Earth Science & Environmental Change



Bruce Fouke Named Ralph E. Grim Professor

On Feb. 1, 2023, the department came together to celebrate the investiture of Bruce Fouke as the Ralph E. Grim Professor of Geology. The Grim professorship was created in commemoration of Professor Ralph Early Grim, considered the founding father of clay mineralogy, and it provides research support for one or more highly prominent faculty members. Professors working in the fields of earth material science, mineral science, sedimentary geology, and/or environmental or industrial aspects of geoscience are eligible for consideration. Bruce's research work spanning sedimentary geology, geomicrobiology, and, in recent years,

geomedicine, has put him at the forefront of his field. To recognize his achievements and stature, the department went through an 18-month process of assessing his record and his stature in the geoscience community, then receiving campus approval to appoint him as a Grim Professor. The process involves obtaining reference letters from leading experts in the world to assess Bruce's work—we are happy to report he got straight A's!

The investiture was attended by Vice Provost Kevin Jackson and Executive Associate Dean Wendy Heller. Also in the attached photo are SESE Director Bob Rauber, Department Head Craig Lundstrom, and Bruce's chosen speaker and long-time collaborator, Professor Charlie Werth of UT Austin (former Illinois engineering professor). Food and celebratory drink followed. Congratulations Bruce on this awesome achievement!



Liu Group: Getting to the Root of Cratonic Uplift



In this hypothetical cross-sectional view of the Earth's crust and mantle, a mantle plume initiates delamination of the lithospheric mantle. (Graphic courtesy of Lijun Liu.)

Professor Lijun Liu's group has mounted a multi-pronged challenge to the longstanding assumption that the Earth's cratons have buoyant, strong, permanent keels that keep them intact. His group has published a series of papers that support a much more dramatic history for the lower lithosphere. First, they used previously collected density data to examine the relationship between modern craton surface topography and the thickness of the underlying lithosphere. The traditional view of buoyant craton keels implies that most of the Earth's cratons would be sitting at 3 km elevation, while in reality, their elevation is usually only a few hundred meters. This requires the lithospheric mantle below the crust to be dense enough to pull the surface down by about 2 kilometers. In further work, the team used gravity field measurements to pinpoint the density structure of the cratonic keels, finding that the deeper parts are most likely where the high-density material resides. This configuration can lead to lithospheric "delamination," wherein dense slabs of the lower craton separate from the upper lithosphere and sink.

In their recent paper, "Secular craton evolution due to cyclic deformation of underlying dense mantle lithosphere" (Nature Geoscience), the group's geodynamic simulations support an interpretation that cycles of partial lithospheric delamination can generate rapid surface uplift: The deeper, higherdensity portion of the cratonic keel peels away from the lithosphere above when mantle plumes initiate supercontinent breakup, and the loss of the dense root causes the remaining lithosphere to rise. The peeled-off keels could return to the base of the lithosphere after they warm up inside the hot mantle, leading to craton subsidence to complete the cycle. "The whole process is like what happens in a lava lamp, where the cool material near the surface sinks and the warm material near the bottom rises," Liu said. He then connected this process to Earth's geologic history: "In particular, there are two major uplift and erosion events in the past, when supercontinents Rodinia and Pangea each rifted apart, the former causing the Great Unconformity."

Professor Craig Lundstrom, graduate students Yaoyi Wang, Zebin Cao, Lihang Peng and Diandian Peng, and Chinese Academy of Sciences professor Ling Chen contributed to this work.

Professor Lijun Liu (Photo by L. Brian Stauffer.)

Letter from the Head, Craig C. Lundstrom



Hello all!

We have big news to share. In April of 2023, we officially changed our name to the Department of Earth Science & Environmental Change. The process of name change took us over many hurdles but was unanimously approved and enthusiastically endorsed by College of LAS administration and higher-ups. We think this is going to be very important for our future. To be clear, this is a department name change only—we still will grant bachelor's degrees in geology, and at our core we will maintain strength in traditional geological fields so in principle the change to our everyday work is not great.

We realize that some of you may ask, "Why the change?" Let me explain our reasons—and I would be happy to chat further to explain in more detail. We are a campus with around 35,000 undergraduates, and yet we struggle to exceed 50 geology majors (all years) in a given year. The principle reason for this is that most undergraduates coming to Illinois have no idea what geology is. You see, in Illinois, K-12 students study Earth science in eighth grade and few ever take a course with geology in the name. Thus, our new name connects better with both "Earth Science," a field students are familiar with, and "Environment," which they hear about all the time from media and life. The name change is aimed at increasing both the number of majors and the number of students taking our 100 level classes. This is important to our future as department budgets are more closely tied to the number of majors and the number of credit hours taken by students in all our classes. With one year of data so far I am happy to report the number of incoming freshman and transfers declaring geology as their major is the biggest in a long time!

