



Guenthner research group reveals the history of the Great Unconformity and the cutting of the Grand Canyon



The view from river level in the Grand Canyon, with the Great Unconformity close on both sides of the Colorado River (photo credit: Professor Laurie Crossey, UNM)

On an 11-day trip through the Grand Canyon, Professor William Guenthner and then-graduate student Olivia Thurston (PhD, '21) attended the Grand Canyon Supergroup Field Forum to examine the Great Unconformity at the base of the Cambrian strata and interact with other geologists studying various aspects of the canyon's geology. Previous editions of this newsletter have reviewed the advanced methods being developed by the Guenthner research group to reveal thermal histories of minerals, and the group's collaboration with Professor Steve Marshak that applied the methods to rocks of the Great Unconformity. Now, expanded work on its global expression is fueled by two National Science Foundation grants to Guenthner.

Researchers have long asked: What caused the 1.3-billion-year gap of missing time at the Great Unconformity? Thurston, now a post-doctoral researcher at Indiana University, led the project to

address this fundamental question using the Guenthner group's cutting-edge methods. Findings were published in the journal *Geology* in an article titled "Zircon (U-Th)/He thermochronology of Grand Canyon resolves 1250 Ma unroofing at the Great Unconformity and <20 Ma canyon carving." Amazingly, the zircon thermochronology approach provides constraints not only on Precambrian erosion but also on the relatively recent downcutting that formed the canyon.

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Professor William Guenthner and Olivia Thurston (PhD, '21), now a postdoctoral researcher at Indiana University.

Spring 2022 Field Course: From flatland glaciers to the Black Hills



Mega-scale cross beds in glacial lake Agassiz flood sediments near Mankato, Minnesota.

The Spring 2022 Field Geology course (415/515) focused on the geologic and geomorphic history of the western Central Lowlands and traveled

through Iowa, southern Minnesota, the South Dakota badlands and Black Hills, and back through Nebraska.

Geology faculty members Alison Anders, William Guenther, Max Christie, Michael Stewart, and Steve Marshak worked together to plan and lead the trip. This field area is the homeland of the Dakota and Lakota people, and we also learned some of the history of conflict and settlement as well as acknowledging the spiritual significance of several of the field locations.

Two major themes were explored in detail: 1) the glacial geology and geomorphology related to the catastrophic drainage of Glacial Lake Agassiz through what is now the Minnesota River Valley; and 2) the geologic history of the Black Hills of South Dakota from Precambrian granite and pegmatite to Tertiary uplift and volcanism. The group saw the Mississippi River in flood roaring over St. Anthony Falls and observed how Paleozoic geology keeps waterfalls steep in Southern Minnesota. They explored the effects of Lake Agassiz floods on the Minnesota and Mississippi Rivers, visited the great unconformity along the Minnesota River valley, and saw the Archean Morton Gneiss. Badlands National Park was the next stop, with a focus on observing spectacular slope processes in the landscape.

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The group at Minnehaha Falls, which was created by knickpoint retreat following downcutting of the Minnesota River during lake Agassiz outburst flooding.

Letter from the head



Craig Lundstrom, department head

Hello all!

One year under the belt as the department head and still surviving! In truth, the first year was fantastic, with lots of great news on the department front.

First, we successfully searched for a new geophysicist, hiring seismologist Ross Maguire (PhD U. of Michigan). Maguire works on mantle plumes, Yellowstone magmatism, and even planetary seismology. He adds the seismology shine to the already stellar geophysics group at Illinois. Next, we successfully nominated Bruce Fouke to become the R.E. Grim Endowed Professor of Geology. His investiture will happen in February. Finally, we have navigated a proposal through a very long process that will eventually change the name of the department. As I write this, we are very near the final hurdles and believe that the new name will be approved and implemented in 2023 (but I can't tell you yet—it's a teaser for next year's newsletter!).

Our new online master's program in Environmental Geology, approved by the Illinois Board of Higher Education in Fall 2021, has been ramping up with advertising and recruiting. We have several students enrolled in the certificate program now and hope to have our first official master's degree students enrolled later this year.

The 2021-2022 academic year was much less impacted by Covid-19 compared with the first 1.5 years of the pandemic. Most 2021-2022 classes were in person, and masking and testing were reduced by the end of the year. Things are mostly back to normal in the Natural History Building. We were able to run a number of field trips during the spring, from a trip to Arizona and Nevada for Intro to Petrology to a trip to Minnesota and the Black Hills for GEOL 415/515. It has been fantastic to get back out into the world, and I know the students appreciate it also.

This is a good time to mention GEOL 415/515 because corporate support for this course no longer exists. Thus, we intend to start a campaign to raise funds for an endowment whose revenues would fund GEOL 415/515 in perpetuity. We have five years to ramp up this endowment, thanks to a gift from a generous anonymous donor (see giving segment). Further, with the rising costs of undergraduate education, we are implementing new undergrad scholarships as a way of attracting more students into our various majors. These are just two of the giving opportunities within the department. We are extremely grateful for the many donations from alumni and friends over the past year.

To see a list of current high-priority giving opportunities and/or to make an online gift, please visit the department website (www.geology.illinois.edu) and click on the "Make a gift" link in the upper right corner. Alternatively, you can give by check. If you need help with any method of donation, feel free to call the department at (217) 333-3540.

We continue to increase our diversity, equity, and inclusion efforts in the department, with knowledge that geology as a field is among the least diverse of the sciences. We continue to address this issue on many fronts, in particular in undergrad and graduate student recruiting. We have also greatly increased our presence at Engineering Open House, a ritual on the campus in April that brings in thousands of visitors. NHB was packed for two days as we showed off the beautiful labs and classrooms that make up modern geological science. Two students even brought home a 2nd place trophy for best in show.

Please drop in whenever you are in the area—we love to catch up with our alumni and friends! Our LinkedIn group, "UIUC Geology Alumni," has over 300 members and is an easy way for our alumni to connect, and to recruit or search for job opportunities—if you're not a member already, please join. And as always, we love to hear from you when you send your news to us at geology@illinois.edu.

All the best,
Craig

Year in Review is published once a year by the Department of Geology, University of Illinois Urbana-Champaign, to highlight the activities and accomplishments within our department and feature news from our alumni and friends.

Department Head: Craig Lundstrom
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www.geology.illinois.edu

iGeology online graduate program is up and running!

After several years of planning and program development, the Department of Geology has begun accepting students into its new iGeology graduate programs, which are designed so they can be completed by working professionals and other students who cannot come to Urbana for the traditional MS program. Students have two options: They can pursue a three-course Certificate in Environmental Geology to gain more skills and obtain a “micro-credential” to boost their career, or they can pursue the full master’s degree.



