Dear alumni and friends,

We have now been in Tate Hall for nearly two years, and continue with the last phases of moving and settling in. This year we finally got our new cabinets for the hallways and atrium, and the Display Committee has been working on filling them with interesting and educational materials. We are also finally getting some geo-art on the walls and larger specimens arrayed where possible on floor spaces. It is starting to look more like an Earth Science department!

I am also happy to report that, as of mid-May, we are finally done cleaning the Pillsbury attic and sub-basement. A dedicated group, led by department administrator Sharon Kressler, worked hard on the attic clean-out well before we even left Pillsbury Hall, and it took many volunteers and quite a few years to get it all done. It is of course a bittersweet accomplishment, as we miss having our unique, treasure-filled attic even as we are very relieved to be done cleaning it out.

I am particularly excited to share the news that we will be offering new BS and BA majors in Environmental Geosciences starting in Fall 2019, along with our existing BS and BA majors in Earth Sciences. These new major programs were endorsed by other environmentally-focused departments across the university, and were approved last fall by the Board of Regents.

Milestone events this academic year included the retirements of Peter Hudleston and David Kohlstedt and the hiring of a new geochemist (Xinyuan Zheng, currently a research scientist at the University of Wisconsin-Madison). Xinyuan and three other previously-hired new faculty members -- Lars Hansen (mineral/rock physics), Peter Makovicky (vertebrate paleontology), and Vera Pospelova (paleoecology/oceanography) -- will be joining us in the fall. In addition, current faculty member Cara Santelli (geomicrobiology) was awarded tenure and promoted to associate professor, Josh Feinberg (geomagnetism) was promoted to professor, and assistant professor Ikuko Wada received an NSF CAREER award.

As I write this, a group of undergraduate students is in Yellowstone National Park for the annual student field trip, this year led by adjunct assistant professor Jeff Havig. They spent the semester preparing for the trip in a seminar taught by Jeff, and they have also been busy fundraising for this trip. It turns out that bake sales in Tate Hall are more lucrative than those in Pillsbury, as the students are able

Another major event of the past year was an external review of the School of Earth Sciences by a committee of faculty – three from other institutions and one from UMN – who visited the department in late March. We are still waiting for their report, though the review has already been useful because, in preparation for the review committee’s visit, we created a self-study document for the first time in 22 years (there was a bit of a gap between reviews, which are typically every 10 years). This provided an opportunity for us to collect and analyze data about the department and to present our accomplishments, challenges, and plans. For example, we compiled information about graduate alumni with degrees between 2008-2018 and determined that 95% are employed in fields related to their degrees. The combined data for PhD and MS degrees are: 48% in academia or research institutions, 27% in industry, 11% in government agencies, and the rest in other employment sectors (such as K-12, non-profit).

Greetings from the Head

Donna and her graduating-from-college-this-spring daughter, Naomi, in Quito, Ecuador
to lure large numbers of hungry students as they trek back and forth to their physics classes in Tate. Even so, we are all very grateful to those who donate to the Field Experiences Fund, as this fund makes it possible for the department to subsidize student trips and to provide scholarships for students taking one or more of the required summer field courses. Field experiences remain an important part of our curriculum.

This spring we also had the 3rd annual meeting of our departmental Advisory Board. We had many thought-provoking conversations with this group of regional geoscience professionals who generously give their time to visit the department, participate in career panels, and provide reports and other feedback on ideas and plans to change and improve various aspects of the department, including career preparation for students.

This year, among other topics, we asked the Board for advice about the best way to stay connected to our graduates. Although we do a pretty good job of keeping track of graduated grad students, it is more difficult to keep in touch with undergraduate alumni although we would very much like to do this. A primary motivation for wanting to know more about our undergraduate alumni is that it is useful and inspiring for current students to see the array of interesting career paths followed by former students.

Based on advice from the Board, we are setting up a LinkedIn group for the department. If you get a request to connect to this group (University of Minnesota Department of Earth Sciences), please accept! Other ways to connect are by e-mail (esci@umn.edu), Facebook (http://www.facebook.com/groups/81943157076/), Twitter (@UMNEarthScience), and the department’s webpage (http://www.esci.umn.edu/). Please send us news of your life and career! Thank you for reading and for your support of the Earth Sciences at the University of Minnesota.

The department would like to thank the Department of Earth Sciences Advisory Board for taking time to meet with students, staff, and faculty on May 6th, 2019. We would also like to thank them for partaking in two career panels for our students. We greatly appreciate the work they do and the input they provide the department. Thank you!

Board Members from bottom left going up and around: Carrie Jennings, Catherine Stott, Ben Sheets, Jon Tortomasi, Dan Holte, Chuck Mosher, Jennifer Engstrom, Melinda Erickson, Shanna Schmitt, and Keith Rapp

Our New Name

The University of Minnesota has recently approved a name-change for the School and Department: we are now the School and Department of Earth and Environmental Sciences! The new name better reflects our research, teaching, service activities and mission.

Cover Photos. Large Photo: Sally Nguyen (back) and Brayden Kuester enjoy a hike in the mountains during the GeoClub spring trip. Left Triangle: Researcher Kristina Brady Shannon give a tour of the LacCore facilities. Center Triangle: Noah Slade explains his research poster at the 5th Annual Earth and Environmental Sciences Student Research Symposium. Right Triangle: Student working on a class project in the microscope lab.

Donna L. Whitney
Head
N.H. Winchell School of Earth Sciences
Incoming Faculty

Peter Makovicky
Professor
PhD, 2002, Columbia University

I am a paleontologist who studies the patterns and processes of macroevolution using the fossil record, which I investigate with a combination of fieldwork, anatomical studies, phylogenetic inference, biogeography, and comparative analyses of trait evolution. I principally use dinosaurs as a research model because of their longevity surpassing 235 million years, global distribution, high diversity, unique anatomical features, and their contribution to our knowledge about mass extinctions. Documenting the fossil record is a foundational step in understanding the Deep Time relationships between the geo- and biospheres, and begins with the discovery and description of past biodiversity. To increase our knowledge of past biodiversity, I conduct field programs in China, Argentina, Antarctica and the US, relying on an extensive international network of collaborators. I use my knowledge of dinosaurian anatomy and biodiversity to investigate topics such as the evolution of life history patterns and heterochrony, biogeography, biochronology, trophic evolution, and how birds originated from theropod dinosaurs.

I am excited to join the Department of Earth Sciences at the University of Minnesota, after spending the last 18 years as a Curator of Paleontology at the Field Museum in Chicago. Prior to that I received my PhD in Earth and Environmental Sciences from Columbia University, and my BSc and MSc degrees from Copenhagen University in Denmark, where I grew up. I am moving to Minnesota with my wife Sushma Reddy, the new Breckenridge Curator of Ornithology at the Bell Museum, and our two daughters Anisha and Jayna.

