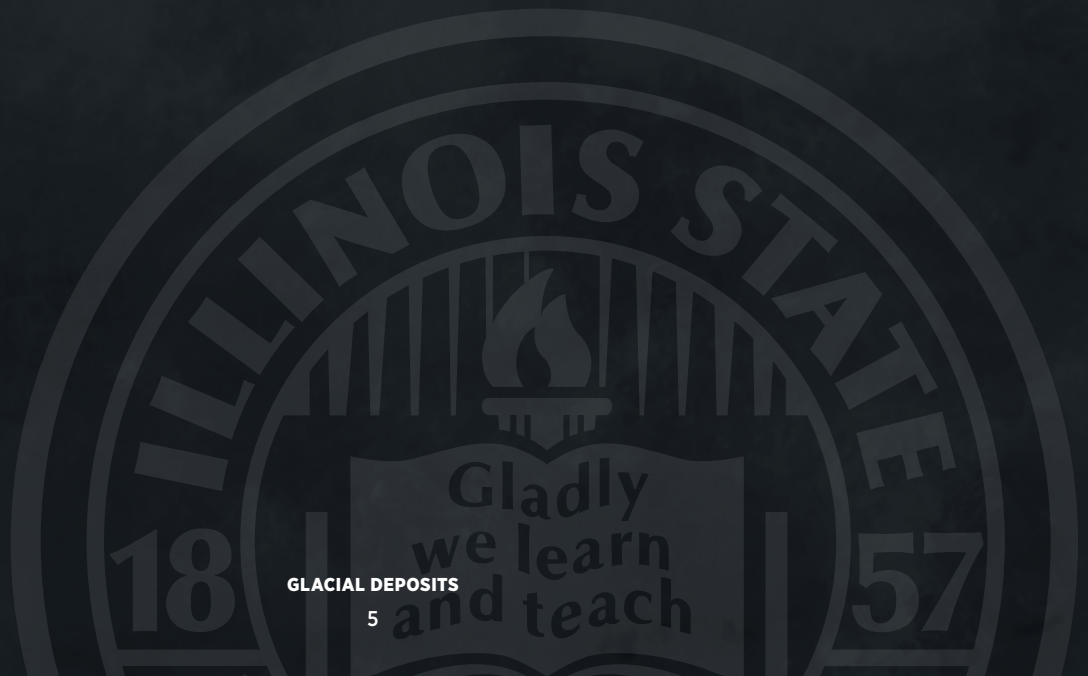
Russell Piontek
LEA Laboratory
Coordinator



Laura Roethle
Accounting Officer



Jill Thomas
Geography Advisor;
Teacher Education
Specialist; Geography
Lecturer



FACULTY SPOTLIGHT

DR. DANIEL KPIENBAAREH

Dr. Daniel Kpienbaareh is a human-environment geographer with an interdisciplinary focus on exploring the impact of human-environment interactions on socio-ecological systems in sub-Saharan Africa, mainly in Malawi, Ghana, and Rwanda, with new frontiers opening in Tanzania and Zambia soon. Specifically, Kpienbaareh applies geospatial techniques and community-based participatory approaches to explore issues about food insecurity, co-produce and implement agroecological and other sustainable farming strategies among smallholder farmers, develop collaborative design of natural resource management strategies, and integrate traditional ecological knowledge with western



Dr. Daniel Kpienbaareh in a hydroponics greenhouse irrigated farm in northern Ghana in June 2024. He is measuring the leaf area indices of bell peppers using a leaf canopy analyzer to assess the impact of the moderated conditions on the health and growth patterns of the crops in the greenhouse.

scientific knowledge (e.g., climate change models) for ecosystem service assessment and climate change adaptation.

Kpienbaareh holds a Ph.D. in geography and environment with a focus on agroecology, ecosystem services, and crop health and productivity in smallholder farming contexts from the University of Western Ontario, Canada; a master of science degree in GIS/remote sensing and cartography from the University of Akron, Ohio; a master of science degree in climate change science and policy from the University of Sussex, UK; and a bachelor of arts in geography and rural development/economics from the KNUST, Ghana.

Most recently, Kpienbaareh's research investigates water use efficiency in irrigation systems in tropical climates for year-round cultivation to improve food security and enhance household income. Initially, he is exploring how hydroponics and greenhouse farming can be used to moderate climate conditions to minimize water use during long dry seasons in Ghana.



Dr. Daniel Kpienbaareh reads air quality monitors in northern Ghana in research investigating the impact of climate and location on outdoor air quality and its impact on human health. He worked with local authorities in July 2024 in a study to highlight the role of changing socio-environmental conditions on health.

He also worked with local authorities in Tamale, Ghana, to monitor air quality in urban areas to assess how socio-environmental changes can affect air quality in urban areas. He used air quality monitors to assess PM_{2.5}, PM₁₀, NO₂, CO, CO₂, and O₃. Ultimately, the goal is to provide evidence-based public awareness messages that highlight the context-specific impact of air pollution on human health. Kpienbaareh has received various external and internal grants, including the New Faculty Initiative Grant (NFIG) and Pre-tenure Faculty Initiative Grant (PFIG), to support his research. As part of improving the learning experience of students, Kpienbaareh regularly integrates his research into teaching by sharing his research experiences, results, and methodologies with students. He has engaged graduate students in the department as his research assistants, and these students have learned valuable skills in remote sensing analysis, coding in R Studio, and professional writing.



Dr. Daniel Kpienbaareh in a workshop with local farmers at a Farmer Training Center in Malawi in 2022. He collaboratively designed ecosystem service assessment indicators to assess the use patterns of ecosystem service strategies for managing them.

As an interdisciplinary scholar, Kpienbaareh adopts a collaborative approach involving local farmers, farmer groups, local non-governmental organizations (NGOs), and other scholars in various universities in the U.S. and abroad. For instance, he has collaborated with and serves on the advisory board of a farmer-focused NGO in Malawi that works to build community resilience through sustainable agriculture and community-based resource management. Kpienbaareh also trains local farmers to use spatial data collection devices such as GPS receivers and tablets to collect spatial and ecological data to facilitate evidence-based decision-making at multi-scalar levels. Other research methods include community engagement, intervention-based observations of farm-level practices, and farmer-to-farmer knowledge co-creation and sharing. Kpienbaareh was awarded the University Research Initiative Award in 2024 in recognition of the quality of the work he has already accomplished and his potential for future accomplishments in research.

Kpienbaareh teaches several courses, including Introduction to Geographic Information Systems, Introduction to Environmental Systems, Earth's Dynamic Weather, and Climate Change, Agriculture, and Sustainable Futures. He has collaborated with faculty in other universities and organizations, including the National Weather Service, to offer guest lectures in his classes. Kpienbaareh has also served on various committees in the department and the college/university, to promote teaching and research in the department and the University.

Faculty awards and recognition

Research Initiative Award

DR. MELISSA HEIL (January 2024)

Excerpt of article by Eric Boerngen published on January 19, 2024

The Research Initiative Award recognizes new faculty members (within their first five years) who have initiated a promising research agenda early in their academic careers.

Dr. Melissa Heil is an urban geographer whose research focuses on barriers to water access in American cities. Her research examines three interrelated aspects of household water insecurity: its structural policy causes, government and non-profit sector responses to address household water insecurity, and emergent geographies of household water insecurity. Her research on household water insecurity began with studies of Flint and Detroit, Michigan, examining the ways that racial inequality in systems of public accounting and debt management contributed to creating water safety and affordability barriers in these cities. Her current research focuses on identifying emerging geographies of household water insecurity in U.S. cities, particularly communities that are at high risk for water service disconnection due to a combination of strict billing practices and unaffordable water rates. Heil joined the Illinois State University faculty as an assistant professor in 2020. She teaches courses in human geography, urban geography, urban planning, and social and cultural geography. Heil holds a bachelor of arts in organizational studies from the University of Michigan Ann Arbor and a master of arts and Ph.D. in geography from the University of Illinois Urbana-Champaign.

Outstanding College Teacher Award

DR. TENLEY BANIK (spring 2024)

Dr. Tenley Banik is an igneous petrologist/geochemist whose research typically focuses on magma formation and chemical processes in magmas prior to eruption; the nature of Earth's crust; and the intricacies of the upper mantle using a variety of mineral and rock-based geochemical methods, commonly in Iceland. She joined the Illinois State University faculty in 2015. She teaches courses in Earth history, mineralogy, igneous and metamorphic petrology, and volcanic processes.