Dr. Cory Pettijohn

To align with current employment patterns, the curriculum currently focuses on:

- Groundwater and numerical modeling
- Contaminant migration characterization
- Water chemistry and bioremediation
- Environmental geophysics
- Multi-scale geodata analysis

A third component of iGeology aims to provide customized single courses or clusters of courses for organizations wishing to upgrade the knowledge and skills of their employees.

Courses have been developed by Department of Geology faculty and seasoned experts at the Illinois State Water Survey and the Illinois State Geological Survey. The programs are synergistically aligned with similar programs in the departments of Atmospheric Sciences and Geography & Geographical Information Science. MS students complete a customized, industry-focused capstone project that builds relevant science knowledge, independent analysis skills, and writing skills, in lieu of a traditional thesis.

Congratulations to Cory Pettijohn, who is the ringleader and major contributor to this effort and has done a huge amount of work to coordinate the efforts of several faculty and staff, develop courses, and get the programs approved and launched.

Detailed information:
igeology.illinois.edu

Alumni Achievement Award goes to Jack Sharp (PhD, '74)

On Nov. 11, 2021, the department welcomed Professor Jack Sharp (PhD, '74) to campus and presented him with the Department of Geology Alumni Achievement Award. Born and raised in Minnesota, Sharp received a bachelor's degree in geological engineering at the University of Minnesota in 1967. He served in the U.S. Air Force as a civil engineer, then came to Illinois in 1971 to work with Professor Pat Domenico for his PhD. Completing in 1974, he joined the University of Missouri faculty and eventually served as department chair before moving to UT Austin in 1982. Promoted to full professor in 1985, he held a series of named professorships, culminating in the David P. Carlton Professorship from 2002 until his 2018 retirement from teaching.

Sharp has extraordinarily broad research interests, ranging from groundwater flow in fractured rocks, thermohaline free convection, fracture skin effects, regional flow in carbonate rocks, hydrology of arid and semi-arid zones, subsidence and coastal land loss, effects of urbanization, alluvial aquifers, and the hydrogeology of sedimentary basins and ore deposit formation. Recent work on the Edwards Aquifer of Texas culminated in GSA Memoir 215, *The Edwards Aquifer: The Past, Present, and Future of a Vital Water Resource*.



When Sharp joined the hydrogeology program at Illinois, it was known for having produced many leaders of the hydrogeology community. Reflecting on the department's influence on his career, Sharp said, “I was fortunate to work with Pat Domenico, who encouraged his students to define their research focus and thesis topic. I also had some great student colleagues, and greatly benefitted from discussions with them about research and course work (including memorable discussions at the Thunderbird after colloquium). The department also helped introduce me to the national hydrogeology community.”

Sharp has garnered many awards during his career, including the O.E. Meinzer award from the Geological Society of America in 1979, Humboldt Fellowships in Germany (1981 and 1983), GSA Fellow (1988), the C.V. Theis Award (1996), the Founders Award (1998) from the American Institute of Hydrology, and the Barton Springs / Edwards Aquifer Conservation Lifetime Achievement Award (2017).

Sharp was extremely active in service to the profession. He served as president of GSA in 2007-2008 and was a perennial leader of the International Association of Hydrologists (IAH). He served IAH continuously from 1993 to 2016 in a wide range of roles and received the IAH President's Award for outstanding contributions to its missions.

In reflecting on his distinguished career, Sharp advises current students, “Never lose your curiosity and don't be afraid to look outside the current boundaries of your research. Also, take more mathematics courses and spend more time in the field.”

The department is proud to count Jack Sharp among the ranks of its illustrious alumni and is happy to recognize his achievements with the Geology Alumni Achievement Award. Congratulations Jack!!!

Steve Altaner retires after 37 years on the faculty

In the summer of 2022, Professor Steve Altaner retired from the Geology faculty at the University of Illinois after 37 years of dedicated service. Altaner came to Illinois as a graduate student. His research included work on the smectite-illite transformation, K-bentonites, and NMR applications in clay mineral characterization. Several of his group's journal articles have been cited over 100 times.

Starting in the 1990s, Altaner took part in building the department's array of highly successful general education courses. They greatly expanded the number of Illinois students served, strengthened the department's standing with the LAS dean's office, and helped lead to the successes of the past 30 years. Geology 100, developed by Steve Marshak, was taught by Steve Altaner every other semester. It became immensely popular, serving 500 to 800 students per semester. Altaner developed a distinctive teaching style, incorporating lively, sometimes quirky presentations and strategic use of humor. Later, he developed a new course—Geology 118, Natural Disasters—and grew it into the most popular gen ed offering of the department. He was also the developer and perennial instructor of GEOL 333, Earth Materials, and GEOL 380, Environmental Geology. A tally of the number of students he taught over his 37 years comes to over 23,000!



Professor Steve Altaner in his office, early in his career.



Altaner sharing his love for geology with students and faculty on one of the well-loved field trips he led for Geology and the School of Earth, Society & Environment.

Professor emeritus Steve Marshak emphasizes that, "Probably no other faculty member in the history of the department has introduced more students to the magic and importance of geology than has Steve Altaner. His dedication to keeping students interested in the subject is unrivaled."

The Department of Geology, with Altaner as a central figure, has been at the forefront of campus efforts to develop high-quality online course offerings. GEOL 100, GEOL 118, and other gen ed courses have been adapted to be taught online in the summer sessions and other key times. Altaner is a recognized expert at finding ways to maximize the advantages of online learning while devising ways to maintain the high level of student engagement he has always created.

Altaner has also made many other critically important contributions to the department. For more than 10 years, he held three leadership roles related to geology instruction: chair of the courses and curriculum committee, chair of the undergraduate advising committee, and associate head of the

department (responsible for course schedules and TA assignments, among many other duties). In these three interlocking roles, Altaner managed course offerings, helped faculty develop new courses, helped students navigate the geology major, and monitored the health of the department's programs. According to Tom Johnson, past department head, "Steve combined these roles expertly to keep the department's teaching machine humming." His friendly and optimistic advising has brought many students into the department's majors.

Altaner also contributed leadership at the campus level, serving on the General Education Board for six years and chairing it for two. This body upholds standards and plans strategy for gen ed courses, impacting every student on campus during their time at Illinois. And on top of all the above, Altaner planned and ran the fall semester-opening field trip for more years than anyone can remember. Originally, the trip was for only geology students, but in the past decade, it has also involved students from Atmospheric Sciences and Geography and serves as an opportunity for cross-disciplinary friendships to develop.

When Altaner announced his retirement plans in early 2022, the collective faculty response was panic. Faculty who will take over his courses know that he is a "tough act to follow," and his expertise as the leader of the department's teaching enterprise will be sorely missed. We wish him well as he moves on to other endeavors, and thank him profoundly for 37 years as a dedicated and caring teacher, leader, and colleague who represents the best of the University of Illinois.

Give to the Department of Geology!