You may also ask, "Why *Environmental Change?*" First, I want to point out that we were the second-to-last Department of Geology in the Big Ten to change its name from geology. The most common name in the Big Ten is *Earth and Environmental Sciences.* While we wanted environment in our name, we also wanted some distinction, with a name that better captured the dynamics of the planet—thus, Earth Science & Environmental Change. We think "change" captures concerns about rapid rates of modern planetary change but also the dynamism of Earth's past history. Finally, we found in polling of 100-level geology students that the name Earth Science & Environmental Change most resonated with them. Yes, it is a mouthful—we are already referring to ourselves as ESEC! We hope you too will find ESEC a change for the better!

Last year brought several important events to the department. We had an investiture for Bruce Fouke as the R.E. Grim Endowed Professor of Geology. Professor Steve Altaner retired in the summer and Professor Gary Parker retired in September. Assistant Professor Ross Maguire joined us as a new seismologist, and we were authorized to search for a new position in climate risk which is nearing its conclusion. Field trips have returned to a normal post-pandemic repertoire. Introduction to Petrology went to Missouri while the structure class went to Baraboo. Our GEOL 415/515 spring field course went to the big island of Hawaii and witnessed a view of real lava flowing into the sea. A graduate-level petrology and plate tectonics class led by yours truly took 12 students to southern California in November.

As mentioned last year, we want to ramp up efforts to build an endowment whose revenues would fund GEOL 415/515 in perpetuity. This class is such a big part of the Illinois geology experience and we want to make it happen at costs that remain affordable for all geology majors. The department is extremely grateful for the many donations from alumni and friends over the past year. To see a list of current highpriority giving opportunities and/or to make an online gift, please visit the department web page (www.esec.illinois. edu) and click on the "GIVE" link in the upper right corner. If you need help with any method of donation, feel free to call the department at (217) 333-3540.

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 more than 350 members (one of the largest geology alumni groups in country) and is an easy way for our alumni to connect and 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 Campbell Lundstrom

Head, Department of Earth Science & Environmental Change

Gary Parker retires from teaching

Professor Gary Parker, who served as the W.H. Johnson Professor of Geology and as professor of civil and environmental engineering since 2005, has retired from teaching and has transitioned into life as an extremely active professor emeritus. Gary has been a key member of our department's faculty. As one of the top researchers in his field, he has brought great visibility to the Illinois sediment dynamics program that spans civil and environmental engineering and geology and geography and geographic information science, helped us build faculty strength in that area, and provided an excellent interdisciplinary link between geology and civil and environmental engineering. A prolific researcher working on key topics in his field, his c.v. lists well over 300 publications, 200 of which have been cited more than 40 times! His

seminal contributions to many areas of sedimentology and geomorphology are widely recognized. Before coming to Illinois, he was the director of the renowned St. Anthony Falls Labotory at the University of Minnesota. Gary has strong international research connections, particularly in Japan, Italy, the Netherlands, and China, and he has been traveling widely since his classroom teaching commitments ceased.

Parker is a member of the National Academy of Sciences and has been the recipient of many other awards and honors including the G. K. Gilbert Award from American Geophysical Union, the G.K. Warren Award in Fluviatile Geomorphology from the National Academy of Sciences, the Ippen Award and the Shoemaker Award (twice) from the Association for Hydraulic Research, and the Einstein Award, the Hilgard Prize, the Stevens Award, and the Hunter Rouse Award from the American Society of Civil Engineers. He was awarded, at the United Nations headquarters in New York, the seventh Prince Abdul Aziz Surface Water Prize. We have been fortunate to include Gary among our faculty and we enjoy his continued presence and funny jokes in the department.



Alumni achievement awardee: Dr. Dennis Coleman

The Alumni Achievement Award recipient in 2022 was **Dr. Dennis Coleman**. We have many accomplished alumni who work either in industry or in basic research in academia or government; Dennis has a unique resume that bridges these two categories.

Dennis started his career at the Illinois State Geological Survey (ISGS) where he, along with Jack Liu, built one of the best radiocarbon labs in the country. They made big improvements in technique, decreasing the mass of carbon needed per analysis, and this opened up many new science applications. The ISGS lab became an internationally recognized facility with a reputation for quality data. His work in this lab led to the novel use of stable carbon isotopes, which can differentiate between microbial gas and thermogenic gas and trace gases from underground storage reservoirs. Demand for this type of analysis boomed and, in 1985, Dennis, along with three colleagues,

formed a commercial isotope analysis laboratory, Isotech Laboratories, Inc., in Champaign. It quickly grew to become the largest privately owned isotope laboratory in the world. He worked with researchers at Chevron to develop the field of mud-gas logging, which became a standard exploration tool in the oil and gas industry. Further, with his son, Todd, Dennis invented new containers for collecting gas samples, IsoTubes, which simplified both sample collection and analysis, leading to explosive growth in the business.



High-precision carbon and hydrogen isotope analysis of natural gas hydrocarbons provided a key method for detailed fingerprinting of gases, for example in identifying the exact source of gas in the blowout of the Deepwater Horizon well.

