

UMD

Earth & Environmental Sciences Newsletter for Alumni and Friends



What's inside?

Invitation to the Spring Banquet (page 2) ...

Old-timers' news (pages 6-8) ...

New Academy inductee (page 9) ...

Karen Gran honored (page 9) ...

Student accomplishments (pages 10-11) ...

AGI Earth highlights two UMD Faculty

Check it out...

www.earthmagazine.org/issues/november-2018

It's been another busy year in Heller Hall, but at least our renovations are just about at an end. To add a research lab for Salli Dymond, we remodeled the Department offices. But what is most amazing, is that after we added the lab we have more usable space; not sure how that happened. Salli's has a new lab on the 2nd floor of Heller Hall with a number of grad students and undergrads buzzing in and out. Next to her lab is the new conference room, which is bigger than the old one and has a state-of-the-art conferencing system. We also have a new mailroom/copy room with Laura's newly remodeled office by the windows. After three years of renovation the dust has about settled (literally). There is a lot of other new stuff around too. We just purchased two new Department vans. We are no longer allowed to have 15-passenger vehicles because of safety issues, so we just took ownership of two new 10-passenger Ford Transits; plush and roomy with the ability to tow!

As for me, I am now in my 28th year at UMD, which does not seem possible. Before long I will join the ranks of the Emeritus Faculty, but not quite yet. I still have four active graduate students working on topics from calcareous fens, to climate and archaeological geology in England, and my new area of expertise, peperites, volcanoclastic rocks formed when magma intrudes wet sediments. I was in England and Ireland over the summer collecting water samples as part of Caro Shull's study on climate and land use through the Industrial Revolution, and I visited Neolithic ritual sites in England and Ireland associated with Paul Burley's PhD research. In September, Jackie Drazan and I were in Iceland mapping and sampling peperites for comparison to her field area in northern Minnesota. Lastly, Nick Budde is working on the hydrologic and geomorphic classification of calcareous fens.

And so, this will be the last newsletter where I write the cover story as my term as Department Head is nearly up; and there is zero chance I will do it again. After nearly nine years as Department Head and three years as Honors Director, I am giving up administration in hope of focusing on research and teaching.

Wishing you all a happy new year.

To Our Donors

We thank the following alumni and friends who have supported our students and programs with a charitable gift in the past year. Listed below are the names of individuals and organizations who donated to the funds of the Department of Earth & Environmental Sciences, and includes those donations that the University has posted to our department accounts at press time.

William J. Bangsund
Catherine L. Barnett-Pfarr
John W. Beck
Marta B. Bianchi
Michael R. Brekken
Paul R. Bulger
Philip J. Carpenter
Odin D. Christensen
Donald M. Davidson, Jr.
Stephen DeLong
John D. Dolan
Eric R. Dott
Dennis R. Duff
Jayne A. Englebert
Andrew M. Fiskness
Julie A. Flammang
Christina D. Gallup
James M. Gearns
Richard C. Graham
John C. Green
Daniel J. Gustafson
Jerry P. Hankins
Barbara H. Hauck
Beth L. Johnson

Jeffrey T. Jones
Peter K. Jongewaard
Keith K. Kraus
Peter R. Krauss
David P. Kyllonen
Jeffrey S. Lynott
Peter S. Mattson
Roger K. McLimans
Elizabeth M. Metzen
Marsha J. Miller
Penelope Morton
Elizabeth D. Munter
Harold J. Noyes
Dennis R. Ojakangas
Richard W. Ojakangas
Shelby J. Plitzuweit
Kathleen Ripley
Paul M. Robertson
David A. Roth
Kelly A. Sable
David J. Stone
Terrance E. Swor
Nicole M. Twing
Catherine E. VonEuw

Duane T. Wagner
Robert J. Wahlstrom
James F. Werler

3M Foundation, Inc.
Anadarko Petroleum Group
Barr Engineering Company, Duluth
Braun Intertec Corporation
Chevron Corporation
Cleveland-Cliffs, Inc.
ExxonMobil Foundation
Thomas J. & Marie Beth Bianchi
Frantes Foundation
Hjerpe Family Fund-Fidelity Charitable
Shell Oil Company Foundation

Upcoming Events

Earth and Environmental Sciences Department 2019 Annual Banquet

Please join us at Greysolon Plaza's Moorish Room on Friday, April 12th for an evening to reconnect with faculty, alumni and friends, and to meet our current students!