Your gifts to the department help support students, sustain excellence, and allow us to pursue new initiatives.

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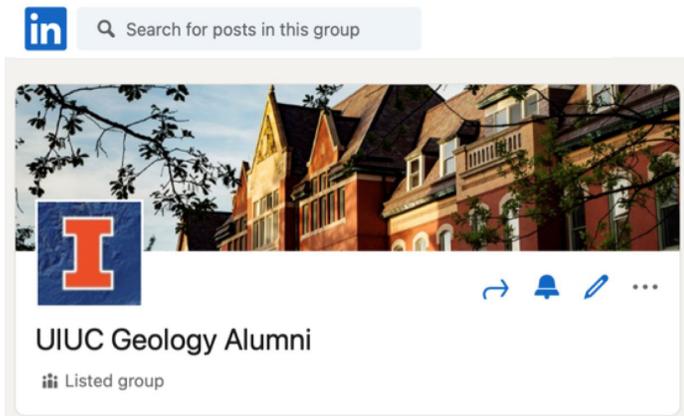
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- 3) By Phone: Please call the LAS Office of Advancement toll-free at (217) 333-7108, and indicate that you wish to make a gift to the Department of Geology.

Geology alumni LinkedIn group breaks 300 member mark



UIUC Geology Alumni LinkedIn group

Congratulations to the LinkedIn alumni group and their latest milestone! The geology alumni LinkedIn group (founded in 2010) has made significant pushes to grow both its membership and group content. With many professionals using the platform for networking, collaboration, and career advancements, LinkedIn administrators **James Cokinos (BS, '02)** and **Anna Sutton (BS, '01; MS, '03)** consistently engage alumni and post content regarding various department news, geology topics, and the occasional geology meme. The group now has more than 300 connected alumni and spans multiple generations. This LinkedIn group is currently the largest geology alumni group within the BIG TEN and one of the largest on the platform. If you have a LinkedIn account and wish to join the group, simply keyword search **UIUC Geology Alumni** to join. Those who want to share their knowledge and professional experiences should consider joining LinkedIn and can use the platform to stay connected with the department and other alumni.



Geology undergraduate majors Chloe Marks and Valerie Smykalov

Geology has big presence at Engineering Open House

Engineering Open House has been a regular event on the Engineering Quad for decades. The event attracts thousands of visitors, ranging from large numbers of school groups on Friday to many families (including out-of-towners) on Saturday. When we moved back into NHB a few years ago we began to get involved by having a few demonstrations in NHB. However, in April 2022, we went all in, having over 15 displays within Geology alone. We used the increased foot traffic in geology halls to advertise the benefits of a degree in geology through new banners on our walls. Two undergrads, Chloe Marks and Valerie Smykalov, built a display showing off the rock and mineral lab and won 2nd place in best exhibit in show category. Great job, Chloe and Valerie!

FACULTY SPOTLIGHT:

Alison Anders



Professor Alison Anders conducts research on the connections between climate and landscapes, using techniques ranging from numerical modeling of landscape evolution and GIS-based spatial analysis of landforms to field measurements of soil and sediment composition and age, landform mapping, and measurement of sediment carried by rivers and deposited on floodplains.

“I am interested in how variability in climate in space and time changes the processes of erosion and deposition at Earth’s surface,” said Anders. “My most recent field work has centered on understanding how the landscapes of East Central Illinois have responded to the conversion from prairie to intensive agriculture.”

With collaborators, Anders has collected sediment cores from the floodplain of the Sangamon River and the Middle Fork of the Vermillion River. The research team is measuring the chemical composition, grain size, and clay mineralogy of the sediments, as well as using radiocarbon, OSL dating, and fly-ash from coal combustion to determine the ages of the sediment. These measurements have been supplemented with geophysical data (ground-penetrating radar and magnetic susceptibility) to aid in interpreting the three-dimensional packages of sediment associated with meander bend migration on the Sangamon River. “The field and lab work at these two sites will be combined with GIS analysis of the broader landscapes of East Central Illinois and my group’s reconstruction of the pre-agricultural stream network in this region to explain why neighboring rivers have contrasting landforms and evolutionary paths,” Anders explained.



Other work in her research group focuses on how climate influences glacier dynamics and glacier erosion. “We’re preparing for future field research in the Olympic Mountains of Washington State and future remote sensing research in High Mountain Asia,” she said.

Undergraduate Student Profile: Lily Lucas

We caught up with Geology senior Lily Lucas.

Talk a little bit about your research.

I am an undergraduate researcher in the Gregg Lab at UIUC, and worked with Trish Gregg, Jack Albright, and Yan Zhan on a project studying the impacts that ice caps have on the stability of volcanic systems. We use finite element models to simulate a magmatic system, and analyze changes in the repose interval (or time to eruption) as we load the system with ice. If you are interested in learning more, check out our published paper in *Frontiers*!



How has Illinois Geology helped prepare you for your career goal?

I am beyond thankful to be a part of the Illinois Department of Geology, as the people here are helpful, kind, and amazing scientists. They have inspired me to pursue a PhD after I graduate from UIUC and either work as a scientist at a research institution or faculty member at a university in the future. Illinois Geology has helped me prepare for my career goals via rigorous courses and undergraduate research. Through my geology classes, I have learned many skills (such as how to perform field work, coding, using the SEM, and more!) and have a greater understanding of the many disciplines within geoscience. On the other hand, undergraduate research at Illinois has taught me what it means to be a geoscientist. I now have a better understanding of the research process and the scientific community and have had the opportunity to meet other scientists and present my research at the SESE Research Review, UIUC Undergraduate Research Symposium, and AGU.

What was your favorite field trip and why?

My favorite field trip was through Professor Alison Anders' Geomorphology course. Dr. Anders and TA Noreen Meghani led the class on a hike through Allerton Park in Monticello, Illinois, where we studied the Sangamon River. The class observed the behaviors of cut-offs in the channel as well as future cut-offs, and learned about the river valley and its geologic past. This class remains one of my favorites because we learned about the geology of Illinois by means of taking weekly field trips and applying our observations from the field in the lab.

What is it like to be a student athlete and have you shared Geology with your teammates?

I am also a student athlete at Illinois, which has been an overall very rewarding experience. My teammates are my family, and we have created a culture of always wanting to compete, improve, and support each other on and off the field. I love to share fun Geology facts and stories with my teammates, and they have attended GeoClub meetings, events, and fundraisers ever since I became a board member a year ago! One of my most treasured memories with my teammates was when they all painted me rocks for my birthday this year.

Awards to current and recent students!

Doctoral student **Hannah Veldhuizen** has been awarded a prestigious National Science Foundation (NSF) graduate research fellowship! Her research focuses on developing stable isotope measurements of antimony to unravel the complex behavior of this toxic element in the modern environment and as a window into past Earth environments. She is carrying on the tradition, in Tom Johnson's research group, of breaking new ground in isotope geochemistry, and she has done a fabulous job navigating the challenges of the painstaking measurements and experiments.