During Dennis's later years at Isotech, the company developed satellite laboratories with automated instruments in Egypt, Brazil, and Australia, operated remotely by analysts at Isotech in Champaign. Perhaps this global experience led Dennis and his wife to become world travelers in retirement, including recent exciting trips to Antarctica! Despite his incredible achievements, Dennis remains modest and eager to enhance education. Department Head Craig Lundstrom said, "I have brought several of my analytical geochemistry classes to Isotech. Each time, Dennis captivates his audience with specific and practical applications of isotope ratio analysis."

Seismologist Ross Maguire Graduate student profile: joins the faculty

Assistant Professor Ross Maguire joined the faculty in Fall 2022. We asked him a few questions to learn about his interests and accomplishments so far.

What are your research interests? My primary focus involves using the tools of seismology to probe the interior structure and dynamics of the Earth, along with other planets and moons. I am very interested in understanding the processes that drive volcanism on Earth, with a particular focus on hot spot volcanism. To study volcanoes, I use seismic tomography to obtain three-dimensional images of seismic wave speeds. These images can then inform us about the material properties of the crust and mantle, and map regions of magma storage. I have also been a collaborator on NASA's InSight Mission, which placed a seismometer on Mars. I use the data to constrain the internal structure of the planet and to understand the tectonic forces that produce "marsquakes".

Describe your study locations and collaborators. My most recent focus has been on Yellowstone, one of the largest silicic volcanic systems on Earth. I am fortunate to take advantage of openly available data from networks of seismic instruments. In the case of Yellowstone, I used publicly available data from the United States Geological Survey, National Science Foundation's Earthscope Consortium, and the University of Utah. These data allowed me to create a new tomographic image of Yellowstone's crustal magmatic system and gain new insights into the volume and distribution of magma.

What plans do you have as you build your career at Illinois?

An exciting development in seismology is the growing use of relatively inexpensive "nodal" seismic instruments that are easily deployed. Dense arrays of these instruments enable high-resolution imaging in volcanic regions where that was not possible previously. By combining new datasets with physics-based computational modeling, I aim to push the limits on imaging resolution to improve our understanding of magmatic processes.



Mahta Gholizadeh Ansari



PhD student Mahta Golizadeh Ansari is known for her hard work, both in the lab and for social justice and equity. During her undergraduate studies in mining engineering at University of Tehran she realized the devastation that mining can cause. Mahta explains how this motivated her: "I am particularly interested in tackling social equity issues, and environmental problems are often, at root, equity problems. Being a hydrogeochemist has allowed me to integrate my two greatest passions: science and equity."

Mahta's PhD research focuses on highly toxic chromium (Cr) in groundwater. She explains, "The most challenging aspect of Cr contamination is that it can occur both naturally and through industrial activities. It can be very difficult to distinguish natural Cr from industrial pollution when they coincide, and this makes it challenging to hold polluters accountable. In my work, I use the stable isotopes of Cr to track sources of contamination and understand the chemical processes that release Cr into groundwater or remove Cr from groundwater."

Her years at Illinois included both challenging and uplifting times. She said "Covid was challenging on many different levels. Ninety five percent of my research happens in the lab, so being locked out for months was extremely difficult. However, I used that time to work on developing an NSF proposal which got funded, so that was really great." Mahta is an accomplished teaching assistant, and she said, "I think my favorite moments have been helping students understand new concepts. Seeing their faces brighten up and being a part of that 'Aha moment' has been an incredible experience."

Mahta served as president of the department's graduate student body and is always advocating for students. She said, "My most fulfilling experience at Illinois was working on reforming policies within our graduate program to make it more equitable. Being a part of different teams of passionate graduate students and faculty members who had a genuine interest in sparking positive change was my most fulfilling experience at U of I."

Donor spotlight: Susan and Glenn Buckley

We caught up with Susan (PhD, '75) and Glenn (PhD, '73) to ask about their experiences at Illinois and their current and past connections to the department.

SUSAN

How did you use the education you received at Illinois?

Education is never wasted. I emerged from university at a time when a spouse's career options in the profession were limited, so after temporary involvement in research on an hourly basis, I became a full time volunteer in the community and public school, rearing two very well- educated children who today are benefitting society in their professional careers. After they were grown, my scientific background enabled me to work in quality assurance in a biotech research company.

What is your favorite memory in the field while at Illinois

(field trip or research)? I loved Wyoming. I was in my element at field camp. The six years I was a research assistant to Charles Collison at the Illinois State Geological Survey enabled me to get up close and personal with practically every inch of the state of Illinois, its local culture, and its history.

Why do you give to the department? The department was a family when I was there and you don't walk away from family.

GLENN

How did you use the education you received at Illinois?

Exposure to a broad range of scientific and geologic concepts gave me the flexibility to work in both research and operations and ultimately expand my interests into areas of natural resource conservation. The experience of teaching in the field was especially helpful and even impacts programs I teach today. Even though I worked on metamorphic rocks, the concepts and techniques were easily transferred to modelling the temperature evolution of sedimentary basins when I started at Exxon Production Research.