Social hour starts at 5:30 pm - cash bar

Dinner served at 7:00 pm - Italian buffet with dessert

Program and award presentations begin at 7:30 pm

Parking is free after 5:00 pm (parking ramp behind the Sheraton, handicap accessible)

Price: \$25 per person

Please RSVP by Friday, March 29, 2019

Phone: (218) 726-8385

or

E-mail: dees@d.umn.edu

Faculty News

Latisha Brengman

Over the last year, we had a fantastic group of undergraduate researchers complete their UROP projects. Undergraduate students Kendall Johnson and Anthony Wetzel presented their research on textures and mineralogy of the Biwabik iron formation at the UROP showcase this Spring. Kendall extended their UROP project over the 2017-18 academic year and presented research at the annual Geological Society of America conference in Indianapolis, Indiana, on November 6th, 2018. Their work focuses on quantifying textural information (grain size and shape parameters) of transported chemical sedimentary grains. Kendall aims to determine grain transport history and primary mineralogy in an effort to inform our understanding of the overall depositional setting of iron formations. We are excited to continue with a fantastic Precambrian research group this year, welcoming new graduate student Sam Duncanson. Sam will be working on translating diagenetic reactions and characterizing preserved primary mineralogy at the sub-micron scale in the Biwabik Iron formation to determine past ocean chemistry. Visit our research website (www.latishabrengman.com) for more information about upcoming projects and presentations!

Erik Brown

I am still helping out in UMD's Grad School and Research Office, working to solve real challenges by fostering interdisciplinary collaborations on campus, supporting graduate students and highlighting UMD's research enterprise. We are working to strengthen ties with Chinese and Mexican university partners for student recruitment and exchange programs.

I am also managing to sustain some of my own research activities, with a continuing focus on results from the Hominid Sites and Paleolakes Drilling Program and the MexiDrill Program, which target environmental records from East Africa and the Basin of Mexico.

Fred Davis

This is my fourth year here at UMD, and it is fun to think that some of you alumni reading this were in my first Mineralogy class in Fall 2015. I had a great time at graduation last spring watching many students that I've gotten to know over the past few years receive their diplomas and begin their journeys beyond UMD. This fall I've been in the new experimental petrology lab trying to iron out the kinks. As I write this, we are days away from our inaugural experiment to learn more about the chemistry of the Earth's mantle. In the spring I am teaching Geology & Earth Systems and Mineralogy; I'll get to meet a whole new crop of Earth Science students! Grad student Amber Roberts presented results from her image analysis project looking at mantle xenoliths from Hawaii at the Minnesota GIS/LIS Consortium. Grad student Andrew Regula is performing experiments to learn more about how basalts are generated in the mantle beneath oceanic island volcanoes. We plan to have two undergraduates perform experiments in the lab in the coming year.

Salli Dymond

Greetings! 2018 has been a bit of a whirlwind working on teaching and research. I brought on three new graduate students: Shelby Hammerschmidt, who is researching the impacts of harvesting on understory plant water dynamics; and Emma Burgeson and Hannah Behar (both co-advised with Karen Gran), who are working on a Sea Grant project that will look at the impacts of removing beaver dams on local hydrology. I was able to secure some funding from NSF to continue my research in California looking at how forest disturbance influences water budgets and subsurface water movement. I was extremely honored to be co-author on a commentary in *Nature Sustainability* on the importance of forests in regulating hydrological processes.

Outside of work, I've enjoyed reading for pleasure again and have read over 30 books this year. My favorites have been the *Underground Railroad* by Colson Whitehead and *Nicholas and Alexandra* by Robert K. Massie. I also logged over a hundred miles running on the trails around Duluth this summer – what a great way to enjoy the natural scenery of our area!

Dymond (continued on next page)

Dymond (continued from previous page)

And I had some memorable adventures road tripping to Colorado, hiking, and camping with my husband, Ben, and our daughters Cece (4) and Tilly (2). Cece's favorite thing to ask these days is whether or not I'm going into the field. I think she had fun helping me install a weather station at the UMD Research Field Studies Center this fall!

Cheers to all and have a wonderful 2019!

Christina Gallup

My highlights of the last year include teaching the coral reefs field studies class in San Salvador, Bahamas, in May with Professor Paul Bates from the Biology Department and our dive instructors Yan and Heidi Saillard. My twins, Sophia and Max, now 9, came for the first week. They are hoping to come when we go in 2020 and learn how to scuba dive! The island had mostly recovered from the hurricane strike in October 2016, but there were still many houses in various states of disrepair and many stories of locals who had moved to Nassau or to the mainland. The people of San Salvador are resilient and inspiring.