Doctoral student and NSF Graduate Research Fellow **Robby Goldman** received an Outstanding Student Presentation Award from AGU for his oral presentation given during the 2021 AGU Fall Meeting, titled "Examining residents' perceptions and attitudes toward sources and messengers of Kīlauea's 2018 eruption information." Goldman, who is advised by Dr. Trish Gregg, has been collaborating with U.S. Geological Survey scientists for his NSF Graduate Research internship project, evaluating the impact of the USGS's public communications during the 2018 eruption of Hawaii's Kīlauea volcano.

2022 PhD recipient **Jack Albright** was awarded a National Science Foundation postdoctoral fellowship! Albright's fellowship research will focus on developing new modeling approaches to investigate phreatic eruptions at Whakaari volcano, White Island, New Zealand. He will remain in residence at UIUC and will be co-mentored by geology professor Trish Gregg and Dr. Sophie Pearson-Grant (GNS Science, New Zealand).

The Great Unconformity, *continued from front page*

“I was aware that they had tried different techniques to date erosion surfaces in Grand Canyon before,” Thurston said. “When (University of New Mexico professor) Dr. Karl Karlstrom came to visit, he showed us his work, and I said, ‘Why haven’t we used zircon-helium yet? We’re debating about these ages of erosion, but we haven’t used all the techniques available.’” Karlstrom, a professor at the University of New Mexico and co-author on the paper, has been a key figure in research in the Grand Canyon for the last several decades. He also led the trip through the Grand Canyon, where Thurston and about 30 other scientists gathered to study the canyon, each with their own research in mind.

Thurston went there to test the reach of zircon-helium thermochronology. The technique looks at the ratio of helium to uranium inside the mineral zircon to determine the timing of erosion and cooling events. “If the crystal is hot enough, helium can actively diffuse out of the crystal because it’s not actually part of the crystalline structure,” Thurston said. “Once we get low temperatures, about 200 degrees Celsius, we start to retain the helium. And that’s when we can use the uranium, helium parent-daughter ratio to get a date.” The age date is related to the time of exhumation, when the zircons cool and the helium accumulation “clock” starts ticking.

The process is far from simple. Despite being crucial to the research, uranium complicates the calculations. While zircon is an ideal mineral in some ways—it is highly resistant to physical and chemical weathering and rich in uranium—its crystalline

structure is damaged by the energetic alpha decays that send atoms “recoiling” through the lattice. Over time, the radiation damage affects the diffusion rates of helium within the crystal. This complication also allows the various mineral grains to reveal different events in the temperature history of the rock.

According to Thurston’s research, the exhumation and erosion of the Great Unconformity began around 1.25-1.35 billion years ago. This timeframe predates the break-up of the supercontinent Rodinia (550-800 million years ago), which some have hypothesized as the driver of the erosion that created the unconformity. However, the new study’s findings point to the Great Unconformity being “broadly related to” the assembly of Rodinia, which occurred approximately 900 million to 1.3 billion years ago. Still “a broader deep-time thermochronologic transect across Laurentia is needed to fully understand the multiple mechanisms” that created the Great Unconformity, according to Thurston.

At the young end of the timescale, the study’s data and models are also highly sensitive to late-stage reheating due to burial beneath 3–4 km of Phanerozoic strata, with maximum temperatures of 140–160 °C, prior to ca. 60 Ma. Inverse models suggest relatively young, post-20 Ma cooling reflecting partial carving of the eastern Grand Canyon, and late rapid exhumation around 3–7 Ma. Guenther said, “What Olivia has demonstrated is that this particular technique can both describe the really old event, which is erosion to create the Great Unconformity in the canyon, and she can record the—relatively speaking—young event, which is the actual carving of the canyon itself.”

This article was originally written by Christian Jones for LAS and adapted for this issue by Tom Johnson.

Alumnus Spotlight: James Cokinos (BS, '02)



Since graduation, where has your career taken you?

I interned twice at the IGS, working for Dr. Hannes Leetaru. During my internships, I worked on a reservoir characterization and on a GIS application for CO₂ sequestration. Afterwards, I was offered a position on a new Department of Energy project for a GIS approach to improve oil production in the Illinois Basin,

which lasted several years. In 2006 I was able to parlay those experiences into my next job opportunity in Houston, Texas. My new company specialized in potential fields geophysics (gravmag) exploration, and my background in both geology and GIS proved to be essential as I built an entire GIS department from the ground up. I have been fortunate enough to work in this industry for the past 15 years.

How did your time at Illinois prepare you for your career?

The Geology department at Illinois was a close-knit group of professors and students. I enjoyed the camaraderie and

developed many long-lasting friendships. The staff made themselves readily available and were an invaluable resource to me and my classmates. Through collaboration on several group projects, I strengthened my teamwork skills among diverse groups of people with varying learning styles and backgrounds. Today, my current position as a GIS manager requires me to work with multiple geoscientists from around the world and to provide GIS knowledge for basin and prospect analysis.

What is your favorite memory in the field while at UIUC (field trip or research)?

I can’t narrow it down to just one memory! It’s a tie between my field trips to Curaçao and to West Texas. I have memories of climbing to the top of Mt. Christoffel (1,220 ft/372 meters) and being able to see on a clear day the Northern coast of Venezuela, followed by diving and seeing the amazing coral reefs and swimming out to the shelf break. West Texas offered completely different yet equally awe-inspiring experiences of hiking the Franklin Mountains, driving along US 90, and camping out under the stars in Big Bend Ranch State Park. I was able to revisit El Paso and the Franklin Mountains with my son recently where we climbed and trekked the very same spots that I did exactly 20 years ago.

Around the department

Alison Anders and her group have completed field work, lab and GIS analyses, and numerical models related to river networks and the critical zone in the Midwest U.S. and climatic controls on mountain glaciers in the Pacific Northwest. Poushalee Banarjee was welcomed as a new PhD student along with undergrads Julia Kasner and Ben Gorski. We celebrated the graduation and senior thesis completion of Garrett Frank, who studied Glacial Lake Douglas. Andy Margason completed an exemplary MS thesis examining the asymmetry of climate and glaciation of the Olympic Peninsula.



The River Lab, located in Monticello, Illinois, performs automated chemical analyses of Sangamon River water several times per hour to catch all the nuances of water and solute dynamics in the watershed.