What is your favorite memory in the field while at Illinois (field trip or research)? I assisted at the summer field course in Sheridan, WY – Susan and I recently celebrated our 50th wedding anniversary in Sheridan to revisit those memories. I also remember a spectacular display of northern lights during a mineralogy field trip to northern Michigan.

Why do you give to the department? My family was blue collar, so finances were limited. Assistantships and other support allowed me to attend and leave Illinois essentially debt free. We now have an obligation to help the next generation.



Susan and Glenn celebrated their 50th wedding anniversary in the Bighorn Mountains near Sheridan, Wyoming, to revisit memories of their time at the Illinois field camp.

An amazing paleobotanical record

The disciplines of Geology and Plant Biology have a long history of collaboration at Illinois. "Coal balls", the carbonate concretions in coal seams that provide exquisite preservation of plant fossils, provide one exciting area of overlap. The late Tom Phillips, who was a professor of plant biology and an affiliate professor in our department, began studying coal balls in the 1970's. He collaborated with Illinois State Geological Survey (ISGS) geoscientists, developed advanced methods for assessing plant fossils, published many revolutionary paleobotanical studies, and became a member of the National Academy of Sciences in 1999. Phillips passed away in 2018, leaving behind an entire warehouse of specimens. Now,

the torch has been passed: Research on coal balls continues under plant biology Professor Surangi Punyasena (affiliate in ESEC), her students, ISGS geologist Scott Elrick (BS, '95 Geology), and ESEC Lecturer Dr. Max Christie.

Essential to the renewed coal ball research is a gift from alumnus Michael Fortwengler (MS, '02) and his wife,



One of approximately 50,000 coal ball specimens from the Tom Phillips collection. (Photo by Carly Conway)

Lalana, creating the Tom L. Phillips Memorial Fund for Paleobotany. The fund has supported a dozen graduate and undergraduate students, and an image analysis platform is being developed to make the collection digitally available to paleobotanists around the world. Grad student Scott Lakeram obtains images of fossils entombed in coal balls using Tom Phillips's method: Coal balls are sawed open, surfaces are etched with acid, and thin "peels" of fossil plant cells are peeled off onto cellulose acetate film. Part of Lakeram's work is digitizing highresolution images of some 250,000 peels in the Illinois collection. The goal, he says, is to "create an artificial intelligence method to automate the identification of the plant contents within these balls."

Around the Department

Meet the mammoth! Many of you have seen the new life-size mammoth sculpture installed just south of the Natural History Building. Several years in the making, the sculpture was a required component of the 2013-2016 NHB renovation. After the building work was complete, Professor Emeritus **Steve Marshak** continued his steadfast leadership of the NHB project, taking a leading role in choosing the sculpture's theme and getting it approved. The mammoth is now extremely popular, highlighted by passing campus tour guides and posing dutifully in thousands of photos.

2023 Spring Field Course, GEOL 415/515 went to Hawaii!! As usual, the classroom component of the class spanned the spring semester, with students learning about various aspects of Hawaiian geoscience —more than just volcanoes—and the field component happened in May, just after the semester's end.

Jessica Conroy enjoyed her sabbatical in 2022-23, which included fieldwork in Palau and working with collaborators in Hawaii. PhD student Sarah Dendy successfully defended her dissertation and is beginning a postdoc at the Illinois State Geological Survey. New PhD student Allison Wallin joined the lab and will be working on Jessica's new National Science Foundation grant, assessing wind variability in paleoclimate model simulations and modern observations. New papers were published in the journals *Geophysical Research Letters*, *The Holocene, Scientific Reports*, and *Environmental Research: Climate*.

Bruce Fouke's laboratory group has fully moved his biomolecular laboratories from the Carl R. Woese Institute for Genomic Biology into the geobiology laboratory in NHB. The lab continues its crossdisciplinary research on carbonate sedimentology, geobiology, and biomineralization in coral reefs, hot springs, oil fields, and Roman aqueducts. In addition, a major new GeoBioMed research effort is now underway on human cardiovascular calcification with colleagues



Faculty and students atop Kilauea crater (left) and students examine Pahoehoe and Aa flows on Chain of Craters Road (right) during the 415/515 field course in Hawaii.

at UCLA Health. Bruce is now in his 11th year serving as director of the Carver Biotechnology Center and is deeply honored to be appointed Ralph E. Grim Professor of Geology.

Willy Guenthner was promoted to associate professor this year! His group made progress on several projects: PhD students Ryan Sigat and Ola Babarinde continued their work on understanding the Proterozoic erosion history of the Great Unconformity surface across the Midwest and Great Plains. Ryan pursued further research into He diffusion in zircon. Masters student Josh Isaacs is working on the Proterozoic erosion history of the Fennoscandian Shield in Finland.

Give to the Department of Earth Science & Environmental Change!