My graduate student, Claire Rabine, with an undergraduate degree from University of Minnesota Morris, successfully defended her thesis in September. She will be presenting her work at the American Geophysical Union meeting in Washington D.C. She successfully used fossil corals from Araki, Vanuatu, to determine the recent tectonic history of a convergent margin in the South Pacific. I will be going to Araki this summer with colleagues from University of Texas Austin to collect more fossil coral samples to continue this research. It is a very remote area and I'm excited to get out in the field and to have a new adventure!

John Goodge

After getting off 'the ice' last January, I have kept closer to home to enjoy the changing seasons and catch up with a number of sorely needed projects at work and at home. Over the summer we completed a significant upgrade to the student microscopy lab in Heller Hall by installing new HD video cameras on the microscopes and running them to new projectors. The live images are awesome! Students who have used the old and new system can really tell the difference. I attended a conference in London in the spring, gave an invited talk at a polar research conference in Davos, Switzerland, over the summer, and will be giving another invited talk at a conference in Tokyo in December. I am teaching Earth Systems and Petrology in the fall semester and Geologic Field Methods in the spring. Despite an unfriendly fall, the weather held off for all field trips! This year I published a paper in *The Cryosphere* on heat flow in Antarctica and hope to get some other manuscripts completed soon. My RAID drilling project continues in development (www.rapidaccessdrill.org) and a small team of field engineers are headed south in early 2019 for testing and modification.

Karen Gran

The fluvial geomorphology group continues to grow at UMD. Anna Baker finished her M.S. developing a phosphorus budget in the Le Sueur River basin. Brian Sockness continues his research into post-glacial landscape evolution. Ellie Brown Curie and Lara Scott continued their research into the response of North Shore streams to different restoration techniques. Emilie Richard joined us to work landslide hazards in northeastern Minnesota. Hannah Behar and Emma Burgeson started this summer on a new project focused on the hydrologic changes associated with beaver dam removals, a collaborative effort with Drs. Salli Dymond and Becky Teasley at UMD. As you can tell, there is a lot of activity going on!

The most exciting research news of the year was learning that our 2013 *GSA Bulletin* paper (Landscape evolution, valley excavation, and terrace development following abrupt postglacial base-level fall) won the Kirk Bryan Award for Research Excellence from GSA's Quaternary Geology & Geomorphology Division. It is an incredible honor to have our work recognized with this award, and pretty neat that the core of the paper started with research from my first M.S. student, Andrea Johnson.

Apart from work, the kids are now in high school and middle school (!). I enjoyed another stint at the Wasatch-Uinta field camp this summer and followed it with a family vacation to Italy. I took the boys to Rome and Pompei while Rik was at a meeting in Trento, and then we all spent a week hiking in the Dolomites. It was amazing!

Vicki Hansen

Participation in The Royal Society Scientific Discussion Meeting 'Earth Dynamics and the Development of Plate Tectonics' marked a clear highlight of 2018. Presentations by invited speakers puzzled over the development of plate tectonics from solar system formation, to comparison with Earth's sister planet—Venus—devoid of plate tectonics (my role), to a rich exploration of Earth-centered topics of mantle dynamics, geochemistry, crustal evolution, evolution of life, and climate. So much to learn—and what a thrill to be surrounded by rich science history! I enjoyed sharing the wealth of clues that Venus provides any quest to understand the pre-plate tectonic Earth. Personally the meeting marked the perfect culmination of a decade of detailed but global scale mapping of Venus with Spanish colleague Ivan Lopez, and extrapolation to clues about early (i.e. pre-plate tectonic) Earth processes. Afterward John and I traveled about southern Spain—Andalucia (that, curiously, doesn't host the type location for Andalucite; apparently (some) mineralogists lack geographical acumen). Our travel overlapped with Holy Week, making for interesting exposure to somewhat spooky Catholic rituals carried out in an environment rich in Moorish architecture. Incredibly fast publication of Venus-Earth connections via The Royal Society directly followed publication of detailed global-scale mapping of Venus, resulting in the culmination of decades of Venus-Earth investigation. Venus research continues. During the summer, Serenity Mahoney (Gustavus Adolphus graduate) began mapping a wonderfully complex region of Venus embarking on M.S. research aimed at gaining insight into how Venus cools, lacking Earth's plate tectonics heat-transfer processes.