Jenny Druhan and her research group enjoyed a productive and motivational year. PhD student Jon Golla passed his preliminary exam and his second paper is in review. PhD student Jinyu Wang made great progress mastering the operations and maintenance of a new lab-in-the-field deployment along the Sangamon River. Postdoc Barbara Esteves published her work on celestite precipitation and welcomed the arrival of her daughter Letícia. Postdoc Bryan Medina Rodriguez joined in January 2022 and has already made excellent progress modeling the potential for hydrogen storage in depleted oil reservoirs. Jenny and Jon spent two months at the Institut de Physique du Globe in Paris, where they conducted field work and developed new lithium and silicon isotope datasets for Critical Observatories in the U.S. and France.

Bruce Fouke's lab continues its cross-disciplinary research on carbonate sedimentology, geobiology, and biomineralization in coral reefs, hot springs, oil fields, and Roman aqueducts, with publications during the year in journals ranging from AAPG Bulletin and GSA Special Papers to Nature Reviews Urology and Kidney360. Lauren Todorov (BS, '20; MS, '22) graduated and has entered the PhD program at Princeton University. Fouke presented a keynote address in May at the 150th anniversary of Yellowstone National Park and unexpectedly ran into former student Samantha Dwyer

(BS, '08; MS, '10) and her family at Old Faithful. Bruce continues to serve as director of the Illinois Roy J. Carver Biotechnology Center (now in his 10th year), has recently been appointed as a Health Innovation Professor in the Carle Illinois College of Medicine, and has exceeded a total international enrollment of 450,000 students of all ages and backgrounds for his online Emergence of Life course on the Coursera platform.

Hello from **Trish Gregg's** UIUC Volcano Lab! Jack Albright successfully defended his PhD dissertation and was awarded a prestigious NSF postdoctoral fellowship. PhD student Robby Goldman was awarded an Outstanding Student Presentation Award for his 2021 Fall AGU presentation on the 2018 eruption of Kilauea. Undergraduate Lily Lucas (rising senior) published her first paper on the impact of ice caps on volcano stability in *Frontiers in Earth Sciences* and was also awarded an Outstanding Presentation at the 2022 Illinois Undergraduate Research Symposium for her work. Riley Balikian and Yuyu Li both successfully passed their preliminary exams. We welcomed a new postdoctoral scholar, Matt Head (PhD University of Exeter, UK) and undergraduate researcher Dom Rzeszutek (rising junior). We are excited about two newly funded projects investigating Sierra Negra volcano, Galápagos and Whakaari volcano, New Zealand, which will both provide exciting field opportunities in the coming years.

Cory Pettijohn welcomed the first cohort of students into the new Environmental Geology online graduate certificate program. Pettijohn started a weekly Geology Careers Newsletter (<https://geology.illinois.edu/resources/geology-careers>) for our undergraduate and graduate students, in which he is including alumni highlights. Please get in touch with Cory in the upcoming months, as our students love learning about our alumni's professional journeys!

Wendy Yang enjoyed this past year on sabbatical in Champaign-Urbana, where she focused on developing the Global Denitrification Research Network and supporting research led by her large team of postdocs, graduate students, and technicians. Her group led six publications and contributed to two others, with many more manuscripts in the pipeline. Together this work advances understanding of how plant-soil-microbe interactions mediate ecosystem carbon and nitrogen cycling in maize, bioenergy crop, and agroforestry for food production systems as well as temperate and tropical forests. She is most excited about a new project funded by the Department of Energy ARPA-E SMARTFARMS program for which her group is collecting novel high spatial and temporal resolution datasets on agricultural soil nitrous oxide emissions and potential driving variables to improve modeling of these notoriously variable emissions that contribute to climate change.



Alumni News

1970s

Brian Cardott (BS, '77) retired from the Oklahoma Geological Survey in June 2021, with 40 years of service. In late 2021 he published OGS Bulletin 152 on “Woodford Shale (Upper Devonian to Lower Mississippian): From hydrocarbon source rock to reservoir.” He and his wife of 44 years, Kathy (BA, '78), reside in North Richland Hills, Texas.

In May, **Glenn Hebert (MS, '78)** and his wife Marilyn visited the department and toured the new NHB. After 10 years in Ecuador, the couple currently reside in Sacramento, California. Hebert says he's humbled to know that a recommendation from his U. of I. Geology advisor, Dr. John C. Mann, led to a rewarding and fulfilling career with ExxonMobil.

Sue Rimmer (MS, '78) recently became Professor Emerita at Southern Illinois University after a career focused on studying biogeochemical cycles recorded in organic-rich sediments, controls on stable isotope composition of organic matter, and coal geochemistry. Rimmer was the 2022 recipient of the GSA Cady Award, which is presented to individuals who have made outstanding contributions to the field of coal geology.

1990s

Laura (Becker) Stevens (BS, '94) still works for the New York State Department of Environmental Conservation (21 years now!) and is now the chief of the Waste Transport & State Assistance Section, within the Division of Materials Management.

Christine Clark (MS, '97) was promoted to department head of Geography and Geology at Eastern Michigan University. She has been employed at EMU as a professor of mineralogy, petrology, and tectonics since 2002.

Joel Johnson (MS, '98) is a full professor at University of New Hampshire and has several recent papers on gas hydrates and diagenesis. He teaches structural geology, sedimentology, and geotectonics. He recently taught Earth History for the first time and was so glad he “TA'ed History of Life at UIUC all those terms!”

2000s

Charlie Mitsdarfer (BS, '04) has a great job title: farmer at Mitsdarfer Farms in Bongard, Illinois. He is also associate professor of Agriculture and director of the Ag and Horticulture Program at Parkland College in Champaign!

Marynia Kolak (BS, '06) is returning to campus as an Assistant Professor in the Department of Geography and GIS!!! She received her PhD from University of Arizona in 2017, then worked at the University of Chicago Center for Spatial Data Science as associate director for health informatics. She received the 2017 Concordium Innovation Award, and a “Highest Impact” award at the American College of Cardiology 2019 conference for her work in connecting chronic disease rates with social determinants of health.

Josh DeFrates (MS, '07) is a senior geophysicist working for HydroGeoLogic Inc., out of their Colorado office. His work focuses on remediating sites contaminated by unexploded ordinance. He works with advanced geophysical classification (AGC) electromagnetic sensors to find intact munitions! He is “still riding bikes of all types here in Golden.”

Mara Orescanin (MS, '09) is an assistant professor of oceanography at the Naval Postgraduate School and is up for tenure in Fall 2022. She advises naval officers for their MS and PhD degrees, focusing on hydrodynamics and morphodynamics of coastal river mouths. She received her PhD from the MIT-WHOI Joint Program in Oceanography in 2015.

Amanda (Raddatz) Bopp (MS, '09) and Charles Bopp (PhD, '11) have returned to the Midwest! Charles is a resource geologist with the Illinois State Geological Survey, working on carbon storage, carbon sourcing, and critical minerals. Amanda is principal geoscience consultant with energy company DNV, working on carbon capture, utilization, and storage.