Banik's current NSF-funded research centers around the study of subglacial volcanoes in Iceland. As climate changes and Iceland's icecaps continue to thin, there is increasing concern about the impacts on subglacial volcanic systems and resulting hazards. Dr. Banik and her students seek to answer questions such as: To what extent are silicic materials associated with active volcanoes under the Vatnajökull glacier? How old are they, how did they form, and how do the geochemical characteristics of these systems' silicic materials compare to those in the known rock record elsewhere in Iceland? What hazards do silicic magmas present in this dynamic rift+mantle plume+ice environment?

Banik's degrees include a bachelor of science from the University of Wisconsin and a master of science and Ph.D. from Vanderbilt University.

Outstanding College Service Award

DR. LISA TRANEL (spring 2024)

Dr. Lisa Tranel is a geologist who studies how the Earth's surface evolves over time. Her research investigates interactions between surface processes and tectonics in mountains in Wyoming, West Texas, and New Mexico, as well as modern changes in landscapes driven

by rivers, floods, rock strength properties, and human interactions with their environments in Illinois. Tranel teaches several courses, including Earth Surface Processes; Glacial and Quaternary Geology; Geotectonics; GIS Applications in Geoscience; Natural Disasters; and Career Preparation in Environmental Systems, Science, and Sustainability. She also collaborates with the Illinois Association of Aggregate Producers to offer a summer workshop for K-12 teachers across Illinois focused on geology and mining in our state. Tranel's service roles include geology liaison on the Howard Hughes Medical Institute Driving Change project for STEM students at Illinois State, director on the Association for Women Geoscientists (AWG) Foundation, as well as a participating member on several committees in the Department of Geography, Geology, and the Environment and the College of Arts and Sciences. Tranel holds a Ph.D. in geosciences from Virginia Tech, a M.S. in geology from the University of Illinois Urbana-Champaign, and a B.A. in geology from Lawrence University.

Kenneth and Mary Ann Shaw Teaching Fellowship

DR. REECIA ORZECK (spring 2024)

Dr. Reecia Orzeck is a human geographer whose work straddles several sub-disciplines—political-economic, historical, and Middle Eastern. She teaches courses across the geography curriculum including World Geography, Political Geography, Career Preparation in Geography, and Qualitative Research Design and Methods in Human Geography. In recent years, she has engaged in several Scholarship of Teaching and Learning projects to better understand how to teach more effectively. In 2024, she was awarded the Kenneth and Mary Ann Shaw Teaching Fellowship for a project that explores how to encourage students to ask their own questions in class, and to assess the effectiveness of different pedagogical practices aimed at getting students to ask their own questions. She is also currently engaged in a project aimed at better understanding how undergraduate students learn about and navigate the application process for graduate school in geography. Orzeck holds a Ph.D. in geography from Syracuse University, a M.A. in geography from York University, and a B.A. in geography and religion from Queens University.

Influential ISU Faculty/Staff Educator

PAUL MEISTER (June 2024)

Paul Meister was recognized as an Influential ISU Faculty/Staff Educator by graduating student teachers and alumni. Student teachers were given the opportunity by the Cecilia J. Lauby Teacher Education Center as part of Teacher Appreciation Week to recognize both an Influential ISU Faculty/Staff Member and an Inspirational PK-12 Educator.

Austin Poschner, class of 2023

"Paul is truly an amazing teacher. He cares about every one of us to an extent I would have never imagined. From the first time we met, he has inspired me to pursue education and be the best that I can be. He has a passion for education and geology that is unmatched considering he has an entire museum in his office. Paul is my inspiration for being a teacher, and he has been highly influential in my teaching career so far."



Students volunteering at the MAPS Conference
October 18-20

Geology Club happenings

By Geology Club

In the fall 2024 semester, Geology Club was been more involved with hosting events for students within the major, with a goal of extending outreach to any students who may be interested in geology as a whole. Some events that we have held for members this year include geology-themed bingo night and Halloween movie night. The club also volunteered to oversee the fossil dig table

at the Mid-America Paleontology Society (MAPS) Conference hosted in Springfield in October. Geology Club also had an ice skating day to finish off the semester on a high. As a club, we also assisted children in the Bloomington-Normal community by donating wrapping paper and wrapping gifts in partnership with the Center for Civic Engagement during December.

Geography Club reflection for the fall 2024 semester

By Geography Club

During the fall 2024 semester, Geography Club continued to host biweekly meetings and hikes for majors of the department and those interested in geography and hikes. The goal is to grow the club while trying to show geography through a different lens. We wanted to make hikes as consistent as meetings to help with growth. Besides hikes, we held a scavenger hunt around campus, game night, and trivia event again. We created our own geocaches to hide. Members brought in food for a potluck that has been held during the week before Thanksgiving. Dr. John Kostelnick was invited to give a talk about his experiences with geography and why he cares about it. We are hoping to have the

Downtown Block Blitz when it is warmer. As a club, we want to show more of what

geography is and be more engaged within the community.



Students after hiking at Matthiessen State Park on September 7, 2024, and Merwin Preserve on September 21, 2024



New Stevenson Center director announced

By Amy Scovel

The Stevenson Center for Community and Economic Development is pleased to announce its new director, Dr. John Kostelnick. Kostelnick has been with the Department of Geography, Geology, and the Environment at Illinois State for 17 years and served as acting chair of the department

during one of the most challenging times of recent memory, the 2020-21 academic year.

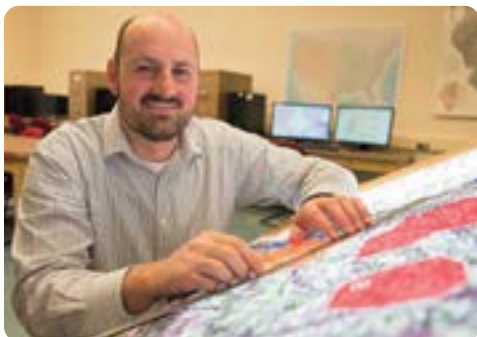
His research is at the intersection of geographic information science (GIScience) and human geography. This work has focused on a range of societal and community issues through a geographic lens, including crisis/hazard mapping, access to public transportation, functional needs and wellness assets mapping, and rural broadband access. His knowledge and scholarship regarding modern geographical challenges to communities complement the aspirations of Stevenson Fellows intending to go out and meet those and other challenges in the field.

"I look forward to working with the Stevenson Center staff, students, and affiliated faculty and partners to

advance the important mission of public service in our local communities and around the globe." —Dr. John Kostelnick

Associate Vice Provost of Research and Graduate Studies Dr. Craig McLauchlan is looking forward to working with Kostelnick in his new role, noting, "He is an accomplished, interdisciplinary scholar who brings his past leadership experience to help build on the existing strengths of the center."

Dr. Frank Beck, the former director of the Stevenson Center who retired in June, envisions a bright future with Kostelnick as his successor. "John is a great teacher, a great scholar and civically engaged," Beck said. "The amazing students the center draws to Illinois State University will be further drawn to John's intellect and passion for applied research."



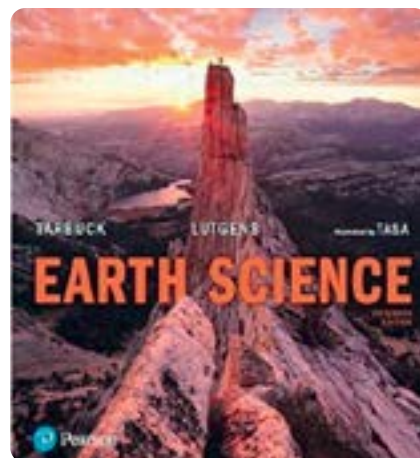
CAS Hall of Fame inductee: Fred Lutgens

In April 2024, Fred Lutgens '67, M.S. '70, was inducted into the College of Arts and Sciences Hall of Fame. He received his bachelor's degree in geography from Illinois State in 1967. His following year was spent as the graduate teaching assistant in the Illinois State geology lab. Lutgens was awarded his M.S. in 1970. Following a year of teaching in suburban Chicago, Lutgens joined the faculty at Illinois Central College. Being part of a new and rapidly growing community college provided many challenging and rewarding opportunities. During his years at ICC, Lutgens introduced the earth sciences to an estimated 15,000 students. In 2014, the college named the newly renovated geology lab in his honor.