Vera Pospelova
Professor
PhD, 2003, McGill University

I will be joining the Department of Earth Sciences at the end of August 2019 as a Professor in Marine Palynology and PaleoenvIRONMENTal Reconstructions. My scholarly interests are focused on understanding the impacts of climate change and human activities on marine and estuarine systems. I use organic-walled microfossils (marine palynomorphs: dinoflagellate cysts, foraminiferal organic linings, pollen and spores, etc.) and geochemical proxies as indicators of past and present environmental conditions on a wide range of spatial and temporal scales. This work is multidisciplinary as it involves some elements of marine geology, biology, geography and environmental science. My research interests include: the taxonomy of late Quaternary dinoflagellate cysts; cyst production, ecology, and seasonal/annual dynamics in coastal waters; calibration and applications of these microfossils as indicators of water quality conditions, with emphasis on high-resolution paleoceanographic reconstructions using sedimentary archives.

Prior to joining the University of Minnesota, I had a long career in Canada. I received my PhD in 2003 from McGill University (Quebec) followed by a postdoctoral position at the University of Victoria (British Columbia) and the University of Guelph (Ontario), all supported by NSERC and FCAR fellowships. From 2005 to 2019 I was an Assistant, Associate and then full Professor at the School of Earth and Ocean Sciences, University of Victoria. Before coming to Canada, I grew up, studied, and worked in Akademgorodok (Novosibirsk), Siberia. My undergraduate and equivalent of MSc degrees are from Novosibirsk University, where I was involved in the research on Jurassic biostratigraphy and had a number of long thrilling field seasons in the Russian Arctic. In a way, I am looking forward to experiencing real winters again! I am coming to Minnesota together with my husband, who is a theoretical physicist and will be working in the same building.
Lars Hansen  
Associate Professor  
PhD, 2012, University of Minnesota-Twin Cities

I will be joining the Department of Earth Sciences in August 2019, taking up a position as Associate Professor and head of the Rock and Mineral Physics Laboratory. My research program centers on the physical properties of geological materials at extreme conditions, with a primary focus on the atomic-scale physics that control the deformation of mantle minerals. In particular, I’ve worked on the manner in which crystal defects (e.g., dislocations and grain boundaries) and microstructure (e.g., grain size and crystallographic alignment) influence the mechanical properties of rocks. I implement laboratory experiments, outcrop-scale field work, and high-resolution microscopy to calibrate constitutive models that describe the mechanical behavior of rocks over a wide range of conditions. Most of my work has involved calibrating models used in simulating and evaluating the formation of tectonic plate boundaries, the strength of Earth’s lithosphere, and convection in Earth’s asthenosphere. My additional work on microstructural evolution has provided a framework for interpreting a variety of geophysical observations, especially anisotropy in seismic-wave speed. My work in the near future will focus on rock physics at shorter timescales for application to processes including creep on major faults after earthquakes, vertical motion of Earth’s surface in response to removing ice sheets, and tidal interactions among planetary bodies.

I am especially excited to be joining the faculty at the University of Minnesota because I completed my PhD in Geophysics in this department in 2012. Because of that time in graduate school, my family has strong ties to the Twin Cities, including our oldest son being born in Minneapolis. I’m returning to the University of Minnesota after spending six years as an Associate Professor and Tutorial Fellow at the University of Oxford, at which I established the Oxford Rock Rheology Laboratory. Prior to Oxford, I spent a year as a postdoctoral researcher in the Mantle Processes Group at Stanford University. Before coming to Minnesota in 2007, I completed an MS in Geology at the University of Wyoming and a BS in Earth Science at California Polytechnic State University, San Luis Obispo.

Xinyuan Zheng  
Assistant Professor  
PhD, 2014, University of Oxford

I am joining the Department of Earth Sciences as an Assistant Professor in August 2019. As a low temperature geochemist specializing in isotope geochemistry, I am interested in biogeochemical cycles of a variety of major and trace elements and their isotopes (e.g., iron, silicon, potassium, rare earths) across different spatial and temporal scales. My research combines development of novel analytical techniques based on multi-collector inductively coupled mass spectrometers (MC-ICP-MS) and laser ablation (LA) systems, experimental isotope geochemistry that investigates fundamental physicochemical controls on geochemical signals recorded in geological archives, studies of modern surface processes, and reconstruction of past climate and environment. The overarching goal is to understand causes and consequences of changing environments of the Earth (particularly redox conditions of the ocean) through the lens of elements and isotopes. I will establish a new MC-ICP-MS and laser ablation laboratory in the department.

I had my higher education in Earth Sciences prior to PhD in Nanjing University in China, and received my PhD in geochemistry from University of Oxford in 2014. Before I accepted the position at the University of Minnesota, I spent several years at University of Wisconsin-Madison as a postdoc fellow and then an Assistant Scientist. I benefited greatly from my experiences of working with people from different cultures across different continents, and I hope to share my multicultural experiences with future students. I am looking forward to this exciting new journey in Minnesota, accompanied by a wonderful group of new colleagues and students and, of course, my wife and two little kids!
Our colleague Peter J. Hudleston has retired after 49 years of teaching, research, and service at the University of Minnesota. Peter has been a central figure of our department as a prominent structural geologist (recipient of the 2013 Career Contribution Award from the GSA Structural Geology and Tectonics Division), a generous and inspiring teacher, and a respected administrator as department head and associate dean in our college.

Peter’s research interests are in “pure” structural geology, and he is famed for his expertise and rigor in this field. As is characteristic of Peter, he has used his broad and deep knowledge to help others, including by serving as editor of the Journal of Structural Geology for 15 years. His international leadership in structural geology has benefited generations of students at UMN by his legendary teaching of Structural Geology, Advanced Structural Geology, and Tectonic Styles. His students, both graduate and undergraduate, will always remember his passion, clarity of mind, and thoroughness.

Peter’s research contribution has been profound, particularly in understanding the 3D characteristics of shear zones and the processes of folding. By his own admission, Peter is attracted to the aesthetics of folds, and by studying them in both rocks and ice, he demonstrated how folds inform the mechanical behavior of these materials in fundamental ways.

Close to home, and armed with first-rate theory and observations, Peter and his students studied the structures of Archean rocks in northern Minnesota, and pioneered the innovative concept of transpression. Whether theoretical, field-based, or built on analog/digital models, Peter’s papers are elegant and meticulous.

Peter was department head from 1983 to 1993 and later served again as interim head (2011-12). Faculty, staff, and students have consistently praised his administrative abilities and remarkable human qualities. Throughout his career, Peter has been the go-to person for level-headed advice. His views and opinions are trusted, and his generosity, good humor, and calm disposition are legendary.