Christian Schardt

This year saw progress on existing research and a search for funding to acquire a new research instrument in conjunction with the University of Minnesota affiliated Natural Resources Research Institute (NRRI).

An ongoing collaboration focuses on weathering of ultramafic Ni-bearing rocks and the resulting evolution of Ni laterites. Ni isotopic analyses of laterites from tropical climates are underway and data will be integrated into a geochemical model that traces geochemical changes as well as Ni isotopic fractionation during weathering processes. Results will be compared to Duluth Complex data to study Ni isotopic fractionation factors during lateritization processes in different environments.

Previous work on the distribution of high-technology metals was expanded to generate a comprehensive geochemical database that includes available information from all geological environments known to have elevated concentrations in ore and individual minerals.

Two new UROP research projects; one by Matthew Paulson from Chemical Engineering who is studying alternative mineral separation techniques, and Angelica Fleury from Computer Science who is working on a creation of an interactive mineral identification guide for reflected light microscopy. Geology undergrad Matthew Metzler is working on a project that involves the occurrence of unusual PGE-type mineralization in glacial material from a lake bed in northern Minnesota.

Several students who graduated or are currently in the process of completing their MS thesis in the field of mining and Economic Geology, graduate students Maggie Upton and Matthew Matko, and undergraduate Jay Robbie, have found steady employment with regional mining companies such as Big Rock Exploration and Aquila Resources.

Byron Steinman

This past year has been full of fun and excitement. My wife, Kristin, and I have been staying busy with our two-and-a-half year old, Charles, who spends his days talking and singing our ears off. He has proven to be a precocious negotiator, especially when cookies or ice cream are on the line.

On the research side of things, my student Kathryn Vall recently defended her M.S. thesis on lake sediment records of climate change and ancient copper culture mining pollution on Isle Royale and has moved on to pursue a career in environmental consulting. Kat's contemporary, Zach Wagner, is currently wrapping up his thesis on a Holocene length reconstruction of past drought cycles in the Rocky Mountains of Alberta based on lake sediment analysis. I'm also pleased to report that I managed to recruit three new students, Ali Wiemer, Collin Murphy, and Alejandro Fernandez, who will work on a wide range of projects including biogeochemical analyses of sediment cores, climate model data analysis, and lake mass balance modeling. I'm a co-author on papers published this past year in Science Advances, Scientific Reports, and lead author on a paper that appeared in Quaternary Science Reviews. The latter paper explores the possibility that

Steinman (continued on next page)

Steinman (continued from previous page)

volcanic ash deposits resulting from large eruptions (think Mount Mazama in Oregon) have the potential to alter catchment hydrology and lower lake levels for centuries after the eruption.

I've been trying to get Kristin and Charlie to try pickled pike, which I learned how to make this past year, but haven't had any luck so far. Maybe this winter's batch will be so good they can't resist! We're looking forward to another year in the Northland.

John Swenson

Four seasons have passed.

On the ecliptic highway.

Life largely unchanged.

Nigel Watrus

In April I spent a couple of weeks in Guatemala working with Jonathan Obrist-Farner, a colleague from the Missouri University of Science and Technology, on a high-resolution seismic reflection survey of Lake Izabal, the largest lake in Guatemala. The lake is located in a pull-apart basin on the Polochic-Motagua Fault System which forms the strike-slip tectonic boundary between the North American and Caribbean plates in Central America. Several presentations linked to this project will be made at the upcoming GSA and AGU meetings in Indianapolis and Washington D.C. We are currently putting together a multi-institutional proposal to submit to the National Science Foundation for a much larger project to study the formation and development of this system and to study the paleoclimatic record preserved in the lake's sediments (which we estimate to be over a kilometer thick).

My interest in drones continues. This summer I constructed my second aquatic drone which is smaller than my first. It's also smarter, having the ability to operate autonomously without direct human operator input.

On a personal note, my daughter Sally got married this September. The wedding was held at the Depot in Duluth and was a great success. Sally and her husband live in the Twin Cities but are hoping to move to Duluth within the next couple of years. My son, Sam, is in his third year of his PhD at Harvard. He's studying the role that stem cells play in blood development, working with zebrafish. Pretty cool!

Faculty Emeriti News

Dave Darby

Nothing new of interest. At our age we are into decay management.

Don Davidson

It is sobering to consider that one week ago we were preparing to evacuate our Chico California home owing to the Camp Fire. And this occurred one year to the week from when we moved here having just celebrated 52 years together. But we did not have to go!