Alumni gifts to the department provide critically important support for students, sustain excellence, and allow us to pursue new initiatives.

WAYS TO GIVE:

- 1) Visit **esec.illinois.edu** and navigate to the alumni page or the **Give Now** page
- By mail: We're sorry we don't include reply envelopes any longer; please call us at (217) 333-3540 if you would like for us to send one to you. Please make gifts by check or money order payable to the "University of Illinois Foundation." Please also include a short note stating the designation of your gift (including fund number if known).

Mail to:

- University of Illinois Foundation PO Box 734500 Chicago, IL 60673-4500
- 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 Earth Science & Environmental Change.

Alumni News

We would like to hear more of your news! Please send your updates to geology@illinois.edu.

Karen Fryer (PhD, '86) is professor emeritus at Ohio Wesleyan University, where she served as department chair for 12 years. She is currently serving as president of the Association for Women Geoscientists.

Rosemary Schmidt (MS, '91) is geology section chief with the U.S. Army Corps of Engineers, New England District. Rosemary has been with USACE for most of her career, and has been in touch with the department to explore online education opportunities for USACE scientists.

Richard Dentzman (BS, '92) is president and CEO of Marine Optical Solutions, Inc. which develop and deliver undersea optical communication solutions that provide high-speed broad band data transfer for static and mobile undersea assets and vehicles. **Ted Flynn** (PhD, '11), after working for several years at Argonne National Lab, has been at the California Department of Water Resources. He is a senior environmental scientist and chief of the discrete Environmental Monitoring Program, conducting ecological monitoring and synthesis of water quality and lower trophic biological communities in the San Francisco Bay-Delta estuary.

Jiashun Hu (PhD, '18) is now an assistant professor at Southern University of Science and Technology (SUSTech), China. After graduating from Illinois, he did a postdoc at Caltech and joined SUSTech in 2020. SUSTech is a beautiful young rising university in Shenzhen China, established in 2010. Jiashun welcomes visits from Illinois geology people!

Nathan Webb (MS, '09) is now head of the Subsurface Energy Resources group at the ISGS, which conducts geologic research on the oil-bearing strata of Illinois in cooperation with the oil industry.

JOIN OUR LINKEDIN GROUP! If you have a LinkedIn account and wish to join the group, simply keyword search **UIUC Geology Alumni** to join. If you'd like to share your knowledge and professional experiences, please consider joining LinkedIn and use the platform to stay connected with department alumni.

Alumna Sue Kay Awarded GSA's Penrose Medal

Professor **Suzanne Mahlburg Kay** (BS, '69; MS, '72) was awarded the 2023 Geological Society of America Penrose Medal on October 15, 2023, at the GSA annual meeting. The Penrose Medal is one of the two highest GSA honors and is awarded "in recognition of eminent research in pure geology, for outstanding original contributions or achievements that mark a major advance in the science of geology."

Sue has had a long and distinguished career on the Cornell University faculty, including breakthrough research on the fundamental tectonic processes responsible for magmatism and crustal dynamics along convergent margins. She served in several leadership roles with GSA, culminating in the GSA Presidency in 2013. She has earned numerous other awards and honors, including a Fulbright fellowship in Argentina, Fellowship in both the Mineralogical Society of America and GSA, and the GSA Distinguished Service Award. She was named the William and Katherine Snee Professor at Cornell. She has also been a steadfast member of the department's alumni advisory board for 10 years.

Sue is best known for her prolific work on Andean magmatism, spanning the entire margin from the caldera-forming ignimbrites of the Puna-Altiplano plateau to the intraplate basalts of Patagonia. Her c.v. lists nearly 100 papers that have been cited 50 or more times. She has applied trace element ratios and isotopic signatures toward understanding phenomena such as the Pampean "flat slab" region, proving that magmas far from the trench resulted from near-horizontal subduction. She was also a pioneer working on the concept of tectonic "delamination;" her landmark paper, Kay and Kay (1993) dealt with the mechanics, timing, and driving forces of delamination – deduced via the geochemical patterns in magmas of the Andean delamination zone. This process remains a prominent topic of research at present (see page 1)!



Alumni Obituaries

Jeanne Farnum (BS, '43) After receiving her BS, Jeanne worked as an assistant curator at the AE Seaman Mineralogical Museum at Michigan Technological University, then joined the Michigan Geological Survey team as their first female geologist. She and her husband Larry Farnum, who worked for the U.S. Army Corps of Engineers, were married 68 years and had six children.

Earl Soley (BS, '50) After serving in the Navy, Lloyd received his BS in geology and chemistry. In 1953, Lloyd married Carol Smith and they had two sons. Lloyd earned his MBA from Xavier University and worked for various lime and cement companies in technical and management positions.

Ann Fox (MS, '53) and her ex-husband (**Bob Fox MS, '53**) embarked on an adventurous life, having four children together and careers that took them to Pakistan, Libya, the Netherlands, and Scotland. They later jointly owned and operated Term Energy, a small oil and gas producer in West Virginia. Ann settled in Athens, Ohio, where she took special pride in her grandchildren and continued as a geologist and business owner until her death.