Following his 10 years as department head, Peter was associate dean of undergraduate programs for 12 years. His legacy includes a successful Study Abroad program that has helped shape the lives and careers of hundreds of undergraduate students. In recognition of his many contributions to the U, he was awarded the President’s award in 2014 for outstanding service.

Finally, Peter is known to all of us as a terrific colleague and mentor, and for being both approachable and irreproachable. Thank you, Peter, for caring so much about our department and college! And thank you for your continued insight, advice, and humor. When asked why 49 years, you characteristically respond, because “50 seems too long”. Peter, the School of Earth Sciences that you helped shape for almost half a century owes you a great deal of gratitude and wishes you all the best in your retirement. We hope to see you often in the halls of Tate and in research group meetings!
Kohlstedt established a world-renowned laboratory in experimental rock and mineral physics. He trained a cohort of graduate students and undergraduate students who went on to become world-leaders in their fields. He taught undergraduates in a wide range of introductory and specialized geophysics classes, most particularly in his Rock and Mineral Physics class, which became a standard for advanced training in this field and has become the template for similar courses taught at institutions across the U.S. and abroad.

Kohlstedt earned his B.S. degree at Valparaiso University, and his Ph.D. in solid state physics from the University of Illinois. Through two post-docs, the first at the famed Cavendish Laboratories at Cambridge University and the second at MIT with the pioneers of rock physics, Bill Brace and Chris Goetze, Kohlstedt brought his expertise in solid state physics to the Earth Sciences. In so doing, he became part of the vanguard of the then-young field of mineral and rock physics, which reached maturity in the 1980s. Prior to this time, the fields of geophysics and the study of the properties of rocks and minerals were largely separate endeavors, with the latter focused almost entirely on chemical rather than physical properties.

Kohlstedt’s research in Earth Sciences has influenced everything from our understanding of convection in planetary interiors to the flow of glaciers on Earth and on icy satellites. He is perhaps best known for his pioneering work in 3 different areas: (1) the deformational properties of mantle rock at high temperatures and pressures, (2) the substitution of H2O (as OH-) in nominally anhydrous minerals, and (3) the interactions between deformation and transport of fluids and melts in Earth’s interior. Kohlstedt’s fundamental determinations of olivine flow properties gave us the depth variation in mantle strength, which in turn provided a first order explanation for why mantle convection results in plate tectonics. His work on H2O in nominally anhydrous minerals provided the first measurements of the H2O storage capacity of the mantle and the influence of H2O on mantle properties, and lead to an explosion of research into Earth’s deep H2O cycle. Studies of melt migration and deformation have illuminated the intricate physics that govern how and where magmas emerge from the mantle to form volcanoes and the oceanic crust.

Kohlstedt’s accomplishments earned him national and international plaudits, as well as recognition here at the University. Among his many honors, he was awarded the H. Hess Medal from the American Geophysical Union (2003), the Néel medal from the European Geophysical Union (2005), and the Murchison Medal from the Geological Society of London (2009). He was elected to the American Academy of Arts and Sciences in 2000 and in 2009 became a member of the National Academy of Sciences. He also is a fellow of the American Geophysical Union and at UMN, he was an Institute of Technology Professor and the Gibson Professor of Earth and Planetary Sciences.

At his retirement this May, more than 30 of his former students and post-docs traveled from across the continent and oceans to celebrate his career. In a day-long symposium on May 18, 2019, they gathered to tell stories of his accomplishments, mentorship, humor and friendship. Beyond all the official honors, that so many of his former advisees, who have themselves found great career success in geophysics, materials science, and other endeavors, crossed the continent and oceans to gather in this way is perhaps the greatest tribute to David’s professional accomplishments and influence.
Changes at the Minnesota Geological Survey

Submitted by: Harvey Thorleifson

Having moved to a new building in 2015, more change is underway at Minnesota Geological Survey (MGS), as long-serving senior staff retire. This started with Tim Wahl’s retirement in early 2018, and continued in February 2019 with the retirement of Bruce Bloomgren and Dale Setterholm.

Since joining MGS staff in 1972, Bruce Bloomgren has performed heroically in many tasks, in particular in the field of water well data and borehole geophysical logging. He possessed fame before arriving at MGS, though, as he was the 1969 recipient of the Outstanding Lineman award on the UMD football team. Bruce is extensively known and respected throughout the Minnesota water well and geological communities. He deserves much credit for facilitating professional networking among water well drillers, and resulting astounding achievements in data collection – with 538,308 water wells now in the database at last count, and the count of cuttings growing. The MGS borehole geophysical database now stands at over 10,000 logs from 7,896 boreholes – gamma logs and more. Bruce’s contributions to the documentation of Minnesota geology for the benefit of people throughout the state thus have been immense.

Dale Setterholm worked for the Survey as a student in 1978, as he was working on a Jordan sandstone senior thesis, and as a member of staff beginning in 1979. Dale lunged into his early career duties in water well data, groundwater sampling, borehole geophysical logging, cuttings, drilling, and Phanerozoic stratigraphy. From 1980 to 1983, Dale, and to some extent other members of MGS staff, became intensively involved in the work of the Waste Management Board, including field work, drilling, advisory committee meetings, report preparation, and many appearances at sensitive, contentious public meetings. He then developed a specialization in the Mesozoic geology of Minnesota, and led projects related to topics such as groundwater, arsenic, manganese, clay, and bedrock topography. In 1990, for example, Dale prepared a driller’s handbook on MN geology. He became Assistant to the MGS Director in 1996, he received a UMN Master’s Degree in Management of Technology in 1999, and he became MGS Associate Director in 2007. His efforts in leading the County Geologic Atlas program, including preparation and updating of the Geologic Atlas User’s Guide, are very widely known, appreciated, and deeply respected – from the Legislature to Counties throughout the State.

But life goes on, as it does everywhere. Quaternary geologist Barb Lusardi is Dale’s successor as Associate Director, and it is pleasing that the transfer of knowledge and procedures from Dale to Barb has taken place over several months. In the water well data and borehole geophysical logging team, Emily Bauer has taken the lead, with the benefit of her decades of experience. In recent months, the MGS team also has lamented additional departures, and celebrated arrivals, in several fields as well, although MGS has for several years been stable at a grand total of about 40 staff – 28 geologists, 4 information professionals, 2 administrative staff, and 6 students.
New Environmental Geosciences Degrees

Written by: Joshua Feinberg

With the U.S. facing a future shortage of geoscientists in the decades ahead, our department is striving to help meet those needs through its new BA and BS programs in Environmental Geosciences.