2010s

Mike Frothingham (BS, '11) received an AGU 2021 Tectonophysics Outstanding student Presentation Award. He is currently a PhD student at the University of Colorado.



A mini-reunion at the wedding of Becca Alberts and Nick Huggett.

Rebecca Alberts (BS, '13) and Nick Huggett (BS, '12; MS, '15) were recently married in Leavenworth, Washington. Many folks from the UIUC Geology Department (classes ~2012-2016) were present at the event.

Kasia (Walkowska) Dick (BS, '15) has worked for AECOM as a geologist in the remediation department since graduating in 2015. She recently moved to Louisiana and works for the AECOM office in Baton Rouge.

Martin Palkovic (MS, '15) is working as a data engineer at Cooke Inc. in Saint John, New Brunswick, Canada. “I make data usable for anyone in the organization that needs it. I do a lot of coding and work with a lot of different tools (SQL, Python, Snowflake, Git, Power BI, Java, etc.). Working with data was always my favorite task as a geologist; I find it very mentally stimulating, challenging and rewarding.”

Tyler Kamp (BS, '16) is working as a hydrogeologist at the Alloy Group in Butte, Montana, after working for Newmont mining in Colorado for a few years. There he developed and implemented a spectral data collection step into their sample prep that proved valuable to global exploration solutions.

Evan Lindroth (BS, '17) has accepted a hydrologist position at Maricopa County Flood Control District in Phoenix, Arizona. He will be working on flood plain mapping and loss prevention.



August Clay Higley with proud mom Melinda.

Melinda Higley (PhD, '18) and her husband welcomed a son, August Clay Higley, in October 2021. She is teaching at Calvin University and expressed appreciation for her experience "TAing GEOL 208 [as] my qualifying exam 'punishment' for not knowing enough geology... But now I teach it at Calvin University and I just love this course so much!"

2020s

Ryan Oeste (BS, '21) completed the first year of their MS work at Iowa State University in the Stable Isotope Paleo Environments Research Group. Oeste's research project involves stable isotopes and trace elements taken from a stalagmite of southern Portugal dating back to the last glacial period. They hope to identify how changes in the hydrologic cycle were recorded karst system.

Alumni Obituaries

Ronald E. Black (BS, '50) passed away Oct. 17, 2021, at the age of 96. In 1950, Black received his BS from UIUC and married Peggy L. Tilstra. He served in World War II and the Korean War as a master navigator/bombardier in the Strategic Air Command and Chief of Plans and Intelligence for the Minute Man Missile program. Following his service, he taught geography, geology, and meteorology at Parkland Community College from 1973 to 1993.

Thomas C. Buschbach (MS, '51; PhD, '59) passed away Jan. 10, 2022, at the age of 98. Buschbach was a geologist for the Illinois State Geological Survey and a research professor of geology at St. Louis University. His publications covered deep oil possibilities, underground storage of gas, rock tunnel sites in the Chicago area, and meteorite impact sites. He served as a naval aviator in World War II and met his wife Mildred during his service. He also served as a deacon, elder, and adult Bible study leader in his church.

George S. Corchary (MS, '59) passed away Nov. 26, 2021. After receiving his MS at the University of Illinois, Corchary worked for the USGS and had publications through GSA and USGS.

Howard R. Cramer (BS, '49; MS, '50) passed away Nov. 6, 2021, at age 96. Cramer served in the U.S. Army during World War II and was awarded a Bronze Star for his service. He enjoyed a fulfilling career as a professor of geology at Emory University and served as chairman of the department. He was married to Ardis V. Lahann from 1950 until her death in 1980, and in 1982 he married Themis Poulos.

Thomas P. Dowell (MS, '72; PhD, '73) passed away Feb. 1, 2022, at the age of 96. Dowell proudly served his country for several years in the U.S. Navy. He also was a member of Incarnation Catholic Church in Florida and loved spending time with his family.

Mary Geraldine ("Gerry") Downs (BS, '47) passed away Nov. 5, 2021, at age 96. Downs was one of the first female field geologists to work for Shell Oil Company. Field studies took her to Denver, Colorado, where she fell in love with the Rocky Mountains, as well as Don Downs, whom she married in 1957. Together the couple moved to Colorado Springs, built their dream home, and raised their two children.

Richard (Dick) Inden (MS, '68) passed away April 16, 2022, at age 79. Inden worked for the USGS, taught at the University of South Carolina and Kent State, and then focused his career on the oil and gas industry. In 1981, he met Penny Frush, who he enjoyed 41 years with. His enthusiasm for geology was

shown through his many papers and poster sessions, presentations to local and national geologic associations, and the field trips he led.

Frank R. Karner (PhD, '63) passed away Jan. 31, 2021, at the age of 86. Karner married Joan Egeland in 1958, and they were blessed with four daughters and one son. Frank enjoyed his work at the University of North Dakota, where he was a professor of geology for 39 years. He loved collecting rocks, stamps and coins, playing handball, and being involved in church with his family.

Beverly A. Pierce (BS, '50) passed away April 5, 2022, at the age of 94. Pierce met her husband Jack in her sedimentology lab at UIUC, and they enjoyed 51 years of marriage and three daughters. She was one of the first women to work for the Illinois State Geological Survey in a scientific position. Over the years, she was known as an outstanding volunteer in Girl Scouts, day camps, schools, and church. As a breast cancer survivor, she also volunteered as a counselor to support those diagnosed.

J. William (Bill) Soderman (MS, '60; PhD, '62) passed away Feb. 22, 2022, at age 86. Soderman was the department's Alumni Achievement Award recipient in 2008. He had a long and successful career in the oil and gas industry and was very active on the department's GeoThrust Committee, contributing greatly to its success in raising endowments totaling over \$3 million. He donated the funds for the Bluestem and Evergreen Graduate Fellowships and was a major contributor for the Geothrust Fellowship. After his graduate work at Illinois, in 1962 Soderman joined Texaco, where he held successive positions including supervisor of geologic research. With Monsanto Oil Company, he was chief geologist, then Vice President for Worldwide Exploration. When Monsanto was acquired by BHP, he was named VP Exploration for BHP Americas, then VP Exploration for BG (British Gas) until his retirement in 1993. To date, about 30 graduate students have been supported by the fellowships Bill created; both the students and the department are very grateful for his generous gifts.



Bill and Dee Soderman in 2008, the year he received the department's Alumni Achievement Award.