Beginning in the mid 1970s, Lutgens and his close friend and colleague, Ed Tarbuck, began their journey as textbook authors with their publication of the introductory college text, *Earth Science*, a survey of geology,

oceanography, meteorology, and astronomy. Forty-eight years later, the 15th edition of *Earth Science* is still going strong. Lutgens and Tarbuck subsequently coauthored four additional college texts for introductory students—*Essentials of Geology*, *The Atmosphere: An Introduction to Meteorology*, *Earth: An Introduction to Physical Geology*, and *Foundation of Earth Science*. They also wrote a laboratory manual and a popular high school earth science textbook. Lutgens and Tarbuck have produced 73 editions of their still widely used books. Today their books (often referred to as courseware) are well known for their effective pedagogy and innovative use of technology. There have been multiple editions in Spanish, Korean, and Italian. Students can also learn from Turkish and German editions.

On three occasions, Lutgens and Tarbuck have won awards for excellence from the Text and Academic Authors Association. This past



year, Lutgens enjoyed an online post by Bill Gates. Gates discussed “looking around for the best book” to help him gain a “better grounding” in climate change. He said, “I especially recommend *The Atmosphere* by Lutgens and Tarbuck,” because “it’s quite accessible for those motivated to learn how Earth’s climate works.”

Research collaboration with high school student

By Dr. Wondy Seyoum

Over the past two years, I have had the pleasure of working with Shourya Mehta, a dedicated senior at Adlai E. Stevenson High School, in Lincolnshire. Mehta first reached



out to me in 2022, eager to learn more about my research on the expansion of Lake Beseka in East Africa, which was

published in the *Journal of Hydrology*. Since then, he has consistently pursued opportunities to contribute to meaningful research. Last year, he took on a project investigating potential mitigation strategies for Lake Beseka’s expansion, applying satellite-based remote sensing techniques.

Mehta’s contributions have been invaluable as we explored remote sensing methods to assess environmental impacts and test mitigation strategies. His primary focus was on data analysis using Python, where he calculated irrigation water demand and return flow by refining FAO water requirement data with NDVI estimates derived from satellite

imagery. These data are further used to optimize the mitigation strategy to decrease the lake level expansion through pumping. It is a pleasure to share that Mehta is now a coauthor on our research and presented our findings at the American Geophysical Union (AGU) Conference. He was also awarded a \$1,000 AGU travel grant to attend the conference. I am confident that Mehta’s passion and skills will drive significant contributions to environmental and earth sciences in the years to come.

ISU scientist prospects for strategic minerals

WGLT | By Charlie Schlenker

An Illinois State University scientist is part of a national effort to find materials crucial to grow a green economy and support a modern tech-dependent economy.

Geologist and distinguished professor Dave Malone is helping geological surveys in several states look for lithium, cobalt, and rare earths used to make batteries for electric vehicles and other high-tech products.

"Let's say we can wave our magic wand and make all our electric vehicles tomorrow. We'd only have a fraction of the commodities we would need to actually be able to do that," said Malone.

The U.S. relies on other countries for lithium and rare earths, but the federal government has begun funding a systematic search for the resources.

"I think that it's going to take some time, but the federal government is really investing heavily in strategic minerals through grants to the state geological surveys. And that's things like your rare earths, your cobalt, your lithium, the things that we need. Some of that \$2 trillion investment package that went through Congress a couple years ago, is filtering down to exploration," said Malone.

There are deposits of strategic minerals in the U.S., Malone said, but commercial viability depends on the concentration.

"You have to be able to get at something. Is it cheap enough to be able to get out? For example, copper. There's a lot more \$10 a pound copper around, and there is \$2 copper. It all depends on what the extraction costs are," said Malone.

There also can be environmental concerns. He noted certain states like Minnesota prefer not to have any mining.

"If you have the 'boundary waters,' who would want to see a copper mine in a place like that? In places like Nevada, or Arizona,

where historical mines operated, they still operate. Some of these mines are more than 100 years old. We're getting lower grade, but big volume to make the economics worthwhile," said Malone.

One historic rare earth mine is on the boundary between California and Nevada. It was put out of business because the Chinese could do it cheaper. Since it's a strategic issue, there are efforts to bring that one back online, said Malone. Another mine in the Bear Lodge mountains of the Black Hills is close to breaking ground.

"So, something's going to be better than nothing," said Malone.

Sometimes you can find what you need in places humans already have touched. Malone is working with the Illinois State Geological Survey on one such opportunity.

"One is the ash from the combustion of coal, for rare earths. There's lots of fly ash pits next to power plants that might happen to be, for whatever reason, enriched in some of the things that are useful," he said.

Another opportunity could be to process salt water from old oil wells to extract and concentrate small amounts of lithium.

"If you look at an oil well in Southern Illinois, 99% of that is salt water and 1% of it is oil, but they keep it circulating, and they can keep that small 1% production going essentially indefinitely," said Malone. "There's not a lot of oil coming out of the well. So that's the first place we're looking for some of these commodities—old mine spoils, places where we mined before that have already been disturbed. Can we go in there and look? Or is there something we're already doing that we can maybe take a little lithium along the way."

Malone spends his summers with students doing basic research on what rocks are



Dr. David Malone

where in the U.S. and what their structures are. Malone said you'd think much of that would already be known, but really only about 20% of the U.S. has been surveyed at that level.

In Wyoming, he's surveying certain kinds of granite. When granite is exposed to air, part of it will oxidize. Anything with feldspar in it will turn to clay. And water reacts with granite as well to dissolve away things in which humans do not have an interest.

"The minerals that hold the rare earths happen to be really durable in a weathering environment. They're in the sand that was left behind from that weathering event," said Malone, adding the easiest place to look is where somebody else has found it. Once you run out of things like that, you have to be creative.

"I tell my students all mineral prospects or energy prospects are originally found in your mind. You have to think how mother nature can do these things," he said.

From Malone's research, he said other people will better know where to look for materials the nation must have to move into a green energy future.



Dr. Chris Haring

2024 Foster Lectures

In 2024, the department had the opportunity to host two Foster Lectures. In the spring, Dr. Chris Haring '95 presented "Rio Coca, Ecuador Regressive Erosion." Haring is with the U.S. Army Corps of Engineers (USACE), where he leads

research and development in water resource studies focusing on river engineering and mechanics, geomorphology, sediment management, and watershed assessments. He is the USACE lead for developing the international fluvial EWN-NNBF guidelines manual collaborating with partners from the UK, Netherlands, and others. He continues to work in the Engineering with Nature-Natural and Nature-based Features (EWN-NNBF) working group on developing technical notes and reports documenting

the EWN initiatives and applications. His current research includes leading the working group on a multi-year project to update the USACE Streambank Manual with EWN-NNBF focus and further develop two geomorphic assessment tools, FRAME and FluvialGeomorph.

In the fall, Dr. Scott Maguffin (M.S. 2007) presented "Redox Dynamics and the Fate of Nutrients and Contaminants in Groundwater, Wetlands, and Agriculture." After graduating from the Hydrogeology



Dr. Scott Maguffin

Program, Scott completed his Ph.D. in geological sciences at the University of Oregon in 2016, focusing on ground-water arsenic contamination. Following his

doctoral studies, Maguffin worked with the American Geophysical Union's Science Policy Division in Washington, D.C., before undertaking a National Science Foundation Postdoctoral Fellowship at Cornell University. During his postdoctoral research, he collaborated with the United States Department of Agriculture Agricultural Research Service (USDA ARS) to investigate irrigation strategies and contaminant and nutrient concentrations in rice paddy soils and rice grains.

In 2022, he became an assistant professor in the Department of Earth and Atmospheric Sciences at SUNY Oneonta. His research interests include biogeochemical processes in groundwater, wetlands, and rice paddy soils, with a particular focus on the impact of sustainable irrigation methods on soil redox processes and the nutritional content of rice.