The 2018 American Geosciences Institute’s report on the Status of the Geoscience Workforce projected a shortfall of 118,000 geoscientists by 2026 even when factoring in trends in geoscience university enrollment, increased efficiency in industry, and some softening of expected demand within the energy industry.

Most of these job vacancies are due to a coming wave of retirements combined with a low graduation rate amongst university geoscience programs. Positions expecting the highest demand for workers include hydrologists, environmental consultants, and geographic information systems (GIS) specialists. Our new Environmental Geosciences programs hope to attract an increasing number of UMN students to be leaders in these disciplines.

This new major was designed over the last two and a half years and incorporates feedback from a range of potential employers, including local environmental and hydrogeology consulting firms, state and federal regulatory agencies, and geoscience-based non-profit groups.

The information gathered from these organizations reinforced the national trends mentioned above and helped to underscore which courses were most important to include in the new major. In addition to these Earth Science courses, Environmental Geoscience majors will also be required to take courses outside the department in statistics, math, chemistry, physics, GIS, and soil science, and will be encouraged to take advantage of internships at regional geosciences firms and agencies furthing their diverse and in-depth knowledge of the field.

As our communities continue to grow, they will need well-trained, diversely educated geoscientists to help restore surface and ground waters, protect fertile soil, responsibly manage natural resources, and innovate technologically advanced ways to monitor their environment and climate. Our new Environmental Geoscience major will help prepare students for a career in a rapidly changing industry and world.

We will continue to offer our existing BA and BS programs in Earth Sciences and we hope they will continue to attract talented students from both the College of Science and Engineering and the College of Liberal Arts! These more generalized programs provide more flexibility for students and also allow students to focus their coursework on longstanding research strengths within our department such as geophysics, paleontology, and tectonics.

Required ESCI Courses for Environmental Geosciences BA and BS Programs

- Mineralogy
- Geochemical Principles
- Environmental Geophysics
- Structural Geology
- Sedimentology & Stratigraphy
- Geomorphology
- Aqueous Geochemistry
- General Hydrogeology
- Geomicrobiology
- Standards & Practices for Professional Geoscientists
- Field Methods
- Introductory Field Geology
- Advanced Field Geology or Hydrogeology Field Camp
- 3-4 Additional Electives
Fortunately for me, I had the opportunity to compete for and win a full scholarship to the U through the Naval Reserve Officers Training Corps. Initially, it was a means to an end. Although I am patriotic and have a family history of military service, my primary objective was to earn my degree (whatever that might be), serve my required “payback time” in the Navy, and then move on with my life. But I soon realized I enjoyed the Navy life and the many opportunities it provided me to learn to lead and, as the saying goes, “See the world!” The Navy also provided me with the opportunity to pursue a passion for flying and, yes, I was one of those kids who always dreamed of flying.

During my senior year, as I neared graduation from the U and earning my officer commission from the Navy, it was time for me to rank the various branches of the Navy (i.e., surface, submariner, aviation and Marine Corps) in terms of where I would prefer to serve my “payback time.” As you can now imagine, Naval Aviation School was my top choice, and I got in! It was a dream come true, and I thought I had at least the next seven years of my life planned out—graduation, Navy commission, general aviation school, aircraft-specific training, and deployment.

Things were really looking good for this kid who, a few years earlier, didn’t really have a plan. Then the bad news came. During a routine flight physical, a urinalysis indicated a potential problem with at least one of my kidneys. After several months of additional analyses and scans, it was determined that one of my kidneys was indeed not perfect, and that was the end of my Navy career. Not only was I not allowed to participate in the Naval Aviation School, I was not allowed to receive my officer commission. That was it. I was done. My plan vaporized. Now what?

I had not been planning for anything after graduation from the U other than serving my country in the Navy and
paying my debt. My summers during my University years, which I would have ordinarily spent pursuing internships and networking opportunities in a geologic profession, were spent on Navy training cruises. By the way, despite the name “training cruise,” I can assure you we were not served drinks with little umbrellas in them. Nevertheless, those cruises were some of the greatest times of my life—seeing the world, experiencing new cultures, learning to lead, and challenging myself both physically and mentally.

Fortunately, when I received the heartbreaking news of the end of my Navy career, I was on my way to completing bachelor’s degrees in geology and geophysics from a very prestigious university. I also was fortunate to be graduating at a time (1987) when the field of environmental consulting was beginning to boom. So I took stock of my fortunes and began pursuing a career in that field.

Despite the beginning of the environmental-consulting boom, it was not especially easy to find a job at that time—many petroleum and mining geologists also were looking for work due to downturns in those markets earlier in the 1980s. Nevertheless, I networked hard and received a few offers. The clear choice for me (based on its corporate culture and opportunities for growth) was to join Braun Environmental Laboratories, Inc. (which later become Braun Intertec Corporation) as an entry-level environmental technician.

Although I was not pursuing such a career during my time at the U, my education certainly provided a solid foundation from which to launch my environmental consulting career. I had learned how to learn, and how to do it efficiently, effectively and with passion. At Braun Intertec, I started my career conducting environmental sampling of soil and groundwater, and Phase I Environmental Site Assessments (ESAs). As our company grew, I soon graduated to Phase II ESAs, underground storage tank (UST) removal assessments, soil and groundwater remediation, and hazardous materials assessments (e.g., asbestos and lead). The environmental consulting boom in the late 1980s and 1990s fueled by the evolving asbestos, lead, and UST regulations and the ESA market, propelled many careers, including my own. My greatest technical passion has been the world of brownfields redevelopment. It is exceptionally rewarding to be part of a team that redevelops a contaminated and blighted property into productive use for the benefit of many stakeholders, especially the surrounding community.

Along the way, I added to my education by taking hydrogeology and groundwater chemistry courses. I’m envious of students at the U who now have the opportunity to choose from a much greater array of courses in the environmental field. I’m also envious of the great work the Earth Sciences Department is doing to provide support to students who are pursuing this career, including resources such as career counseling, career panels, internship courses, and HAZ-WOPER training.

My passion for leading, which ignited during my Navy service, along with my business acumen and curiosities about technology, which were developed at Braun Intertec, drove me back to the U in 1997-1999. At that time, I was a principal of Braun Intertec, and leading our environmental consulting practice. I was enjoying my time at Braun Intertec because of the people, the culture and the seemingly endless opportunities for my personal growth. I could see myself working there a long time. But I could also see myself becoming too “homegrown,” if I spent my entire career at one company and did not seek any outside forms of development. I enjoyed helping to lead and grow our business, and I knew our firm and I would be well served, if I received additional education in business management. I began looking for master of business administration (MBA) programs and soon discovered the Master of Science in the Management of Technology (MS-MOT) program at the U. It’s like an MBA but with a very strong focus on STEM-related businesses. The technology-business aspect of the coursework and the two-year, cohort format made the MS-MOT program a perfect fit for me.