Continued on Page 13



Student Awards and Degrees

Estwing Award
Valerie Smykalov

Wallace Field Camp Awards to Women Geology Students
Brooke Dykstra
Lauren Gardiner

R. James Kirkpatrick Award for Outstanding Graduate Research in Geology
Mingfei Chen

Harriet Wallace Outstanding Woman Graduate Student Award
Lauren Todorov

Harriet Wallace Outstanding Woman Undergraduate Student Award
Anne Mattson

Harriet Wallace Geology Graduate Student Service Award
Mahta Gholizadeh Ansari

Harriet Wallace Geology Undergraduate Student Service Award
KeMia Smith

Outstanding Graduate Teaching Assistant Award
Spring 2021: Karoline Bruckel
Fall 2021: Lauren Todorov

Outstanding Senior Award
Cynthia Ochoa

Morris Leighton Research Grants
Perry Akrie
Karoline Bruckel
Yanchong Li
Andy Margason
Nooreen Meghani

Diandian Peng
Lihang Peng
Lauren Todorov
Yaoyi Wang

Jackson Geology Graduate Student Research Awards

Jack Albright
Mahta Gholizadeh Ansari
Zebin Cao
Mingfei Chen
Sarah Dendy
Jenna Kaempfer
Charles Monson
Nicole Murray
Ryan Sigat
Mario Velazquez
Hannah Veldhuizen

Sohl Award for Research
Hannah Veldhuizen

Winslow Research Grant in Hydrology
Jon Golla

DEGREES CONFERRED IN 2021-2022

BACHELOR OF SCIENCE DEGREES

August 2021
Marjean Annette Cone
Ryan Michael Davila
Brooke Anna Dykstra
Noe V. Munoz
Ryan Andrew Oeste
Stanislaw A. Wrobel
Abigail Nicole Zochowski

December 2021
Garrett Frank
Anthony W. Green
Ima Ikuru
Adam Elliot Manaster

May 2022
Ariana Echevarria
Tara Rose Ernd
James Mark Haken
Amirul Mukminin Bin Lokman Hakim
Anne Mattson
Cynthia Ochoa
Jin Bo Shim

MASTER OF SCIENCE DEGREES

August 2021
Christopher Edward Campe, "Ghost Granophyre and Hydrothermal Granophyre: Observations and Experiments to Redefine a Common Silicic Igneous Rock Texture"

Shaelynn Naomi Kaufman, Applied Master's

May 2022
Perry Miles Akrie, "The Role of Chemical Reduction in Decreasing Uranium Concentrations in Natural Groundwaters: A Case Study from India"

Andrew Margason, "Glacier Dynamics Across Precipitation Gradients in the Olympic Mountains of Washington State, USA: Modeled Ice Elevation Feedbacks Can Overcome Orographically Forced Drying"

Lauren G. Todorov, "Kidney Stone Crystalline Architecture: A Contextual GeoBioMed Framework to Assess Extracorporeal Shock Wave Lithotripsy Fracture Geometries, Particle Size Frequencies, and Recurrence Mechanisms"

Hannah Juliette Veldhuizen, "Kinetic Fractionation of Antimony Isotopes During Reduction by Sulfide"

DOCTORAL DEGREES

August 2021
Xiaobao Lin, "The High Temperature Geochemistry of Vanadium: From Isotope Ratios in Ocean Island Basalt to Thermal Diffusion Processes at the Core-Mantle Boundary"

December 2021
Jenna Marie Kaempfer, "Deep-Time Tectono-Thermal History of the Northern US Cordillera: Understanding Zircon (U-Th)/He Thermochronology and its Application to Idaho-Montana Basement Rocks"

May 2022
Mingfei Chen, "Microbial-Biogeochemical Interactions in Tropical Lacustrine Environments"

Diandian Peng, "Quantifying Slab Evolution and Mantle Flow Using Global Subduction Models with Data Assimilation"

Yaoyi Wang, "The Density and Evolution of Sub-Cratonic Lithospheric Mantle Constrained by Geological and Geophysical Observations"

Alumni Obituaries *Continued*

Ann L. Sutton (BS, '44; MS, '45) passed away Jan. 8, 2022, at age 98. Sutton was a geologist with the U.S. Geological Survey and taught geology at the University of Kentucky. She and her husband, Myron Sutton, collaborated in the publication of over 70 magazine articles, technical papers, and many books, which have received national awards.

F. Michael Wahl (MS, '57; PhD, '58) passed away Dec. 16, 2021 at the age of 90. Wahl had a long and productive history with the Department of Geology, including his graduate work,

10 years on the faculty, and several years as a key member of the GeoThrust Committee, the alumni advisory board that raised endowments totaling over \$3 million. After receiving his BS in geology at DePauw University, Wahl married his college sweetheart Dottie Daniel, then served in the U.S. Army during the Korean War. He served on the UIUC Geology faculty for 10 years after completing his PhD, then moved to the University of Florida in 1969 as professor and chair of geology, and eventually became dean for graduate studies and research. He then served as executive director of GSA from 1982 to 1994, when he retired.

Department Directory

Faculty

Stephen Altaner (*Associate Professor and Associate Head*)

Alison Anders (*Associate Professor*)

Jim Best (*Jack and Richard Threet Professor*)

Jessica Conroy (*Associate Professor*)

Jennifer Druhan (*Associate Professor*)

Bruce Fouke (*Professor*)

Patricia Gregg (*Associate Professor*)

William Guenther (*Assistant Professor*)

Tom Johnson (*Professor*)

Lijun Liu (*Professor*)

Craig Lundstrom (*Professor and Head*)

Gary Parker (*W. Hilton Johnson Professor*)

Cristian Proistosescu (*Assistant Professor*)

Gillen Wood (*Professor*)

Wendy Yang (*Associate Professor*)

Specialized Faculty

Max Christie (*Lecturer*)

Ann Long (*Teaching Lab Specialist*)

J. Cory Pettijohn (*Teaching Assistant Professor*)

Rob Sanford (*Research Associate Professor*)

Michael Stewart (*Clinical Associate Professor*)

Jonathan Tomkin (*Research Associate Professor & Associate Director, School of Earth, Society, & Environment*)

Affiliate Faculty

Stanley Ambrose (*Professor, Anthropology*)

Marcelo Garcia (*M.T. Yeh Endowed Chair, Civil and Environmental Engineering*)

Scott Olson (*Professor, Civil and Environmental Engineering*)

Surangi Punyasena (*Associate Professor, Plant Biology*)

Bruce Rhoads (*Professor, Geography & GIS*)

Adjunct Faculty

Daniel Abrams

Kurtis Burmeister

Todd Cole

Brandon Curry

David Grimley

Sam Heads

Dennis Kolata

Hannes E. Leetaru

Andrew Phillips

George Roadcap

William Shilts

Scott Wilkerson

Sherilyn Williams-Stroud

Emeritus Faculty

Thomas F. Anderson

Jay Bass

Craig Bethke

Daniel B. Blake

Chu-Yung Chen

Wang-Ping Chen

Feng Sheng Hu

Sue Kieffer

Steve Marshak

Xiaodong Song

Department Support Staff

Lana Holben

(*Assistant to Head*)

Anna Kuppler (*Office*

Support Associate)

Teachers Ranked as Excellent

These instructors were ranked highly based on student course evaluations.