Overall the move has been a tremendously positive experience. This is especially so being close to part of the family (son Rob and family) in a college town. In addition to enjoying the active youthful university culture we have been busy with: golf, gardening, swimming, fishing, choral singing, quilting, and enjoying a number of decent ethnic restaurants. Having medical care close at hand is an additional particular bonus for us as seniors.

So despite northern California being QUITE a change from sleepy southern Arizona, we are in good health and adapting. We trust UMD geology is also doing well.

Jim Grant

Greetings from Lake Nebagamon and/or Bluestone Flats! Spending most of the winter in town worked very well for us and we are happy to be able to repeat our sub-lease right now. Happily, when we finally moved in, I was greeted by some raucous shouts from the lounge, and there were Peach and Dick Ojakangas, who now live there too, having moved in a day after we moved out at the end of April.

Back to last January, first day at Los Cabos, Christabel missed a step on the stone stairs and broke her right arm. She was given excellent care by the local medics and our resort provided a car and a driver; we were well looked after! Following our annual trip to Park City, we had a marvelous whirlwind of family and friends which kept us hopping into October. Starting with a great family gathering for Helen's 70th in California, and a visit from Niki to checkup on her sisters progress (slower than one would wish) and finishing with a genealogical trip to New York and the Hudson Valley, meeting cousins of all sorts, known and unknown, living and dead. The latter we found in Sleepy Hollow graveyard, including a young girl we didn't know of, with a name we hadn't heard of. But if you ever run across a relative called Bedelia, it's a "pet" Irish name for Bridget and that's the long and the short of it.

Wishing you all the best for a good outcome from the mid-term elections, a Merry Christmas, and a healthy and Happy New Year!

John Green

Newsletter time finds me scanning and labeling in an Excel spreadsheet a couple thousand of my color slides (remember those?!) of field trips to lots of interesting geological (and scenic) places, from Iceland to Namibia to Costa Rica to Japan as well as Hawaii, Columbia Plateau, Rio Grande Rift, Chiricahua Mountains etc. – bringing back lots of wonderful memories.

Otherwise, we're still working on clearing out our house and getting it ready to sell next year. Meanwhile, we are enjoying our new apartment overlooking the Lake Superior shore on London Road in town – but also need to keep maintaining the house. Our daughter Martha (hydrogeologist) and husband Joe (Chief, National Water Information System, both with the USGS), now in Madison, Wisconsin, come up to help and visit about once a month.

I still give the occasional geology talk and lead a field trip now and then. Jan is back working up rare-bird data for the Minnesota Breeding Bird Atlas, to come out in book form by the University of Minnesota Press next year. She has spotted 99 bird species from our apartment windows so far.

Tim Holst

Several items of news this year. Beth and I are grandparents! Our younger son, Nathan, and his wife, Sarah, had a son on July 11. They live in the Woodland neighborhood of Duluth, only about a mile from us, and we have become doting grandparents. Our older son, Jeremiah, and his wife, Katherine, are expecting a child in March. They live in Bemidji. The other big item of news for the year was that Beth fell just over 21 feet out of her deer stand last November and broke her left femur. We were extremely fortunate that this was the extent of her injuries. She now has more titanium in the rod in her left leg than I do in both my artificial hips! I do not hunt, but Beth took it up about a decade ago, after working in the woods on a maple syrup farm just north of Duluth for nearly two decades. Since retirement, I have joined her during syrup season, working in the woods and at the sugar house. We tap about 5,000 trees, and it is hard work, but fun and rewarding. She recovered sufficiently to get out for one x-country ski in mid-April (I got out 120 times last winter), and she water-skied this summer. In September we took an extended fall camping trip to the Black Hills, Big Horns, Yellowstone, Tetons, and Wind Rivers. The last three of those reminding us of field camp field trips. Lots of great hiking, and wonderful rocks.

Tom Johnson

Greetings from the East! Kate and I moved to western Massachusetts after I retired in 2015, where we live in a picturesque village in the foothills of the Berkshires. Kate is actively engaged in her art, with one art show just coming down and four more lined up thus far for the coming two years. I have an adjunct appointment in the Geosciences Department at UMass Amherst, enabling me to keep some contact in academia, which is great. I am particularly pleased to see my former graduate student at UMD, Isla Castaneda, doing so well as an Associate Professor in the department. Kate and I now have a dog that we rescued out of Georgia – advertised online as a "mid-size golden retriever mix." Somehow in the van ride up from Georgia last spring she transformed into a 70 lb. husky mix. We are still deciding who walks whom on the daily forays through the local streets and on nearby hiking trails.