Ed Franklin (BS, '56) was a great benefactor of the department, having served on the Geo Thrust committee, which raised several million dollars in donations for the department and established endowments that have been key to our success over the past 25 years. Ed created the Franklin Field Camp Scholarship, which has helped roughly a hundred students afford field camp costs. He served in the U.S. Army during the Korean War. After receiving his BS, he earned an MS at Nebrasksa and embarked on a career as a petroleum geologist, mostly with Exxon, for more than 25 years. Ed was married to Alison Reppert from 1966 until her death, then married Nancy Richardson in 2014.

Richard Malkowski (BS, '56) worked as a sales representative with Dow Corning Corporation for more than 30 years. In 1964, he met Betse Voss, to whom he was happily married for 58 years. They had six children.

Lee Williamson (MS, '56) joined the U.S. Navy during the Korean War. He and his wife, Joyce Ann, were married 52 years and raised three children. After receiving his MS, Lee joined Conoco Oil and lived in Lafayette, Louisiana, where he and Joyce Ann were founding members of St. Barnabas Episcopal Church.

John Bredehoeft (MS, '57; PhD, '62) had an illustrious, 32year hydrogeology career with the United States Geological Survey, including several years as chief of the Water Research Program. He was at the forefront of many important developments in hydrogeology and received numerous recognitions, including the Horton Medal from the American Geophysical Union, the Penrose Medal from the Geological Society of America, the M. King Hubbert Award from the National Ground Water Association, and membership in the National Academy of Engineering. John taught and mentored students as a visiting professor, he wrote extensively and received numerous awards and honors, and he co-founded The Hydrodynamics Group, a consulting company specializing in groundwater problems. John is survived by his wife, Beth Garbutt, and his four children.

Paul Karrow (PhD, '57) taught at the University of Waterloo, became the first chair of the Department of Earth Sciences, and had an enormous influence on the department's research and teaching directions. Karrow was a pioneer of Quaternary Geology, most recognized for mapping in the great lakes region. He published more than 200 articles, coauthored a textbook, received numerous recognitions and distinctions, and helped many students throughout his career.

Bud Cofer, Jr. (PhD, '58) served in World War II as a gunner on a B-29 in the Army Air Force. He enjoyed 76 years of marriage with Anne Borders Cofer, raising six children together. Bud taught at Emory University, worked for American Cyanamid Company, and then taught at Georgia Southwestern College until he retired in 1988.

Bill Hay (MS, '58) had an illustrious academic career and was the department's Alumni Achievement Award recipient in 2013. He taught in this department beginning in 1960, then was a joint professor of geology at Illinois and professor of marine geology and geophysics at the Rosenstiel School of Marine and Atmospheric Sciences (RSMAS) at University of Miami (1968 -1974). He was an early leader in the Deep Sea Drilling Project on the Glomar Challenger. Bill was a pioneer in using nanoplankton as a stratigraphic tool. He held roles of chairman and dean at RSMAS, president of the JOIDES ocean drilling organization, director of the University of Colorado Natural History Museum, and professor and visiting professor at various universities. Bill authored about 200 publications during his career and received numerous national and international awards.

Donald Roy (MS, '60) worked as a petroleum exploration geologist for Texaco Inc. for several years, and then went on to become a process control engineer in New England. Don and his wife of 52 years, Frances, raised their children in Cape Elizabeth, Maine.

Dan Textoris (PhD, '63) was professor of sedimentary petrology at UNC Chapel Hill from 1965 until his retirement. He administered a \$10M NSF grant and served as an assistant dean of research administration. He published extensively on carbonate petrology, sedimentary diagenesis, origin of sedimentary cherts, petrology of Castle Hayne Limestone, and Triassic rift basin rocks. He was faculty advisor to many UNC geology students.

Continued on Page 10

Student Awards and Degrees

Estwing Award Sam Neumann

R. James Kirkpatrick Award for Outstanding Graduate **Research in Geology** Karoline Marie Bruckel

Harriet Wallace Outstanding Woman Graduate Student Award Nooreen Amina Meghani

Harriet Wallace **Outstanding Woman** Undergraduate **Student Award** Chloe Alexa Marks

Harriet Wallace Geology Graduate Student Service Award Hannah Veldhuizen

DEGREES CONFERRED IN 2022-2023

Bachelor of Science Degrees

AUGUST 2022 Jared Giovanni Bruni Maciej Robert Dziugan

DECEMBER 2022

William Robert Matzek

MAY 2023

Brian Michael D'Souza Chloe Alexa Marks Kirsten Jenna Mazurkiewicz Lindsay M. Nottingham Kathleen Virginia O'Brien Pedro Nicolas Sanchez Valerie Diana Smykalov Jack Arthur Tullis