Fall 2021

* Steve Altaner - 118

Mingfei Chen - TA 143

Max Christie - 143,208

Jenny Druhan - 560

Ann Long - 100

Rob Sanford - 591

Michael Stewart - 432,460

Lauren Todorov - TA 208

Hannah Veldhuizen - TA 107

Spring 2022

* Jim Best - 440

* Zebin Cao - TA 100

* Max Christie - 118,440

* Jess Conroy - 484

Sarah Dendy - TA 100

Trish Gregg - 450

Rob Sanford - 591

Lauren Todorov - TA 208

* Hannah Veldhuizen - TA 107

Hongyu Xiao - TA 107

Summer 2022

Cory Pettijohn - 117

T.A. - Teaching Assistant

**The instructor ratings were outstanding*

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Spring 2022 Field Course: From flatland glaciers to the Black Hills *Continued*



Close examination of the Harney Peak Granite in Custer State Park, South Dakota.

There were several chilly days in the Black Hills, where the incredible pegmatite of the Harney Peak Granite impressed everyone with large and beautiful crystal faces. The needles highway allowed observation of how weathering of this pegmatite creates unique landscapes. The stay in the Black Hills ended with a tour of Wind Cave, formed from multiple episodes of karstification in the Pahasapa (Madison equivalent) Limestone.

On the way back to Illinois the trip stopped at Scottsbluff National Monument for a walk through the White River Group and a great view and, on the final day, visited enormous loess bluffs along the Missouri River and experienced the extreme stickiness of loess mud. Overall, it was an unforgettable trip!

\$1M Donation by anonymous alum

2021-2022 was a fantastic year for giving to the Department of Geology. Generous gifts helped to set up undergraduate scholarship funds named for former professors James Kirkpatrick and Ralph Langenheim. A gift fund entitled the Dan Blake Collection Preservation Fund was established and is being used for curation of the department's amazing fossil collection at a facility on south campus. Finally, an anonymous donor pledged to give \$1 million over the next five years for general department development. We are so grateful for this tremendous support!

Join our weekly colloquium talks on Zoom!

The department will continue to offer a virtual option to join the colloquium talks via Zoom. To be added to the listserv to receive weekly emails, or to receive the Zoom link, please contact the department at geology@illinois.edu

Join us for virtual Geology Alumni events!

The department has conducted several virtual alumni gatherings on Zoom and plans to do a few more each year. We advertise them via email, so if you have not received invitations, please contact the department at geology@illinois.edu to update your email address.



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2021-2022 Colloquium Speakers

- **Sept. 2:** Jack and Richard Threet Lecture in Sedimentary Geology, Charles Kerans, University of Texas at Austin, “400 ka record of Carbonate Deposition/Erosion–The Pleistocene ‘Bridge’ between Modern Process Sedimentology and the Stratigraphic Record”
- **Sept. 9:** Tom Johnson and Craig Lundstrom, UIUC Geology, “The Department of Geology: Past - Present - Future”
- **Sept. 16:** Peter La Femina, Penn State University, “Integrated Studies of a Persistently Active Volcano: Telica Volcano, Nicaragua”
- **Sept. 23:** Alex Tartakovsky, UIUC CEE, “Physics-Informed Machine Learning for Modeling Subsurface Flow and Transport”
- **Sept. 30:** Stephanie Olson, Purdue University, “Exploring the Co-evolution of Life and Environment on Earth to Guide our Search for Exoplanet Life”
- **Oct. 7:** Andrea Stevens Goddard, Indiana University, “Resolving the Geodynamic Effects of Spreading Ridge Subduction in the Patagonian Andes Using Multichronometer Thermochronology”
- **Oct. 14:** Glenn and Susan Buckley Lecture in Environmental Geology, Jacky Austermann, Columbia University, “How High was Last Interglacial Sea Level?”
- **Oct. 21:** William Guenther, UIUC Geology, “Testing the Limits of Time: An Appraisal of Zircon (U-Th)/He Thermochronology for >1 Ga Thermal Histories”
- **Oct. 28:** R. James Kirkpatrick Lecture, Doug Faulkner, University of Wisconsin-Eau Claire, “The Paraglacial Chippewa River, West-Central Wisconsin: A Case Study of Long-Term Complex Response to Abrupt Base-Level Fall”
- **Nov. 4:** Bruce Fouke, UIUC Geology, “Universal Biomineralization: Life-Water-Mineral Interactions Through Geological Time”
- **Nov. 11:** 2021 Alumni Achievement Award Recipient, Jack Sharp, University of Texas at Austin, “Carbonate Aquifers Systems – Scientific, Environmental, and Legal Issues”
- **Jan. 27:** Gary Parker, University of Illinois Urbana-Champaign, “Morphodynamics of Lowland River Networks Modeled as Simple Binary Trees”
- **Feb. 3:** Karen Fischer, Brown University, “Deciphering the Distribution of Partial Melt in the Asthenosphere with Seismic Waves”
- **Feb. 10:** R. James Kirkpatrick Lecture, Mike Ackerson, Smithsonian, “Granitic Minerals as Records of Magmatic and Metamorphic Thermal Histories: Insights from Yosemite National Park”
- **Feb. 24:** Marcia Bjornerud, Lawrence University, “Visions of Deep Time”
- **March 3:** Steve Altaner, University of Illinois Urbana-Champaign, “Looking Back at 37 Years: A Tale of Two Careers”
- **March 10:** Ralph E. Grim Lecture, Emily Cooperdock, University of Southern California, “The Timing of Fluid-Rock Interaction and Faulting in Serpentinites Revealed by (U-Th)/He Thermochronology”
- **March 24:** Glenn and Susan Buckley Lecture in Environmental Geology, Ellen Wohl, Colorado State University, “Messy Rivers are Healthy Rivers: The Role of Spatial Heterogeneity in Sustaining River Ecosystems”
- **March 31:** Graduate Student Lightning Talks - Kalini Bruckel, Andrew Margason, Professor Alison Anders, Nooreen Meghani, Professpr Jess Conroy, Paul Ginsberg, Professpr Rob Sanford, Robby Goldman
- **April 7:** Mary Grace Bato, California Institute of Technology, “Towards Operational Real-Time Eruption Forecasting: Are We There Yet?”
- **April 14:** Kristen Cook, GFZ Potsdam, “Fluvial Disasters in the Himalaya: New Insights and Potential for Early Warning”
- **April 21:** Ted Flynn, California Department of Water Resources, “Steady Science, Rapid Change: Environmental Monitoring in the 21st Century”
- **April 28:** Phillips Lecture, Kevin Boyce, Stanford University, “Impact of Flowering Plant Evolution on the Earth System: What Can and Can’t Happen”