Currently, I have the great honor and privilege to lead Braun Intertec as its CEO, an honor bestowed upon me by our board of directors in 2009. That young man earnestly pursuing a career in the Navy back in the 1980s and thinking he had the next several years of his life planned out never would have imagined such a thing. Sometimes, when you think you have a plan, God has a better plan. I am thankful every day for the many blessings that have unfolded with my plan, especially my loving wife and our three wonderful children.

There is an old saying that goes, “When God closes a door, He opens a window.” I encourage you all to seek out every door and window in your life, and don’t allow yourself to be transfixed on those that are closed, lest you miss out on the greatest opening of all.
We wish to express our gratitude to alumni and friends who continue supporting the department with generous donations. Your financial support provides scholarships and fellowships enabling students to carry out their studies, conduct field and analytical research, and present papers at professional meetings. Listed on these pages are gifts received from 2018.

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- Caroline & James Chinquist
- Michael & Lynn Convery
- Myrna M. Halbach
- Donald & Pamela Jakes
- Marguerite M. McCarron
- Scott L. Murchie
- John J. Read

**Frederick Swain Fellowship Fund**
- Larry J. Nutter
- Kenneth & Marilyn Quarfoth
- Thunderbird Land and Cattle Co

**Zoltai Graduate Fellowship Fund**
- Thomas C. Sutton

**Allan & Eleanor Martini Fellowship**
- Allan V. & Eleanor F. Martini

**H. E. Wright Footsteps Fund**
- Ruth G. & Carl S. Benson
- Keith A. Brugger
- Kristine L. Bradof
- Richard B. Darling
- Christoph Geiss
- Hanft Charitable Fund-Ayco Charitable Foundation
- Elisabeth Almgren & David Haviland
- Michael J. Jackson & Elizabeth K. Leach
- Kerry L. Keen
- Robert H. & Marjorie J. Rutford
- Linda C. K. Shane & Orrin C. Shane III
- Julie K. Stein & Stanley Chernicoff

**Scott Rice Memorial Scholarship in Earth Sciences**
- Judith J. Friedman
- Marjory & Robert E. Rice

*multiple donations
Sam Sawkins Public Engagement Fund

The School of Earth Sciences is very fortunate to have a new endowed fund to support our efforts in public engagement, including outreach and science communication. The fund was established by two former graduate students of the late Professor Sam Sawkins: Susan Zerwick (MS 1982) and Daryl Scherkenbach (PhD 1982). In establishing this fund, Daryl and Susan wanted to recognize Sawkins’ commitment to communicating about science with people beyond the University and the geoscience community.

The fund supports students, faculty, and researchers in Earth Sciences (ESCI) at UMN to develop and improve skills in scientific communication and outreach. There is an active and growing group of ESCI people engaged in outreach activities, but we have not previously had a dedicated means of support for these activities. Examples of recent outreach efforts, which are described in more detail on p. 19-20 of this newsletter, include an annual event in which nearly one hundred 6th graders visit the department and do lab activities organized by graduate and undergraduate students, visits to K-12 area schools and groups (such as Cub Scouts), the Make Earth Science Accessible (MESA) program that is focused on the exhibits in and around Tate Hall, the Outreach through Science & Art (OSA) program in partnership with artistic programs at Northrop, collaborations with the Bell Museum (such as Saturday with a Scientist and involvement with their planetary science programming), and participation in other UMN and CSE outreach events geared towards K-12 students.

In the 2019-20 academic year, we hope to sponsor a science communication workshop for ESCI people, to help us improve how we talk and write about science beyond the realm of academia. Many of the major issues facing the world today involve Earth Science processes, so it is critical that we develop new communication skills to better explain critical geoscience processes and predications to politicians, the media, schoolkids, neighbors, and others.

We are extremely grateful for the generosity of Susan and Daryl, and hope that others will be inspired to contribute to the Sam Sawkins Public Engagement Fund as well! To contribute to the Sam Sawkins Public Engagement Fund, please visit: give.umn.edu (fund # 22863). Thank you.

David and Sally Kohlstedt Scholarship Fund

A new endowed scholarship has been started to celebrate David and Sally Kohlstedt’s legacy of leadership, teaching, and research at the UofMN. Alumni Nate and Amanda (McKnight) Groebner (MS 2000; BS 2000 respectively) provided funds to help establish this scholarship in an effort to “give back to the department since everyone did so much for us.”

We wish to thank the Groebners and invite anyone who would like to contribute to the David and Sally Kohlstedt Scholarship Fund by visiting give.umn.edu (fund # 22875). Thank you!

CSE External Relations

On May 10th Earth Sciences celebrated a new class of graduates who will join the ranks of our accomplished alumni. Our students are driven and optimistic about their futures, thanks in great part to the dedicated and talented faculty members who are teaching and guiding them through their education. The other vital piece of their time at the University of Minnesota is the support they receive from our alumni, friends and corporate partners.

Gifts of every size to support students, faculty, and our facilities— they all matter. From annual gifts to the areas important to you, pledges to build up funds over time, or creating lasting endowments with assets such as those listed in the planned giving article below, your philanthropy elevates our ability to recruit top students and retain our outstanding faculty.

https://give.umn.edu/stories/make-most-your-assets

To discuss ways to contribute, please contact Shannon Weiher, Senior External Relations Officer, at seweiher@umn.edu or at (612) 624-5543.
Departmental Fellowships, Scholarships, and Awards 2019-2020

Fellowship and scholarship support has grown significantly over the last decade because of our alumni. Your generosity has been the tipping point in many cases, in which better financial packages enable us to attract and retain the best undergraduate and graduate students to the University of Minnesota and to the department. Thank you for your continued support of our students.