Summer research in Iceland

By Alaina Glover and Ruby Garey

Last summer, we took part in an exciting volcanic research project under the guidance of Dr. Tenley Banik in Iceland, focusing on the Kverkfjöll volcano and Jökulsárlón. We had two main research objectives: to identify and characterize rhyolites (rocks with $>70\% \text{SiO}_2$) at Kverkfjöll, and to better understand the compositional diversity of bedrock (including presence of rhyolites) under a section of Vatnajökull ice cap by sampling moraine clasts around Jökulsárlón. Along with our collaborators from Lafayette College, including three other students, we gained experience analyzing each rock sample's major element composition using a portable X-ray fluorescence (pXRF) machine, taking good field notes, learning how to organize a research project with multiple participants, and discovering how to navigate the Icelandic geography. We also enjoyed some geotourism, including visiting spectacular basalt columns, various geothermal areas, and taking the ferry to the volcanic island Heimaey. We treated ourselves to an Icelandic mocha at the Viking Café and partook in some fun kite flying. One of the



Alaina Glover, Ruby Garey, and two Lafayette College collaborators boarded the boat at Jökulsárlón to travel closer to the foot of the glacier for moraine sampling.

most memorable experiences of the trip was traveling across Jökulsárlón, a glacial lagoon, in a small boat with a member of the local search-and-rescue team, weaving around icebergs as we made our way to our sampling sites. Another unforgettable experience was hiking over 12 miles to collect sediment samples from the Kverkfjöll volcano. After our field season was complete, we then spent two weeks at Lafayette College process-



Home base for collecting samples from Kverkfjöll volcano. We slept outside but cooked meals and did science in the evenings inside the hut.

ing our samples for further analysis and continued the zircon separation process back at Illinois State during the fall semester. We are continuing our research throughout the spring and aim to present at the joint GSA North-eastern/North-central section conference in spring 2025.

Sedimentary Geology field trip report

By Preston Kietzman, Emily Laureano, and Gabby Montano

Over the weekend of October 11–13, the GEO 295 Sedimentary Geology class had the opportunity to attend and participate in the 76th annual Tri-State Geological Field Conference. On this trip our students got to observe a variety of sedimentary rocks and better understand the

environments in which these rocks form.



The 2024 Tri-State Geological Field Conference



Continue on Page 12

The field conference focused on geology in the Driftless Area and focused on Silurian–Ordovician stratigraphy in the Upper Mississippi Valley. Two different quarry sites were visited, which gave many students on the trip their first experience of being in a

professional geological setting. The keynote speaker for this year's Tri-State conference was Pat McLaughlin, an alum of the Illinois State University geology program. Pat is a specialist in Ordovician stratigraphy and spoke on the occurrence and distribution

of critical mineral enrichment of the basal Maquoketa Graf Phosphorites. Overall, this was a great opportunity for us to gain field experience and we appreciate the efforts of the organizers and more experienced participants to help us learn.

Personal impact: Report from a first-time field conference attendee

By Carmen E. Harrington

In October 2024, I had the privilege of attending my first field conference. The Society for Sedimentary Geology Great Lakes Section held a tri-state field conference where we visited various places within Iowa and Illinois. This field conference was the most enjoyable learning experience. Not only did

I find many fossils, but I was also exposed to various ways that geological resources are used that were unknown to me before. We visited several quarries, state parks, and a cave system. The keynote presentation during the banquet about mining for rare earth minerals by Pat McLaughlin broadened my

horizons as to what I can do with my degree. Being in the field allowed me to build on what I've learned in the classroom. Thank you for the educational and riveting opportunity to explore the Midwestern landscape with a geological perspective.

Students explore quaternary landscapes of western Tennessee

By Dr. Lisa Tranel

From March 22-24, 2024, six students from the Earth Surface Processes course (GEO 380) joined Dr. Lisa Tranel on a field trip hosted by the Southeastern Cell of the Friends of the Pleistocene. The field excursion visited several state parks and field sites north of Memphis, Tennessee, to learn about the interconnected geologic and geomorphic processes that influence this area. Faculty and graduate students in geology and geography from the University of Memphis shared their research results and expertise on Eocene stratigraphy, earthquakes associated with the New Madrid Fault Zone, Mississippi River fluctuations and erosion, and groundwater

resources for the city of Memphis. We had the opportunity to observe great geomorphic and geologic features including landslides, slumps, terraces, faults, and folds. We stopped at Reelfoot Lake State Park to visit the lake formed by fault displacement during the earthquakes in the winter of 1811-1812 and observe bald eagles in the bald cypress

trees. We also enjoyed a warm and sunny lunch on the bank of the Mississippi River. It was a bit rainy the first night camping out at the Meeman-Shelby Forest State Park, but conditions were much improved for the rest of the trip. We were all grateful for the Powell Fund to cover our transportation costs for this trip.



Students walking along the boardwalk through bald cypress trees at Reelfoot Lake



Participants on the last day of the field trip outside the Meeman-Shelby Forest State Park

Fourth Volcanic Processes field trip: More students, more volcanism

By Lauren Driggs

The spring 2024 Volcanic Processes class led by Dr. Tenley Banik took a trip to explore the volcanics of Nevada and California. We started out in Las Vegas, but quickly vacated to the desert to set up camp. On day two, we got to see the “Charlie Brown Highway” roadcut, which is a textbook outcrop of regional explosive volcanic history; a cinder cone in Death Valley; and a fault scarp before proceeding to Bishop. On day three, we started the day by visiting Knopf’s Knob, which is an interesting combination of basalt and granite intermingling, then spent the rest of the morning at Chalfant Quarry examining several Bishop Tuff ignimbrite units from the ~767 ka eruption of Long Valley

and reconstructing part of the eruption history. After lunch, we geologized in the Owens River Gorge, observing the bottom-to-top shift in the Long Valley eruptive units that are closer to the vent and adding that information to the morning’s eruptive history. We ended day three at a geothermal area in the Long Valley caldera to see rock alteration and discuss geothermal processes. Day Four was exciting with a visit to the beautiful Lake Crowley and its columns, then a snowy hike to Obsidian Dome (with sledding of course), followed by a quick stop to Panum Dome (new this year!), an example of phreatomagmatic volcanism, and ended the trip by discussing tufa precipitates

and water resources at Mono Lake. After getting back to the hotel that evening, the class shared a group dinner before departing in the morning. This was an amazing learning experience that allowed students to improve on their field notes, igneous rock descriptions, stratigraphic columns (with a volcanic twist), and field experience. This would not be possible without the generous contributions to the Powell Fund donors and the efforts of Dr. Banik for organizing and planning, and Paul Meister, Dr. Eric Peterson, and Dr. Galina Shinkareva who graciously agreed to chaperone. The students extend their greatest thanks for this irreplaceable opportunity.



First stop of the trip at Charlie Brown Highway roadcut



Hot Creek geothermal area in the Long Valley caldera



Walking back from Obsidian Dome



Professor Rowley and students in front of Himeji Castle. *Back row, left to right, Ethan Geist, Kyle Schick, Stevie Resler, Micah Gagliano-Campbell, Prof. RJ Rowley. Front row, left to right, Emma Walis, Viviana Ramos.*



Japan Explorations students with group of school kids at Horyuji Temple



Japan Explorations students on the move after visiting Mt. Fuji (background)

Japan Field Explorations 2024: Student reflections

By Stevie Resler

Well, here I am. A man who dreamed of going to Japan for 15 years, and I just did it over the summer. It was everything I hoped it would be and more. I walked on Mt. Fuji, lightheaded due to the high elevation, but it absolutely did not take away from the scenery. I jammed to the Super Mario Brothers theme on a guitar for foreigners. I got served dinner by a robot in a café; went to a baseball game in a massive stadium rooting for both teams; and navigated the rail system during rush hour, squeezing into the tightest of spaces while carrying three bags. I even ventured out into Osaka in the middle of the night to find laundry services and got lost. I would like to tell you about this experience and how it, and all my experiences there, changed me and how I look at life.

I am a 48-year-old non-traditional student. I used to travel with bands as a guitarist and was a music teacher for 23 years. You may think this would make me naturally outgoing, but I am far from it. Sure, I can let loose once I am comfortable, but generally, I keep to myself, speak when spoken to, and never ask for help or directions. As I have gotten older, my introversion has increased. That is why this trip was a big challenge for me.

One of my experiences in Japan is the perfect encapsulation of how I had to break free of my personal boundaries. As I stated,

I went out into Osaka late at night to do my laundry. I misunderstood the hours of availability of the laundry facility in our hostel, and I had no clean clothes for the following day. I had no data plan on my phone while in Japan, so I used the hostel Wi-Fi to find a 24-hour coin laundry. Luckily, there was one a few blocks away. I took a screenshot of the map and headed out on my adventure.

One thing about Osaka, and many towns and cities in Japan, is they are not laid out in a grid. The streets twist and turn, and it is very disorienting. For this reason, and the fact that I had no sun to help me figure out what direction I was facing, I quickly found myself confused. I was looking around for the coin laundry and then for any recognizable locations on the map. I soon had to face the fact that I was lost.