AUGUST 2023

Renuka Karina Beniamin Gabriel Sebastian Brophy Addison Claire Curtis Julia Ann Kasner Lilian Christine Lucas Monica Saradhi Pula KeMia S. Smith Hayley G. Woodrich

Harriet Wallace Geology Undergraduate Student Service Award KeMia S. Smith

Outstanding Graduate Teaching Assistant Award Spring 2022: Hannah Veldhuizen Fall 2022: Sarah Dendv

Outstanding Senior Award

Lilian Christine Lucas Valerie Diana Smykalov

Morris Leighton

Research Grants Mahta Gholizadeh Ansari Conner Hansen Lihang Peng Ryan Sigat Hannah Veldhuizen

Master of Science Degrees

DECEMBER 2022 Alexandra Theresa

Sanchez, "The Sedimentary Architecture of Meandering Rivers: The Influence of Bend Migration Style"

MAY 2023

Mario G. Velazquez, "Investigation of Aztec Wash Pluton Using 87Sr/86Sr as a Tool to Understand Mush-Zone Differentiation"

Mingyue Yu, "Petrographic and Strontium Isotopic Analysis on Rare Earth Element Bearing Minerals in Hicks Dome, Southern Illinois"

AUGUST 2023

Kathlyn Rose Ortega, "Testing Formation of the Torres del Paine Intrusive Complex, Southern Chile via Sr Isotope Analyses: Insights into Granite Formation"

Jackson Geology Graduate Student Research Awards

Mahta Gholizadeh Ansari Karoline Marie Bruckel Zebin Cao Robert Trevor Goldman Yanchong Li Nooreen Amina Meghani Nicole Murray Lihang Peng Mario G. Velazquez Hannah Veldhuizen

Winslow Research Grant in Hydrology

Celia Aranda Reina Jon Kenneth Kabigting Golla Andrew Guertin Matthew Stiegman Jinyu Wang

Doctoral Degrees

AUGUST 2022 John Alexander Albright,

"Forecasting Volcanic Unrest Through Geodetic Data Assimilation"

MAY 2023

Karoline Marie Brückel. "How Similar are Silicic Volcanic and Plutonic Systems? New Insights into Upper Crustal Storage Conditions and Formation Processes of Ignimbrites"

Nooreen Amina Meghani,

"Post-Glacial Rivers: Rates of Development, Utilization of Inherited Glacial Features, and Resulting Morphology"

AUGUST 2023

Zebin Cao, "Understanding Lithospheric and Mantle Dynamics Using Geodynamic Models with Data-Assimilation"



Midwest Alumni Undergraduate **Research Grants**

Samantha Davis Julia Ann Kasner Lilian Christine Lucas Chloe Alexa Marks Dominik Rzeszutek KeMia S. Smith Valerie Diana Smvkalov Hayley G. Woodrich

Langenheim Scholarship Recipients Carl Antczak

Anne Cook Sam Neumann

Sarah Dendy, "Reconstructing Late-Pleistocene Climatic and Glacial History of Central North America Using Loess-Derived Land Snail Stable Isotopes and Detrital Zircon Provenance"

Paul A. Ginsberg, "Elastic Properties of Augite and of Garnets by Multiple Methods at High Pressures and Temperatures"

Robert Trevor Goldman,

"An Interdisciplinary Approach Toward Improving Volcanic Hazard and Threat Management"

Jon Kenneth Kabigting

Golla, "Critical Zone (bio) geochemical Reactivity and Hydrologic Transport Recorded by the Stable Lithium Isotope Ratios of Fluids Draining Upland Watersheds"

Yingzhe Li, "The Elasticity of Olivine at High Pressures and Temperatures; and the Effects of Hydration and Cations on the Elasticity of Several Silicates"

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Alumni Obituaries continued

Bill Wilson III (PhD, '63) received his BS from Harvard college, served in the Navy, and earned his PhD in hydrogeology here. He worked for the USGS for 28 years and worked on groundwater resources investigations in many areas on the east coast. He and his wife Kathie enjoyed 64 years of marriage and had two children.

Bill Butler (BS, '66) After receiving his PhD in geology from the University of Arizona, Bill taught at Russell Sage College, then moved to the USGS in Denver. Being an avid outdoorsman, he and his son volunteered with an Alpine Rescue Team. Bill did freelance detective investigations and blood hound searches and he taught gun safety, selfdefense, and outdoor survival.

Sophie Dreifuss (MS, '77) was one of the first women to become a California certified engineering geologist. She worked as a CEG for over 35 years and was a member of the Association of Engineering Geologists (AEG). She had two sons and was married to Genghmun Eng for almost 44 years. **Thomas Murphy (BS, '80)** moved to California and earned an MS in landscape architecture and environmental planning at UC Berkeley, where he met his lifelong partner and wife, Claudia Stuart. Together, they raised two children, travelled, and did meaningful work in Hungary and Guatemala.