Graduate Fellowships

Subir Banerjee Fellowship
John McDaris

Dennis Graduate Fellowships
Joshua Kuether
Leah Nelson
Shanti Penprase
Amanda Tudor

William Emmons Fellowship
Patricia Kang
Natalie Raia

Warren Fisher Memorial Fellowship
Woonghee Lee
Christine Newville
Christopher Schuler

Forrest Fellowship
Jen Taylor

Francis Gibson Fellowship
Harsh Anurag

Samuel Goldich Footsteps Award
Avishek Rudra

John Gruner Fellowship
Fernando Medina Ferrer
Morgan Monz

Junior F. Hayden Fellowship
Meng Sun
Lindsey Kenyon

David Jensen Award
David Birlenbach

Allan and Eleanor Martini Fellowship
Hwaju Lee
Nora Loughlin

Harold Mooney Fellowship
Zhao Zhu

V.R. Murthy/Janice Noruk Fellowship for Women Graduate Students
Clem Hamelin

Fred Swain Fellowship
Nora Loughin

H.E. Wright “Footsteps” Award
Kerry Callaghan

Zoltai Graduate Fellowships
Hannah Blatchford
Evan Whiting

Other Awards

Graduate School Doctoral Dissertation Fellowship
Fernando Medina Ferrer
Peter Scheuermann

Graduate School Dove Fellowship
Jabari Jones

College of Science and Engineering First Year Fellowship
Maddy Nyblade
Undergraduate Scholarships

Thomas & Margaret Aldrich Award
Kayla Nelson

Robert R. Berg Scholarship
Trey Brink
Elizabeth Hill
Megan Wedal

Dennis Undergraduate Scholarships
John Crowley

Fred Donath Honors Scholarship
Noah Slade

J. Chris Kraft Scholarship
Madison Wieczorek

McMillen Undergraduate Scholarships
Alexis Stricker
Jenny Huang
Janelle Ruth

Rita Paquette Memorial Awards
Kaelyn Sperle

Sidney A. Parkans Scholarship
Marga Ramsdell

2019 Field Camp Scholarships
Derek Cole
Elizabeth Hill
Jennifer Huang
Phillip Jones
Camryn Jordan
Isabel Keefe
Jonathan Libra
Sakinah Muhammed
Hayley Orlowsky
Tovio Radloff
Marga Ramsdell
Janelle Ruth
Riley Schmitter
Kaelyn Sperle
Alexis Stricker
Megan Wedal
Madison Wieczorek

2018-2019 Outstanding TA Awards
Joshua Kuether
Christine Newville
Evan Whiting
Jennifer Huang

2019-2020 Department Fellowship and Scholarship Awardees
Degrees Granted 2018-2019

Graduate Degrees

Spring 2018

Liz Roepke, M.S., April 2018
Manganese-oxidizing Microbes could Remove Metals from Brackish Groundwater in the Soudan Mine, Northern MN
Advisor: Cara Santelli

Christie Cino, M.S., May 2018
An Analysis of the Hydrothermal Fluid Chemistry and Isotopic Data of Yellowstone Lake Vents
Advisor: Bill Seyfried

Shane Loeffler, M.S., May 2018
Improving Geoscience Data Access and Interoperability through the Flyover Country Mobile App
Advisor: Andrew Wickert and Amy Myrbo

Michele Stillinger, Ph.D., April 2018
Archaeomagnetism as a Geochronological Dating Tool: Dating a Levantine Iron Age Conflagration
Advisor: Joshua Feinberg

Aimee Zack, M.S., Plan C, May 2018
Advisor: Crystal Ng

Summer 2018

Olivia Beaulieu, M.S., July 2018
A Look at Landsliding Statistics from a Physical Experiment
Advisor: Andrew Wickert

Fall 2018

Colleen Hoffman, Ph.D., September 2018
Iron and Carbon Speciation in Non-Buoyant Hydrothermal Plumes along the East Pacific Rise: A Chemistry Love Story
Advisor: Brandy Toner

Michelle LaGarde, M.S., October 2018
The Morphodynamic Influence of Base-level Change and Waves on Lake Sediment
Advisor: Emi Ito

Evgeniya Khakhalova, Ph.D., November 2018,
Observation of Vortex States in Intermediate Titanomagnetite and Their Evolution with Temperature
Advisor: Bruce Moskowitz

Spring 2019

Josh Torgeson, M.S., May 2018
Biogeochemical Interactions and Cycling of Sulfur, Iron, and Carbon in Sulfate-Impacted Riparian Wetlands and Wild Rice Waters
Advisor: Cara Santelli

Tian “Sunny” Qin, Ph.D., May 2018
Computational studies of the hydrous defects in the olivine, and iron-silicon isotope fractionation during the core-mantle segregation
Advisor: Renata Wentzcovitch

Jen Caseres, M.S., May 2018
H2O and F contents in Mt. Hood magmas recorded by plagioclase phenocrysts
Advisor: Marc Hirschmann

Megan Korchinski, Ph.D., May 2018
Investigation of deep crust viscosity during continental extension
Advisors: Christian Teyssier and Donna Whitney

Max Longchamp, M.S., May 2018
Pseudotachylyte remanence confirms generation along low-angle normal faults
Advisor: Joshua Feinberg
Undergraduate Degrees

Bachelor of Science

Spring 2018
Christian Reynolds
Blaise Villaume
Megan Wang
Jacob Donlin
Andrew Hayes
Ethan Kurak
Kelly McKeough
Paige Melse
Edward Pencak

Summer 2018
Jack Lange

Spring 2019
Jackson Applequist
Blaze Ettlinger
Samuel Fleagle
Rachel French
Long Minh Ho
Melissa Kimball
Riley Lamers
Kayla Nelson
Sally Nguyen
Michelle Qian

Bachelor of Arts

Spring 2018
Josh Erickson
Nicole Hendrickson
Devon Osman
Natasha Peterson
Kaitlyn Rathe
Zachary Roecker
Sarah Schroeder

Photo Credits: CSE
Christian Teyssier and Chris Paola were selected as the 2018-2023 George and Orpha Gibson Chairs in Geoscience.

Marc Hirschmann was selected as the 2018-2023 Gunn Professor.

Sally Kohlstedt was awarded the Sarton Medal, the most prestigious award of the History of Science Society.

Evan Whiting, a graduate student, received the 2018 Estes Memorial Award for research in non-mammalian vertebrate paleontology at the annual Society of Vertebrate Paleontology meeting.

Josh Feinberg was selected as a new Fellow of the UMN’s Institute on the Environment.

Crystal Ng was selected as a new Associate of the UMN’s Institute on the Environment.

Morgan Johnstone, an undergraduate student, received the Mullhollem Cravens leadership Scholarship through the College of Liberal Arts.

Claire Porter, researcher at the PGC, received the National Space Club and Foundation’s NOAA David Johnson Award.

Morgan Monz, a graduate student, received the John Bowers Excellence in Teaching Assistance Award through the College of Science and Engineering.

Anette von der Handt won the February JEOL USA 2019 Image Contest with her photo of crystallites on the surface of a micrometeorite taken on our microprobe.

Ikuko Wada received an NSF CAREER Award for her project titled: “Deformational evolution and serpentinization of the mantle wedge corner in subduction zones”.

Max Van Wyk de Vries, a graduate student, was recognized with the Best Talk at the 2019 Earth and Environmental Student Research Symposium.

Hannah Blatchford, a graduate student, was recognized with the Best Graduate Poster at the 2019 Earth and Environmental Student Research Symposium.