I stopped walking for a few seconds to ponder my situation. "What am I going to do?" Up ahead, a young lady walking her bike was standing at the crosswalk. I decided to use my limited Japanese language skills and ask her for help. I was quite nervous because this was way outside my comfort zone. This, paired with the fact that I have a long beard and am covered in tattoos, both very uncommon in Japan, made the situation that much more uncomfortable.

I spoke to her in Japanese, asking about my current location and tried to explain that

I had no data on my phone, so I could not find the coin laundry. She stared at me with a puzzled expression on her face. She did not understand at all. I was surprised she did not just walk away. I held up my laundry bag and made a washing motion with my free hand while stating "coin laundry." She perked up and repeated, "Oh, coin laundry!" Then she motioned for me to follow her. My relief went through the roof!

We walked for some time through empty streets and alleys before I tried to speak. I managed to convey that I was a university student, that I had been learning Japanese for 10 months, and that I had been in Japan for two weeks. She was very receptive and seemed happy to help me. Before I knew it, we were approaching a coin laundry with a



Japan Explorations students at 5th Station, Mt. Fuji

big “24” on the window. To our surprise, it was closed. All I could do was laugh.

She looked at me with a somewhat embarrassed look, then held up one finger, indicating I should wait for a minute. She pulled out her phone and gave someone a call. While talking, she motioned for me to follow her again. Around the time she completed her phone call, we found the coin laundry, and it was open. I was so happy we found it that I almost forgot to ask her where I was. I had been following her for around half an hour, twisting through the streets and alleys of one of Japan’s largest cities. Through a combination of Japanese, pointing, and a bit of charades, I managed to get directions back to my hostel. She smiled at my display of gratitude and told me she was happy to help. Then she walked off down the dark alley, bicycle in tow.

It saddens me that I don’t even know what her name was. I will never forget her

face, her baggy clothes over her small frame, or her bike that seemed nearly as tall as she was. My final memory of her was her smile before turning away. It will forever be stamped into my memory. As I waited for my laundry, I made a snap on Snapchat talking about how I was “on the other side of the planet without phone data and nowhere near anyone I knew.” I had never been more isolated than on that night. I never panicked, though. I pushed through the fear and asked for help, and she happily obliged.

If I can do that, I have far more confidence than I thought. This memory, along with so many more experiences in Japan, changed me as a person. Since then, I have gotten out more and spoken to more people. In a time where people are becoming increasingly isolated and highlighting only our differences, it is even more important that we talk to each other. This young Japanese girl and Japan itself helped me find something in



Japan Explorations students with up-and-coming sumo wrestlers after a practice in Tokyo

me I did not know I possessed. I will cherish my experience there for the rest of my days.

When we got back to America, a fellow student, having heard many of my life stories, asked me where the trip rated among them. I replied, “This is the best.”

By Emma Walis

Imagine stepping onto a moving platform that hovers over mountains littered with trees, floating down a calm stream listening to a man sing words you do not recognize



Japan Explorations students in front of Kabushima Shrine in Hachinohe City

but do not need to know, or walking on the ocean floor during low tide while the sun highlights a magnificent tori gate before it sinks below the horizon. Experiencing these simple yet remarkable moments in Japan made my jaw drop every single day.

From trying to converse with locals about shared interests, attempting a bidet for the first time, sampling a variety of culturally significant foods, to visiting ancient and historically profound temples and castles, this trip left me with indelible memories. When you’re standing in front of a temple that dates older than the country you are from, you start to realize how small you are, you recognize the power held in these remembrances, and you develop a deeper level of respect. Additionally, physically being at the hypocenter of the Hiroshima and Nagasaki

bombings left an impression on me that no textbook or article would be able to match. These experiences combine and contribute to an individual’s character, and I feel as though I left Japan a different person than when I flew in.

I’d like to highlight some of my favorite memories although, if I could, I’d write about the whole trip. However, for the sake of brevity, one of the most significant memories from this trip came from seeing the Miyajima Water Tori Gate. While this feature alone was breathtaking, this evening was my favorite because of the connections I shared with some of the group members, the realization that I was walking on the ocean floor, and the fact we stayed in a traditional house. I would have never believed someone if they said sleeping on mats on the floor is more comfortable than a bed. I also cherished being at the Chureito Pagoda, overlooking Mt. Fuji. Despite conquering 398 steps and the weather being cloudy, it’s surreal to know you’re at a place people keep as their phone wallpaper overlooking, arguably, the most symbolic geographical feature of Japan.

Lastly, my third favorite memory was visiting Sakurajima, an active stratovolcano. The island was dusted with black ash, and the tropical scenery was quite different from the nature in Hakodate, Hokkaido. While our time here was short, we dipped our feet into a warm foot bath despite the blazing temperatures; I touched the Pacific Ocean for the last time; petted some stray cats; and was offered a free coffee by a local, before we

took a ferry back to the main island. Seeing these geographical features allowed me to realize their magnitude and impact firsthand. I made so many other stark memories that it pains me to leave them out, but within this paragraph, I hope I painted a picture of my time in Japan and maybe encouraged someone to visit this beautiful country one day.

Overall, I am grateful I had the chance to travel to Japan. Dr. RJ Rowley is a fantastic professor who pushed us to see as much as we could in the three weeks we were there and challenged us to really think about the landscapes, culture, and activities. I could not have asked for a better professor, guide, and role model. Imagine you are hovering



Japan Explorations students in front of Great Buddha at Kamakura

above mountains on a ropeway, floating down a serene river listening to a man sing, or walking on the ocean floor underneath a tori gate and know that if you get to experience these places like I did, you will not be the same person you were and you won’t look back.

Becker, Ferry recognized as Alumni Day honorees

The department was proud to welcome Jodi Becker '13 and Liz (Pigg) Ferry '02 as guests for Alumni Day in September 2024.

JODI BECKER '13

Jodi Becker graduated from Illinois State in 2013 with a degree in geography and environmental studies. Following her graduation, she was hired as a GIS intern at Macon County Emergency Telephone System in Decatur and became a full-time employee



shortly after. She has accumulated 10 years of experience through her service as the GIS specialist and the addressing authority in Macon County.

Becker has worked with the ISU geography program, hiring two interns, one of which turned into a full-time employee. Becker now uses her GIS experience as a supervisor at the Central Illinois Regional Dispatch Center in Decatur, where they answer all 911 calls for Macon County. In her spare time, she enjoys exploring national parks with her other half, Tim '12 criminal justice, scrapbooking her vacations, and spending time with her dog, Scout.

LIZ FERRY '02

Liz Ferry is now president of R.W. Harden & Associates, Inc., and a licensed professional geoscientist in Texas with nearly 20 years of experience in the field of hydrogeology and the development of groundwater resources for beneficial use including public drinking water supplies. Areas of expertise

include the design and implementation of exploratory drilling and aquifer testing programs, geophysical logging interpretations for subsurface structural mapping, and developing estimates of groundwater availability, and water quality data analyses. She is experienced in all aspects of hydrogeology with a focus on numerical and analytical groundwater flow modeling, determination of groundwater availability with respect to quantity and quality of water within regulatory limitations, and design and implementation of well construction and wellfield projects.



Geographers travel to Italy for field work



John Kostelnick explores an Etruscan tomb near the Valle Gianni site. (Photo courtesy of Lea Cline)

Geography faculty members Dr. John Kostelnick and Dr. Jonathan Thayn traveled to the Valle Gianni archaeological site in Italy with a project team to conduct field work in May 2024. The site, situated two hours by car northwest of Rome in the countryside near the medieval town of Gradoli, dates to over 2,500 years old during Etruscan times and includes remains of an elaborate fountain, a wine production site, and possibly may have served as a Roman villa. The site is also adjacent to Lake Bolsena, the largest volcanic lake in Europe. Kostelnick and Thayn are assisting Dr. Lea Cline (ISU art history) and Dr. Katie Jasper (ISU history) in their efforts to document and interpret the significance of the site. The project team is supported by an Advancing Research and Creative Scholarship (ARCS) grant program through the ISU Office of Research and Graduate Studies.

One important project objective is to understand the ancient trade network that connected the Valle Gianni site to the rest of the Roman world. For this objective, the project team is documenting the area with available historic maps and aerial photography. They also plan to capture their own aerial imagery and Light Detection and Ranging (LiDAR) data for the area in the broader vicinity of the site to see if they can uncover any additional evidence of the Roman and medieval trade networks in the region that may have linked the site to the outer world.