Hannes Leetaru (PhD, '97) passed away in May at the age of 69. Hannes was well known to many of us in the department as an ISGS petroleum geologist, friend, and teacher of a well-liked petroleum geology course. He began his career in Houston as an advanced exploration geologist with Getty Oil in 1978, then as a senior geologist for Union Pacific Resources in 1984. He then moved to the ISGS where he was a senior petroleum geologist for more than 33 years, eventually becoming head of Subsurface Energy Resources. In 2023, Hannes was completing his term as president of the AAPG Division of Environmental Geosciences. He received AAPG Certificate of Merit awards twice and received the A.I. Levorsen Memorial Award for best paper at an AAPG Section meeting. Hannes was highly active in ISGS carbon capture, utilization, and storage projects and was known for his enthusiasm and dedication to the ISGS and to science.

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2022-2023 Colloquium Speakers

September 1 - David Mohrig, The University of Texas at Austin, "The Roles of Channel Networks & Hurricane Ebb Surge in Construction and Destruction of Coastal Zones'

September 8 - Richard Wooten, AEG Jahns Lecturer, "Going Against the Grain: Linking Brittle Cross-Structures with Landslides, Hydrogeology, and Earthquakes in the North Carolina Blue Ridge and Piedmont"

September 15 - R. James Kirkpatrick Lecture, Peter G. DeCelles, University of Arizona, "Why the Central Andes are Larger than the Himalaya: Dry and Broad vs. Wet and Narrow"

September 22 - Albert Valocchi, UIUC CEE, "When the Whole is Less than the Sum of its Parts: Simplicity in Coupled Subsurface Transport + Reaction"

September 29 - Michael C. Gurnis, California Institute of Technology, "Subduction Initiation and the Pacific Hemisphere at 50 Ma"

October 6 - Ralph E. Grim Lecture, Athena Eyster, University of Wisconsin-Madison, "Deciphering the Trajectory of Marine Oxygenation: Stratigraphic and Geochronological Clues from Massive Iron Formations"

October 20 - Xue Feng, University of Minnesota, "Plant Hydraulic Transport: Connecting Above- and Below- Ground for Understanding Ecosystem Response to Drought"

October 27 - Meghana Ranganathan, Georgia Tech, "A Microstructural View of Ice Sheet Change"

November 10 - Dimitri Sverjensky, Johns Hopkins University, "How Earth's Surface is Habitable by Permission of the Deep Earth"

November 17 - Glenn and Susan Buckley Lecture in Environmental Geology, Ken Ferrier, University of Wisconsin-Madison, "On the Origin of Sediment: Climatic and Tectonic Controls on Soil Production, Erosion, and Chemical Weathering"

December 1 - Anna Stoeriko, UIUC CEE, "Linking Reactive Transport Models to Molecular Biology"

February 2 - Nicholas Swanson-Hysell, University of California, Berkeley, "The Development and Demise of North America's Midcontinent Rift: A Record of Supercontinent Assembly 1.1 Billion Years Ago"

February 9 - Glenn and Susan Buckley Lecture in Environmental Geology, Kevin J. Anchukaitis, University of Arizona, "Reconstructed Snowpack Variability in the Western United States Over the Last Millennium"

February 16 - Praveen Kumar, Prairie Research Institute, "Introduction to Prairie Research Institute"

February 23 - Jonathan Delph, Purdue University, "Integrating Seismic Observations with Geochemical Constraints in the Puna Plateau to Understand the Structure and Evolution of Silicic Magma Systems"

March 2 - Charles Bopp, Illinois State Geological Survey, "Professional Pathways and Skills in the Geosciences"

March 9 - R. James Kirkpatrick Lecture, Fan-Chi Lin, University of Utah, "Imaging the Hydrothermal and Volcanic System of Yellowstone Using Dense Seismic Arrays"

March 23 - Wendy K. Stovall, Virtual Seminar, ÚSGS & Yellowstone Volcano Observatory, "What's All This Talk About Volcanoes?"

March 29 - 2022 Alumni Achievement Award Recipient, Dennis Coleman, IsoTech, "The Isotech Story"

March 30 - Phillips Lecture, Conrad Labandeira, Smithsonian Institution, National Museum of Natural History, "Mid-Mesozoic Insect Pollination Modes During the Gymnosperm to Angiosperm Transition"

April 6 - Devon Orme, Montana State University, "Insights Into Forearc Basin Initiation from the Mesozoic Great Valley, California"

April 13 - Phillip H. Larson, Minnesota State University & University of Minnesota, "Secrets in the Sand: Paleoenvironmental, Geomorphological, and Archeological Significance of Aeolian Deposition Beyond the Ice Margin"

April 20 - Kerry Callaghan, University of Illinois Chicago, "Hydrologic Connectivity in the United States"

April 27 - Tracy K.P. Gregg, University at Buffalo, "Venus and Earth: Separated at Birth?"

May 3 - Phillip D. Ihinger, University of Wisconsin Eau Claire, "On the Evolution of Basalt and the Origin of Granite: The Sequential Extraction Model for Layered Mafic Intrustons"