Katie Schroeder, an undergraduate student, was recognized with the Best Undergraduate Presentation at the 2019 Earth and Environmental Student Research Symposium.

Natalie Raia, a graduate student, was selected as a Smithsonian Institution Pre-doctoral Fellow.

Peter Kang received the 3M Non-Tenured Faculty Award for his project titled “Understanding and predicting biofilm dynamics on rough surfaces: the interplay among fluid flow, roughness, and biofilm”.

Megan Korchinski, a graduate student, was selected as the Grand Prize Winner of the Minnesota Supercomputing Institute’s 2019 Research Exhibition in the Physical Sciences & Engineering category.

Clem Hamelin, a graduate student, is a 2019 recipient of a research grant in mineralogy and petrology from MSA’s Mineralogy/Petrology Research Fund for their proposal titled “Putting QuiG to the test: a high-resolution, microscale investigation of the Quartz-in-Garnet barometer in a progressive metamorphic sequence”.

Kathryn Hobart, a graduate student, is the 2019 recipient for the research grant in crystallography from the Edward H. Kraus Crystallographic Research Fund for their proposal titled “Crystallographic controls on abiotic and microbially-mediated pyrrhotite dissolution.”

Sally Nguyen, an undergraduate student, was recipient of the Society for Mining, Metallurgy & Exploration Gust Bitsianes SME Student Award.
Outreach Through Science and Art

Written by: Jen Taylor

Outreach through Science and Art (OSA) is a group of graduate and undergraduate students in the Department of Earth Sciences at the University of Minnesota dedicated to uncovering the connections between the arts and sciences and sharing these connections with the general public.

This year OSA partnered with Northrop to create an exhibit inspired by Company Käfig’s Pixel, a hip-hop based production where dancers interact with dynamic, projected digital environments. They explored the role of digital technology in both dance and Earth science by adapting computer code used for seismology to capture the movements of a dancer in three dimensions. They also built an augmented-reality sandbox that demonstrates how landscapes change through time and how digital technology can be used to document these changes on human timescales. This spring, OSA members have been meeting with local painters and choreographers to learn how science inspires their art and how art can be used to share scientific knowledge with the general public.

Earth and Environmental Sciences Student Research Symposium

Our undergraduate and graduate students took part in the 5th annual student-organized Earth and Environmental Sciences Student Research Symposium in April, 2019. The event, presented by the Department of Earth Sciences, Department of Soil, Water, and Climate, and the Water Resources Science Graduate Program, gives students an opportunity to present their research to students, staff, and faculty through poster presentations and talk sessions organized in a day-long event.

This year’s symposium saw an increase in participation from undergraduate students, with a total of thirty-four students giving talks and/or poster presentations. The symposium plays an important role for students in helping to improve their presentation skills and to gain confidence in presenting their research. As the symposium continues to grow, the committee hopes to increase the involvement of other departments and provide a larger diversity of research topics being presented at both the undergraduate and graduate levels.

Continuing the tradition of having a keynote speaker, the symposium committee invited Dr. Jane Willenbring, Associate Professor at Scripps Institute of Oceanography and Director of Scripps Cosmogenic Isotope Laboratory (SCI-LAB), whose talk was titled ‘Rocks, Regolith, Rain, and Rivers: The Dynamic Interaction of Life and Landscape.’

The 2019 Symposium Committee members were graduate students, Max Longchamp, Natalie Raia, Nick Rodgers, and Chris Schuler. The symposium continues to be a wonderful opportunity for all Earth Sciences students to give a presentation in a friendly environment, get feedback from students, researchers and faculty, and build confidence in their research presentation skills. We would like to thank the Symposium Committee for all of the hard work they do in planning and executing the Annual Earth and Environmental Sciences Student Research Symposium.
Earth Science Department Activities

Tate Hall Displays- Behind the Scenes

Written by: Ikuko Wada, Chair of Display Committee

Since the department moved into Tate Hall, the displays in the building have been evolving through various efforts by the department’s display committee (in the photo at the right). The mission of the committee is to promote Earth Science by making research and teaching material accessible to the public. In particular, the committee is aiming to develop displays that can convey unique stories about Minnesota, Earth, and beyond. With this idea, the committee has initiated several projects, many of which are led by graduate student committee members.

One of the projects has created a display on the geological history of Earth with some focus on Minnesota, using the newly-installed four wall-mount cases in the north corridor on the main floor of Tate. Using two of the display cases in the south corridor, another project focused on illustrating the range of colors that minerals and rocks can have. The committee is also working towards including meteorites in the display case by the main office and is preparing images for the third-floor hallway that represent different fields of Earth Science in the department.

Another exciting project is the high-resolution relief map of North America and the surrounding ocean basins to be put on the wall between the two elevators on the main floor. For this project, a museum-quality platform has been installed, and a trial version of the image is currently being displayed (shown in the background of the photo in the right corner). Many of the projects by the committee are considered work-in-progress as the committee hopes to update and modify the displays to reflect the research, teaching, and outreach activities in the department that are continuously evolving. We invite you to come and check in on the display progress. For more information on the displays and the committee’s activities, please visit mesa.umn.edu.

Graduate Student Outreach Committee

Gerard Salter with Students from the Hiawatha College Prep School

The Graduate Student Outreach committee partook in several outreach events within the community and local schools during the 2018-2019 academic year. In Fall 2018, the department hosted the annual Hiawatha College Prep school outreach at the UMN campus. This event, in which ~100 6th grade students spent half a day learning about various areas of earth sciences with fifteen of our graduate and undergraduate students, helped to kick off a busy year of outreach for our students. The graduate Outreach Committee also collaborated and designed carts for Bell Museum surrounding their new exhibit of climate change and the committee arranged a school visit with three graduate students at Cornelia Elementary school, where four 3rd grade classes engaged in lessons about pebbles, sand, and silt.

In Spring 2019, the department was asked to give a presentation for a Cub Scout Pack in Monticello. This event was attended by 82 co-ed students from grades K-5 and their parents for a total of around 250 people. Four graduate students and 2 undergraduate students presented an interactive talk about interesting geological features one may find as one moves west ending the talk with a history of the gold rush.