Another project objective is to reconstruct ancient agricultural practices in the region around the site to characterize the population that inhabited the region. For this objective, the team is constructing a field-level historical GIS database of the region around Valle Gianni by utilizing historical documents and land records acquired by Jasper as well as other geographic information about ancient agricultural practices. By merging these historical documents and other information with modern GIS data layers of the environment, the team aims to estimate the population in the region that the agriculture could have supported. Geography undergraduate student Oscar Barrett is assisting the historical GIS work as a project research assistant.

Like true geographers, Kostelnick and Thayn made sure to find time amidst the field work to explore the cultural and his-

torical landscapes of the region, meet local residents, and enjoy lots of fine Italian food.

For more information about the Northwest Bolsena Archaeological Project, see the following article.



Jonathan Thayn flies a drone to capture imagery of the Valle Gianni site.

Department hosts the USGS Digital Mapping Techniques Workshop Series

Mark Yacucci '98, Illinois State Geological Survey

The Digital Mapping Techniques Workshop Series (“DMT”) 2024 workshop was held May 13-16, 2024, on the campus of Illinois State University. DMT '24 was an in-person event, organized by staff of the Illinois State Geological Survey, the Illinois State University Department of Geography, Geology, and the Environment, and the National Geologic Map Database.

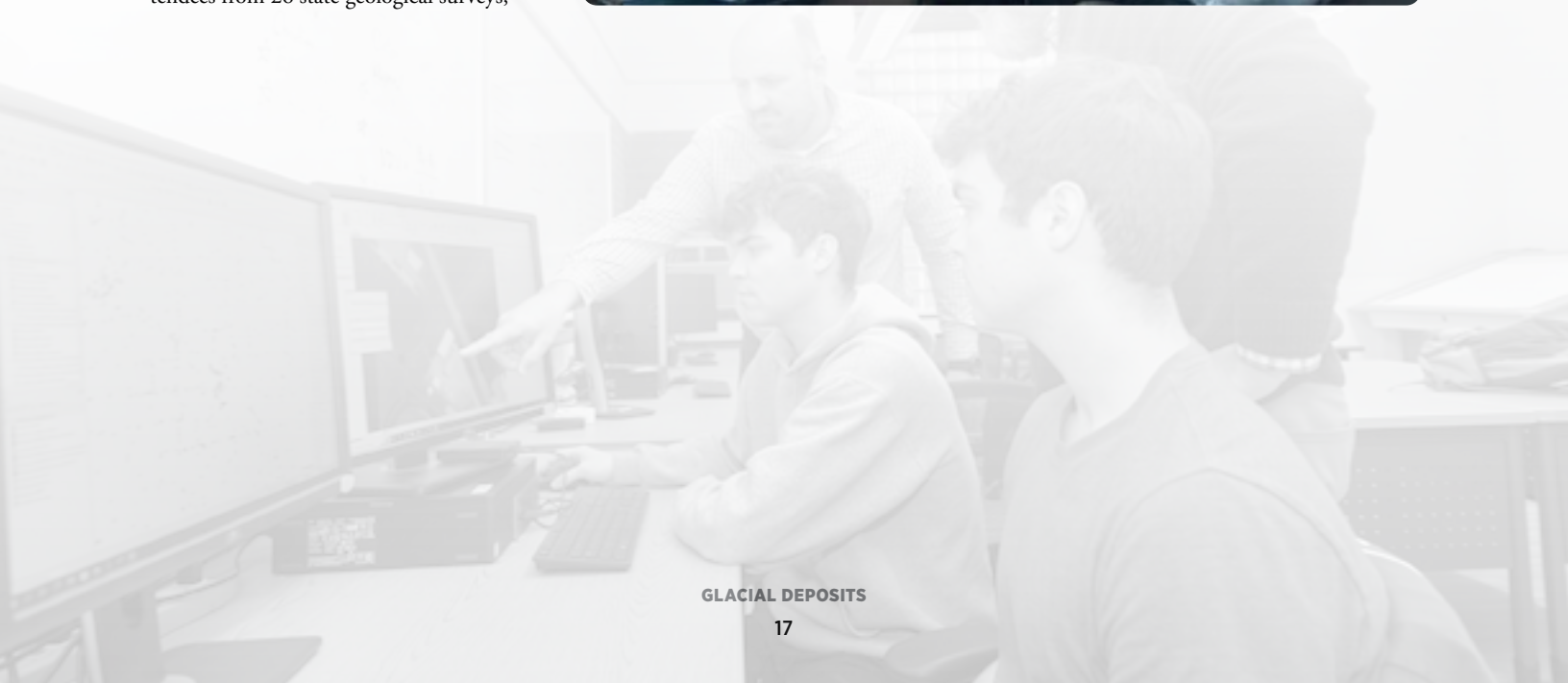
The DMT '24 brought together scientists, cartographers, and GIS specialists, from state and federal agencies, as well as universities, the private sector, and international colleagues. This annual series of workshops began in 1997. It is a highly regarded venue that has contributed to the development and evolution of digital mapping techniques, standards, and guidelines both in the United States and internationally.

The workshop's objective is to foster informal discussion and exchange of technical information and expertise, and to develop more efficient methods for the many aspects of creating, managing, and serving digital geoscience map information. There is not, of course, a single “solution” or approach to digital mapping that will work for each agency or for each program or group within an agency. Instead, each agency must plot its own course, based on personnel, funding, and many other constraints. The value of the DMT workshops and similar forums is their role in helping to design or refine these agency-specific approaches to digital mapping, and especially to find applicable approaches used by other agencies.

This year's workshop had over 70 attendees from 26 state geological surveys,

the United States Geological Survey, and the Geological Survey of Canada. Attendee affiliations included state and federal government

as well as university faculty, students, and industry professionals.



AWARDS and SCHOLARSHIPS

Every year, the department presents student awards that reflect the characteristics we value in our programs. These values include being engaged in department activities, helping each other, working hard, valuing teaching, and excelling in research.

Trilobite Award

Aiden Fanning

To a first-year undergraduate student who has been trying hard and getting engaged in geology program activities.

Gneiss Award

Alaina Glover (undergrad)
Joseph Awuku (graduate)

Given to a student (both undergraduate and graduate) who is engaged in department activities, helps other students, and is generally overall really nice and positive.

Gold Star Award

Nicte Rivadeneyra-Braswell

For research achievement. Given to an undergraduate student who has been involved in high-level research activities, including presenting at a national conference.

Titanium Award

Kasi Legler (undergrad)
Alex Schwartz (graduate)

Given to a student (both undergraduate and graduate) who has a solid work ethic, is fully committed, and just keeps going.

Granite Award

Celeste Saul (undergrad)
Kennedy Cull (graduate)

Given to a student (both undergraduate and graduate) who has excelled in teaching and mentoring students and supporting the mission of teaching at ISU.

Research Initiative Award

Christabel Obi

Given to a first-year graduate student with a promising research direction.

Research Achievement Award

Andrew Dooley

Given to a graduate student with a demonstrated ability to conduct impactful, high-quality research.

Brad and Amber King Field Camp Awards

Lula Staley
Alaina Glover
Julia Lavelle
Ruby Garey

To support students attending ISU Field Camp.



From left, Dr. John Kostelnick, ISU alum Nick Goodwin, ISU alum Brent Crain, award winner Bryce Heiniger, Jill Thomas, and Dr. Daniel Kpienbaareh

major with minors in environmental studies and water sustainability. Heiniger began his geography college career at ISU in fall 2021. He is not only in the Honors Program but also on the Dean's List, and is an Illinois State Scholar. Outside of the classroom, Heiniger was an undergraduate research assistant for two faculty members, a planetarium student assistant, and active member of Geography Club and Gamma Theta Upsilon. He is also a member of the Twin Cities Amateur Astronomy Club and is an Eagle Scout.

Heiniger is a regular participant in departmental events such as GIS Day and won first place in the 2023 Redbird GIS Day Student Research Project. He currently serves as a research assistant on a project with Dr. John Kostelnick that is developing maps for rural counties in Illinois to assist in their advocacy efforts to expand access to high-speed broadband internet.

During summer 2023, Heiniger completed an internship with Illinois State Climatologist Dr. Trent Ford, an Illinois State alum. He was able to study environmental conditions that led to the dust storm in May 2023 in Illinois. This research was highly analytical and assisted the climatologist in future predicting of agricultural dust storms in Illinois.

In January 2025, Heiniger began his online master's program in GIS.

Conference attendance, presentations, awards, and recognition

By Christabel Obi

In 2024, I had the privilege of presenting my research at both the National Association of Black Geoscientists (NABG) Conference and the Geological Society of America (GSA) Annual Meeting.