Jim Miller

Greetings from Canada. Louise and I continue to enjoy the retired life in our cozy home on the Lake Superior shore. Geologically, I am still doing some consulting work for North American Palladium here in Thunder Bay and for Eagle Mine in Marquette, as well as teaching three outreach classes on North Shore geology each year for the North House Folk School in Grand Marais. However, my most enjoyable endeavor this summer has been constructing a geologically correct garden wall in our yard. Over the past year, I have been collecting local rocks, mostly from road cuts on the recently expanded Trans-Canadian Highway near our home. The foundation of the wall has been constructed of Archean (~2.6 Ga) granite and greenstone. Atop of this, I have begun to lay slabs of Paleoproterozoic (1.85 Ga) Biwabik Iron Formation which will be overlain by Mesoproterozoic (~1.4 Ga) Sibley Group sandstone. Like the table-top mountains in the area, the top of the wall will be capped by Midcontinent Rift-related (1.1 Ga) Logan Sills. Finally, amethyst veins and diabase dikes (both ~1.1 Ga) will be shown cutting through the wall. Once my geo-masterwork is completed (next spring honey, I promise), Louise will be planting the garden with native species of shrubs, fruit bushes, wild flowers, and grasses. Please stop by for a look and a visit if you are passing through Thunder Bay. Cheers, eh!

Penny & Ron Morton

It's early November, there are gunshots in the distance, and it's snowing—it has to be northern Minnesota and deer opener!

This past year Penny retired as Associate Dean of the College and was immediately elected to serve as a supervisor for Duluth Township. If that's not busy enough she is also the president of the board of University Nursery School, plays bridge three times a week, belongs to two book groups, and her flower gardens get larger and larger. Not being nearly as ambitious I can say that our nine-month-old Brittany puppy and I just graduated from starters to intermediate agility (at least she did, not so sure about me). Between vegetable gardens, tree pruning, running and dog walks I did manage to write a new book called "Shooting the Wintermaker." It is available from Amazon with the print version on the horizon.

We did go out to Big Sky again for a great week of skiing and eating, then a week with the grandkids on Sanibel Island (before the red tides), a great hiking vacation in Sedona, the Grand Canyon, Zion, and Bryce National Parks, and finally an eight day cruise down the Rhone River from Avignon to Lyon.

Our four grandchildren are out here a lot and sleep over at least one night a week. On warm days, it's treasure hunting in the woods (searching for the Fairy House), then hot tub to cool pool with snacks in-between.

So, all is well and good out this way and I really hope it is the same for all of you.

Dick Ojakangas

Another year gone to who knows where?

This spring I taught a University for Seniors class entitled, "Geotravels: The Arctic to Antarctica, Plus Places In Between".

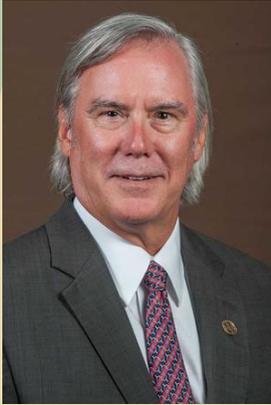
I also presented "FINLAND'S THREE WARS TO STAY INDEPENDENT, 1939-1945: Winter War & Continuation War vs. USSR; Lapland War vs. Germany". That is not exactly a geological topic, but some of the battles with the USSR were fought on terrane that was glaciated at 2.3 Ga! Besides, Peaches and I are 100% Finnish! (That 100% is actually a bit of a fib because son Greg had his DNA done and he is ONLY 99.7 % Finnish. We all assume the 0.3% is just the margin of error.)

The biggest news is that we are no longer "country folk"! We are now "city slickers", having moved into Bluestone Flats just off Woodland adjacent to UMD. Downsizing my "barn full of rocks" (to be studied some day that never came) was difficult! USGS, Denver took 600 ft of Nonesuch drill core (Midcontinent Rift) that Tom Suszek and I WERE going to analyze for tidal signatures (spring and neap tides) ala Bay of Fundy, Nova Scotia. Most other rocks ended up in two piles outside of the back barn door--the new owners didn't mind because they have goats and "goats like to climb on rock piles".

I'm still eating well via Peach's 31st cookbook, "Breakfast with Beatrice".

I finally "got the electric chair"! It's a "ZINGER" that replaces my four-wheeled walker.