The committee also partook in outreach with two more schools in the community and hosted a community geology club for the club’s monthly meeting. The committee is looking forward to continuing the departments commitment to outreach and education in the community. We would like to thank our students for the efforts and care they have put into the wonderful work they have done in outreach for the community.
The University of Minnesota Geological Society (also known as GeoClub) continues to provide students with fun opportunities in a student-led group setting. They partake in many activities during the school year including tabling at student expo events, Paint-the-Bridge, various fundraising bake sales, cookies and coffee at the weekly department seminar, the GeoClub spring trip, and much more. This year the GeoClub planned a trip out west covering 5 states with areas of geological interest. Leading the group of undergraduate students was Dr. Jeff Havig and two graduate students, Aubrey Dunshee and Joshua Kuether. Below is a recap of the wonderful spring trip, written by Jeff Havig:

’TThe intrepid Earth Science undergraduate students enrolled in ESCI 3890 settled on an ambitious plan to tour a large swath of the west for the spring trip, culminating with five days/four nights in Yellowstone National Park. We departed the UMN East Bank campus early on May 20th, heading west to our first stop in Badlands National Park, South Dakota.

Throughout the day, the mood was set as we drove into the teeth of an approaching winter storm...one which would dominate our weather for most of the trip. However, as Earth Scientists, we would not be thwarted by rain and snow, driving wind, and temperatures hovering around freezing. The first night found us holding tarps as a group over tents while we set up camp, with the driving rain never letting up through the next day.

Snow on the freeways and near blizzard conditions in the Black Hills did not stop us from visiting the Homestake Mine, once gold mine repurposed into cosmology/astronomy laboratories, but we certainly took the cue and drove back down to lower elevations and found our way to Buffalo, WY at the base of the Big Horn Mountains where we found refuge in cabins (and the generous motel owner donated two cabins to our cause, which was great for morale).

Unfortunately, due to predictions of up to 2 feet of snowfall, we decided to forgo our trip south to visit the Medicine Bow Mountains and the Archean to Proterozoic rocks there, and the rangers ‘suggested’ that we not try to travel over the Big Horns. We made our way to Sinks Canyon to visit a river that flows through a karst cave, and then traveled over the Wind River Range, settling into the Gros Ventre campsite in Grand Teton National Park. We explored the Tetons and the amazing glacial and tectonic topography there for two days, and then packed up camp to make our way into Yellowstone National Park.

In Yellowstone, we visited sites in six different hydrothermal areas, saw Old Faithful erupt, took in views of Grand Prismatic Spring, missed seeing Steamboat Geyser erupt by a couple hours (so close!), visited Yellowstone Lake and the Grand Canyon of the Yellowstone, and actually had a couple days with some precious sunshine. We were also lucky enough to meet with Ranger Annie Carlson, who is in charge of the Science Permit Office at Yellowstone.

The winter storm again thwarted our intentions of traveling over mountains (this time the Beartooths), so we instead traveled north through the Paradise Valley in Montana, stopping to collect beautiful basement rocks, basalts, and petrified wood in glacial deposits along the Yellowstone River.

Our final night found us in Theodore Roosevelt National Park in North Dakota, with temperatures suddenly in the 70s and blue skies overhead. Finally we could all dry out! The Twin Cities welcomed us back with sun and temperatures in the 80s (quite a change from the freezing temps that we left in). Apparently we missed the week of Minnesota spring while we were gone on our adventures!’
**1980's**


Jonathan Paetz, MS, 1989. Since completing their masters, they have worked in consulting for firms in Minnesota, Iowa and Nebraska. They are currently employed at Valmont Irrigation in Omaha, Nebraska as a Project Manager working on irrigation projects that involve groundwater investigations for irrigation projects and the development of pumping solutions to deliver water and wastewater to center pivot irrigation systems. Jonathan and wife, Leanne, have two children, Joseph and Olivia who are a 5th year and Junior in college.

**2000's**

Anna Courtier, PhD, 2008 and their family stopped by John T. Tate Hall during a family trip to check out their favorite rock, the Ely Greenstone.

Anna and her family in front of the Ely Greenstone

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**Please join us for the University of Minnesota alumni gathering on Monday, September 23, 2019, held during the GSA Annual Meeting in Phoenix, Arizona.**

As alumni, you are part of our Earth Sciences family and we would love to hear from you!

Please send us your comments, memories, and exciting news about life! You can contact us via:

- e-mail: esci@umn.edu
- Facebook, Twitter, and LinkedIn
- Our Alumni Updates Google Form: https://goo.gl/forms/FU4fhapvWs
- Postal Mail

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Find us on Facebook

You can find the following components and affiliates of the School of Earth Sciences on Facebook:

**Department of Earth Sciences:**
https://www.facebook.com/groups/81943157076/

**Institute for Rock Magnetism:**
https://www.facebook.com/pages/Institute-for-Rock-Magnetism/214991911849169

**LacCore:**
https://www.facebook.com/laccore

**Minnesota Geological Survey:**
https://www.facebook.com/MinnesotaGeologicalSurvey

**Polar Geospatial Center:**
https://www.facebook.com/polargeospatial

**St. Anthony Falls Laboratory:**
https://www.facebook.com/saflumn

**College of Science & Engineering:**
https://www.facebook.com/umn.cse/?fref=ts

**UMGS/Geoclub:**
https://www.facebook.com/groups/364483183631510/
In Memoriam

1940's

Warren R. Beck, MS 1948, d. 10/20/16
Alan T Broderick, BA 1940, d. 10/27/2012
Robert H. Cress, EM 1949, d. 03/18/17
Richard G. Gray Sr., BA 1940, d. 03/05/14
Thomas J. Jeffrey, EM 1940, d. 09/02/16
E. Joyce Rembold (husband H. Walter, EM 1942), d. 03/20/17

1950's

Dennis D’Andrea, EM 1959, d. 12/2/17
Warren D. Bell, EM 1950, d. unknown
Curtis A. Bury, MS 1958, d. unknown
Barrett H. Erickson, BA 1955, d. unknown
David E. Fogelson, MS 1956, d. 03/26/18
Walter E. Granlund, EM 1951, d. 02/18/17
Frank A. Jaksa, BA 1954, d. June 2002
William C. Kirkwood, EM 1952, d. 12/24/17
Richard H. Maywald, EM 1955, d. 11/04/17

1960's

Dennis D’Andrea, EM 1959, d. 12/2/17
Warren D. Bell, EM 1950, d. unknown
Curtis A. Bury, MS 1958, d. unknown
Barrett H. Erickson, BA 1955, d. unknown
David E. Fogelson, MS 1956, d. 03/26/18
Walter E. Granlund, EM 1951, d. 02/18/17

1970's

Roger W. Cooper, PhD, 1978, d. 10/24/17
Leon W. Gladen, BA 1976, d. 04/23/16

1980's

Stuart J. Beling, BA 1989, d. June 2010
Ronald R. Vidlund, BS 1986, d. 05/04/17

We were very excited to see some Alumni and Department friends at the two retirement parties the department held this Spring. Thank you to everyone who made the journey to celebrate both Peter Hudleston and David Kohlstedt and the wonderful work they have done throughout their careers.