At NABG, I connected with fellow Black geoscientists, shared insights on advancing diversity in geoscience, and received invaluable feedback on my work. This experience deepened my sense of community and commitment to promoting inclusivity in geosciences.

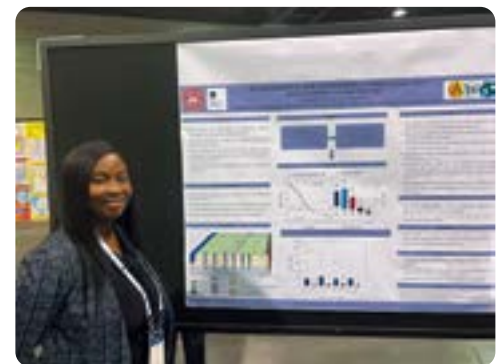
At the GSA Annual Meeting, I presented my thesis research, sulfate sources in groundwater in an agricultural area in Illinois. I was able to engage with experts in contaminant hydrogeology, receive constructive feedback, and gain fresh perspectives on my research approach. Both conferences offered incredible opportunities to build professional networks and enhance my knowledge in geoscience.

I was honored to have received the AWG Sand Student Research Presentation Travel Award, a recognition which supports women in geoscience in presenting their research at the Geological

Bryce Heiniger: 2024 Outstanding Senior award winner for the Illinois Geographical Society

Bryce Heiniger was awarded the Outstanding Senior Award representing Illinois State University's geography program during the 2024 Illinois Geographical Society Annual Meeting in West Burlington, Iowa, in April 2024.

Heiniger's accomplishments have been many. Heiniger is a geography



Christabel Obi presents her research at the GSA Annual Meeting 2024, supported by the AWG Sand Student Research Presentation Travel Award and the GSA North Central Section Student Travel Award.

Society of America's Annual Meeting, as well as the GSA North Central Section Student Travel Grant. These awards, in addition to the Department of Geography, Geology, and the Environment, supported my attendance at the GSA Annual Meeting, where I presented my research and connected with peers and mentors.

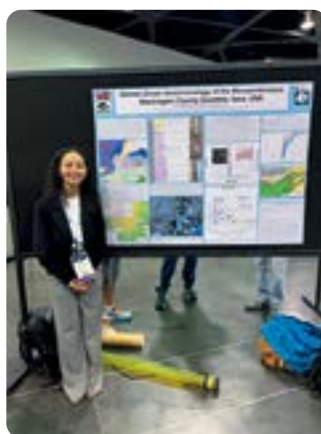
CuRE grant in stratigraphy facilitates experiential learning

By Amira Harris-Bommarito



Students at the University of Arizona LaserChron Center.

As part of Dr. David Malone's GEO 296 (Stratigraphy) course this past spring (2024), I participated in a research project funded by a Course-Based Undergraduate Research Experiences (CuRE) grant. My research focused on characterizing drill core of the Washington County Quartzite (WCQ) from Washington County, Iowa. The goal of the research project was to determine the age of the WCQ and investigate potential source regions of the grains composing the WCQ. Along with several other students, I accompanied Dr. Malone to the University of Arizona Laser Ablation Center to obtain U-Pb ages on detrital zircons from the WCQ and the local Yavapai basement rocks in Washington County for comparison. These data suggest a maximum depositional age of 1740 Ma. We then took a trip to the Iowa Geological Survey's core library, where I could observe and create a detailed stratigraphic column of the core. Using this information, Dr. Malone and I were able to identify the source region of the WCQ sediments. I then put these figures and information on to a "potential" GSA poster," which was my final project for Stratigraphy. After some refinements and changes to the poster, I presented my work at the 2024 GSA Connects conference in Anaheim, California. My poster won the Sedimentology Geology Division/Society for Sedimentary Geology (SEPM) Student Poster Award, which came with a \$500 check. Overall, the CuRE grant allowed me to be part of a research project from start to finish, and not only see how this process works, but be fully hands-on throughout this process as well. This research opportunity helped me grow as a person, expand my knowledge of field and lab work, and better understand the broader science of geology.



Amira Harris-Bommarito presents her research at GSA Connects 2024.



Franklin Ijigade receives the NABG Scholarship award.

Ijigabe awarded NABG and AWWA Scholarships

By Franklin Ijigade

Hydrogeology graduate student Franklin Ijigade was awarded two scholarships from the NABG and AWWA. The NABG (National Association of Black Geoscientists) scholarship is a prestigious award supporting Black students in geosciences and related fields, fostering diversity and encouraging innovative research in earth and environmental sciences. Receiving the NABG scholarship allowed me to dedicate more energy to my research, which focuses on developing groundwater and reactive transport models for understanding nitrate reduction in a heterogeneous

Brad and Amber King Scholarship

Preston Kietzman

Provide financial assistance for high-achieving sophomores, juniors, or seniors majoring in geology.

Dr. Gary P. Holland Scholarship

Emily Laureano

Provide financial assistance for high-achieving sophomores, juniors, or seniors majoring in ESSE.

Eunice Blackburn Geography Scholarship

Andrew Jensen

Edward Latko

Julia Longstaff

Provide support for high-achieving students entering the geography program.

George Means Geography Scholarship

Kaeli Wlock

Provides financial support and encouragement to students of high character with strong professional promise and potential to improve society.

Henry O. Lathrop and A. W. Watterson Award

Devin Durica

Lauren May

America Rosales De Avila

This memorial scholarship honors students who demonstrate academic achievement, good character, and leadership qualities.

Joseph Fluder Excellence in Environment Award

Oscar Barrett

Jack DuFrane

This award recognizes student academic excellence and supports professional development activities, including an unpaid internship experience, participation in professional conferences and related travel, study abroad, or purchase of materials or technology that will enhance the professional growth of the candidate.

Louis Miglio Scholarship

Julia Lavelle

Jack Bradford

Lian Leatherman

The scholarship provides support to Teacher Education students while student teaching.

Margaret Means Geography Scholarship

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Jack Santillan

Lindsey Mullen

Kyler Kradle

Laine Sullivan

Supports geography students pursuing internships that are unpaid or that only carry a small stipend.

Continue on Page 20

Powell Scholarship

Owen Dunham
Jana Kadel
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Emma Reichardt
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To provide support for new freshmen in the geology program.

Steve and Lori Nalefski Scholarship in geology

Amira Harris-Bommarito

To support high-achieving geology majors.

William E. Shields Scholarship Memorial Scholarship in geology

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Provide support for transfer students transitioning into the geology and ESSE majors.

Michael D. and Patricia A. Sublett Geography Professional Development Fund Award

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Calvin Croy
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Eric Hedden
Greg Larsen
Lauren May
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Viviana Ramos
Mary Salins
Laine Sullivan

Provides support to geography majors to offset the cost of education, including paying for necessities of life, academic and otherwise.

Earth and Space Science Education (ESSE) Professional Development Fund Award

Emily Gordon
Hailey Kuhn

Provides funds to ESSE majors to offset the cost of education, including paying for necessities of life, academic and otherwise.

formation of glacial till with the aim of enhancing sustainable strategies such as the saturated riparian buffer for improving water quality of both groundwater and surface resources. Furthermore, winning the NABG scholarship has expanded my professional network, connecting me with mentors and experts who share similar research interest in hydrogeology. This recognition has validated my work through the support of my supervisors and strengthened my confidence as I prepare for the next step.

The American Water Works Association (AWWA) Scholarship is awarded to students dedicated to advancing water resources, water quality, and environmental engineering fields. This scholarship aims to support future leaders in the water industry by providing financial aid and opportunities for professional growth. Receiving this scholarship has been invaluable in enabling me to focus on my research into sustainable water quality solutions, specifically targeting nitrate reduction in groundwater systems. With AWWA's support, I have been able to attend key conferences such as AGU to share my findings, network with industry professionals, and participate in paid groundwater training to further enhance my technical skills and practical knowledge. Overall, the AWWA Scholarship has strengthened my expertise and positioned me for impactful contributions in water resources management.

Fall 2024 FIREBird and BirdFEEDER grant winners announced

By Eric Boerngen



The Office of Student Research (OSR) at Illinois State University announced the winners of the fall 2024 FIREBird and BirdFEEDER research grants. These small grants provide funding to support student research, scholarly inquiry, and innovation at Illinois State. The FIREBird Awards provide undergraduate students with funds for Faculty-mentored Independent Research Experiences (FIREBird). Up to \$1,500 may be used for student hourly wages, research incentives, supplies, or travel. The BirdFEEDER Awards (Fund for Experimentation, Enquiry, and the Development of Student Research) provide graduate and undergraduate students with up to \$500 to use for research supplies, materials, or travel to conduct research.