SWENSON COLLEGE OF SCIENCE & ENGINEERING
ACADEMY INDUCTEE



It is an honor to announce that Thomas Frantes is this year's inductee into the Swenson College Academy of Science and Engineering. The Academy was established in 2001 to recognize alumni and special friends of Swenson College who have distinguished themselves through commitment and leadership in their chosen profession.

Tom grew up in the Twin Cities and he always preferred to be outdoors. He had an early fascination with fossils, agates, and strange looking rocks (those would be the metamorphics). He would sneak his finds into the house where he hid them under beds and in closets, to the chagrin of his mother and father. Tom moved up to Duluth in 1975 and received a Bachelor of Science degree in geology at UMD in 1979. He then moved on to the University of Texas at El Paso where he received his Masters of Science degree in Geology in 1981. For most of Tom's professional career he conducted oil and gas exploration activities for ExxonMobil, activities that took him to all continents except Antarctica. Tom held several executive positions with the company,

most recently overseeing exploration operations in West Africa and Russia. Tom practiced geology and geophysics throughout his technical and managerial career, including advancing research related to artificial intelligence and 3-dimensional visualization for use in mapping subsurface sediments and depositional systems. Tom retired from ExxonMobil in 2016 after 36 years.

Tom is married to Beth Bianchi Frantes, an accomplished Petroleum Landman. Together they have three adult children. Tom's favorite outdoor activities are upland game hunting, fly fishing, golf, and working and playing at "Charco" their South Texas ranch. Tom and Beth reside in The Woodlands, Texas.

Dr. Karen Gran honored with the 2018 Kirk Bryan Award

Dr. Karen Gran was honored with the 2018 *Kirk Bryan Award* by the Quaternary Geology and Geomorphology Division of the Geological Society of America at the Annual Meeting in Indianapolis, Indiana, in November. The Kirk Bryan Award for Research Excellence has been awarded annually since 1958 for a publication (within the past five years) of distinction advancing the science of geomorphology or Quaternary geology. Karen and her co-authors received the award for their paper entitled *Landscape evolution, valley excavation, and terrace development following abrupt postglacial base-level fall*, which was published in *Geological Society of America Bulletin* in 2013. The Geological Society awards committee states that Karen's paper "...not only represents a significant scientific advance in understanding landscape evolution, but also relates clearly to modern land use and watershed management applications."

Karen shared the award with her co-authors Noah Finnegan, Andrea Johnson (MS 2012, UMD), Patrick Belmont, Chad Wittkop (PhD 2004, UMD), and Tammy Rittenour, and she emphasized in her acceptance address that the work on which the paper was based was an "...integrated effort, and I wanted to make sure my co-authors and collaborators get the recognition they deserve."

Congratulations, Karen!



Karen Gran received the Kirk Bryan Award at the Geological Society of America 2018 annual meeting.

Graduates

BA / BS Geological Sciences

Thomas Bouta
Trey Harsch
Ann Hunt
Shawnee McMillian
Chase Poppenhagen
Mark Prince
Lino Rauzi
Jay Robbie
Tyler Soltis
Joseph Wadding
Anthony Wetzel
Benjamin Wirth
Christa Wood

MS Geological Sciences

Kristi Kotrapu
Connor Mulcahy
Claire Rabine
Kathryn Vall

BS Environmental Science

Katherine Alexson
Jack Belvedere
Austin Carlson
Bryan Crum
Tyler Fettig
Emily Fleissner
Shelby Hammerschmidt
Andrew Hanf
Steven Haynes
Lucas Hendrickson
Grant Huso
Kelcy Huston
Drew Janke
Shenquan Li
Jared Mader
Paige Melius
Blake Messer
Chelsey Mienert
John Sarafolean
Jack Sillars
Ian Strasburg
Trevor Zimmerman

In Memoriam

Behling, Stuart, BS 68
Bushey, John, BS 87
Ross (Sellner) Linda, BA 96

Alumni News

Dolan, John, BS 70, is now a full time fly fisherman in Wyoming. He has stayed in touch with Harry Noyes (for over 50 years!) since their first field trip with Dr. Charlie Carson.

Manor, Matthew, BS 12, began a PhD program fall 2017 in the Department of Earth Sciences at Memorial University St. John's Newfoundland, Canada with Dr. Stephen Piercey. Matt did field work for six weeks summer 2017 in south-central Yukon, Canada, where he completed a mapping campaign, core logging, and sampling. His research focuses on the petrology and isotopic geochemistry of VMS-bearing felsic rocks and crustal growth of the northern Canadian Cordillera, Yukon.