This semester's recipients are (Note: Three of the nine FIREBird awards were from the Department of Geography, Geology, and the Environment):

FIREBird

Alaina Glover, Department of Geography, Geology, and the Environment, "Unique feature of prominent flow banding in basalts sourced from Kverkfjöll Volcano, Iceland." Faculty Mentor: Dr. Tenley Banik.

Aaron Jacob, Department of Geography, Geology, and the Environment, "Guadalupe Mountains Erosion: Tracing and dating the detrital and stratigraphic origin of sediments from stream channels." Faculty Mentor: Dr. Lisa Tranel.

Gabby Montano, Department of Geography, Geology, and the Environment, "What lies beneath: An investigation of subglacial magma systems (Esjufjöll, Iceland)." Faculty Mentor: Dr. Tenley Banik.

Students awarded FIREBird grants for Icelandic research

By Dr. Tenley Banik

Geology majors Alaina Glover '24 and Gabby Montano each received FIREBird grants through ISU's Office of Student Research to conduct research projects with Dr. Tenley Banik this year. Glover's project stems from observations she made in the field in Iceland. At Kverkfjöll volcano, the prominent and copious flow-banding in basalts is an unusual feature that is typically associated with rocks crystallizing from high-viscosity magmas, not low-viscosity basalts. Glover will use a combination of petrography, SEM imaging of textures, electron microprobe analyses of glass



Alaina Glover in Iceland, summer 2024

compositions, and mathematical calculations in a suite of flow-banded samples to ascertain the potential range of viscosity and temperature conditions these samples likely experienced. Her work will help us to better understand the different types of magmas erupting from this understudied, but active, volcano.

Montano's project involves the characterization of moraine-derived clasts that we hypothesize to originate from Esjufjöll volcano, Iceland. Esjufjöll is almost entirely ice-covered, so using glacial erosion to bring the samples to us is the easiest way to obtain samples. Existing Esjufjöll data indicate some

unique geochemical characteristics, including very zircon low oxygen isotope values. Montano separated zircons from our new moraine clasts and will analyze their O isotope values (and eventually other geochemical parameters) to determine if they are derived from the volcano or not. Our recent data suggest that Esjufjöll is still an active system, which was previously unknown. If determined to be from Esjufjöll, the data from these new moraine clast samples will allow a much more complete picture of the volcano's magmatic history to be determined. The volcano looms over one of the most iconic tourist attractions in Iceland—Jökulsárlón, a

glacial lagoon that has been featured in several films and TV shows—so understanding its history and behavior is important for hazard mitigation.

Both Glover and Montano aim to present their work in 2025.



Gabby Montano hand-picking zircon for analysis

Departmental Undergraduate Research and FIREBird grants support student research in the Guadalupe Mountains

By Dr. Lisa Tranel



Geology major Aaron Jacob received an Undergraduate Research Grant from the Department of Geography, Geology, and the Environment for summer 2024 and a FIREBird grant

from the ISU Office of Student Research for fall 2024 and spring 2025. Jacob's project

is focused on analyzing sediment characteristics to understand erosion patterns in the Guadalupe Mountain stream channels. The first part of his project is focused on assessing the quality of apatite minerals to determine their potential for application of low-temperature thermochronology to trace sediments to their bedrock sources in small stream catchments. The second aspect of Jacob's work is to characterize the roughness of and weathering of gravels in active stream chan-

nels and on terraces above the active channels to identify if this method can provide a useful tool to assess the strength, weathering, and relative age of fluvial sediments or bedrock surfaces over time. The results of Jacob's work combined help us understand the evolution of the Guadalupe Mountains landscape in response to long-term climate change and tectonic uplift in this region of west Texas and southeast New Mexico.

Internship and presentation summary

By Joseph Larbi Awuku

This past summer was a big learning experience for me as I received hands-on training in water quality monitoring in nature preserves and prairie areas, environmental site assessment for groundwater contamination, and restoration of wetlands. Some highlights from the internship include visits to Lake in the Hills Fen Nature Preserve and Bluff Spring Fen Nature Preserve for surface and groundwater sampling, a visit to the Illinois Industrial Carbon Capture and Storage site in Decatur to learn about carbon sequestration, and presenting a research project on chloride monitoring and prediction in nature preserves. Taking this internship provided me with the opportunity I have always sought to apply knowledge learned in school, and it has helped me properly define the career path I want to pursue as a graduate student.

I also had the privilege of giving a poster presentation of my thesis research titled "Investigating heterogeneity of hydraulic conductivity and its influence on groundwa-



Joseph Larbi Awuku presents a model for predicting chloride he developed as part of his internship project research.

ter flow dynamics within a saturated riparian buffer" at the National Association of Black Geoscientists and the Geological Society of America's Connects 2024 conferences. This

was an inspiring moment for me as I shared the findings of my research with other scientists in geoscience and learned about diverse research carried out in hydrogeology.

U.S. Forest Service internship

By Kyler Kradle

My name is Kyler Kradle, and I'm currently a senior studying geography and environmental studies. Over the summer of 2024,

I moved to Southeast Alaska and interned with the U.S. Forest Service through the Student Conservation Association (SCA), a nonprofit organiza-



tion that helps young students get involved with the environment and conservation. My direct position was as a trails intern for the Petersburg District in the Tongass National Forest.

Our trails crew was made up of five interns, including myself, a permanent seasonal employee, and our supervisor. We worked on one major project followed by many other smaller tasks and missions along the way. Our main project was the Petersburg Lake Trail, a three-year funded project to restore the trail for local and tourist use. Since the trail is on a different island than our district, we had to travel to our worksite locations via float plane or jet boat. Our team spent five hitches (a "hitch" referring to a set period of work time) clearing trail and prepping puncheon logs while camping on site. Other projects included repairing broken bridges, improving staircases, and

clearing other trails.

Being on this island all summer helped me be a part of a local community and take part in their culture. Petersburg is a major fishing port with tons of history leading back to its Scandinavian descent. But even before that, the land was home to Native Alaskan tribes. I had the luxury of seeing the remainder of two different handmade fishing traps that are still intact and visible when the tide moves out. I also participated in their "Mayfest" and Fourth of July parade by playing different games and supporting small businesses on the island.

Other SCA employees, like wilderness and cabins crews, also played a huge role. We traded job assignments, giving ourselves opportunities to explore various locations and experiences. We also worked together on certain tasks like our crab survey, looking for the invasive European Green Crab. But more importantly, we all became friends and hung out on days off, exploring the nature around us. We traveled by pack raft and kayaks to nearby islands to camp and fish. We also took a trip to Juneau, Alaska, to explore and learn about the Mendenhall Glacier and hike nearby mountains.

Every day was an adventure full of new experiences while bonding with my crew and making new friends along the way. I experienced the Northern Lights for the first time and came face to face with new animals I have never encountered before. For example, I woke up to a moose in front of my tent so close I could touch it. I learned a lot as far as working outdoors and with new



tools, but, more importantly, I learned how to work with a team and embed myself into a new community/culture. This internship helped me grow as a geographer, through both physical and societal aspects, learning about the land, its history, and how it is used today along with its connection to plants and animals.



Using a LiDAR scanner to measure the dimensions of a mine heading while underground

Summer internship opportunity: Sibanye-Stillwater, geology intern

By Preston Kietzman

I am Preston Kietzman, a junior geology major. During summer 2024, I had the opportunity to intern for Sibanye-Stillwater mining company at their Montana operation. I spent a few weeks with the development geologists logging core and better understanding the rock units that compose the "Stillwater Complex." I then got to spend about four weeks of my internship underground with grade control geologists finding contacts between the footwall (rock unit before the ore zone), the ore zone, and the hanging wall (rock unit after the ore zone). I also got experience using Vulcan

software. It was very interesting seeing how the ore zone and structural features such as faults or dikes are projected digitally from information gathered by development geology onto a computer screen prior to being mined by the production mining crew. I also spent time working on a project that utilized Vulcan block modeling to best predict the ore grade in the sub-level extraction mining process. These experiences allowed me to better understand the role that a geologist has in the mining sector. Overall, it was an amazing experience that has interested me in mining.

2023-24 Donors

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