Pearson (Bendtsen), Lisa, BS 98, studied hydrogeology at UMD 1996, 1997. While completing her BS degree in the Twin Cities, she interned for the Minnesota Department of Natural Resources, Groundwater Unit. After graduation, Lisa took a full-time permanent position as a Hydrologist I, eventually moving to the Surface Water Unit. Currently in a supervisory role in this unit (now called Water Monitoring and Surveys Unit), there are 31 staff including a fulltime well driller, three land survey staff and three state Climatology staff. They have four different offices throughout the state, and collect stream flow and stage groundwater level and climate data. The data is used for flood prediction and warning, water appropriation permitting, water quality studies and climate change, and can be viewed on the MPCA/DNR Cooperative Stream gaging website (CSG) and the DNR Cooperative Groundwater Monitoring website (CGM).

Student Scholarships, Awards and other Notable Mentions

Outstanding Graduate Teaching Assistant Award (Randy Seeling): Andrew Dennison

Outstanding Graduate Student (Ralph & Ellen Marsden & Randy Seeling): Ross Salerno

Outstanding Senior Award-Geology (Ralph & Ellen Marsden): Lino Rauzi

Outstanding Senior Award-Environmental Science (Barr Engineering): Hanna Leapaldt

Outstanding Junior Award-Geology (Hugh Roberts Scholarship): Nevada Lasher

Outstanding Junior Award-Environmental Science (Barr Engineering): Ruth Axtell-Adams

Tools-of-the-Trade Award (New Millennium): Nevada Lasher, Mark Prince, Jenny Sherrin

Harry & Margaret Walker Research Fund Scholarship: Jacqueline Drazan, Amber Roberts

UMD Crain Family Scholarship: Craig Steiskal

Cleveland-Cliff, Inc. Scholarship: Heidi Krauss

Jill & Terry Swor Scholarship: Peter Bouchard, Madelyn David, Kendall Johnson, Andrew Holstrom,

Estwing Geology Field Methods Award: Heidi Krauss

Kenneth E. Differt Scholarship: Nevada Lasher

UMD Peterson Memorial Scholarship: Andrew Henke

Frantes Graduate Fellowship: Nicholas Budde, Jacqueline Drazan, Alejandro Fernandez, Ali Wiemer

Roderick Syck Outstanding Field Camp Performance Award: Lino Rauzi

Barr Engineering Scholarship: Alexander Peichel

FIELD CAMP SCHOLARSHIPS:

Robert L. Heller Field Camp Scholarship: Andrew Henke

"Rip" Rapp Field Camp Scholarship: Tate Lang

Charlie Matsch Field Camp Scholarship: Dominic Alfonso, Calvin Gaudette, Christa Wood

Steven & Karen Brand Geological Sciences Field Camp Scholarship: Anthony Wetzel

Lempi M. & John Pagnucco Scholarship: Jacob Heitzman, Nathan Koski

Faculty Emeriti Scholarship: Lino Rauzi

R.C. Bright Scholarship: Tate Lange

Ralph & Ellen Marsden Scholarship: Madelyn David, Benjamin Wirth

New Millennium Scholarship: Mark Prince, Nathaniel Snaza, Jennifer Swartz

Graduate Student Presenters & Contributors

Geological Society of America North-Central 2018

Iowa State University

Sockness, B., McDanel, J., Miller, B., Moore, P., Gran, K., Cullen, C., Anders, A., "A Harmonized Map of Glacial Landform Regions in the Central Lowlands of North America"

Wagner, Z., Steinman, B.A., Abbott, M.B., "Reconstruction of Hoocene paleoclimate in the northern Rocky Mountains, Alberta, Canada, using oxygen isotope analysis of lacustrine carbonate sediment"

Geological Society of America

Indianapolis, Indiana

Drazan, J., Mooers, H., Moen, R., Pastor, J., Swartz, J., David, M., Bopray, C., Jakska, M., Messer, B., "Mastodons (Mammot americanum) and the Late-Glacial Vegetation of the Eastern USA"

Sockness, B., McDanel, J.J., Gran, K.B., Miller, B.A., Moore, P.L., Cullen, C., and Anders, A., "Mapping of glacial landform regions in the Upper Midwest, USA"

Advocates for the Knife River Watershed AKRW 2018

Knife River, Minnesota

Burgeson, E., and Behar, H., "Beaver, trout, and the Knife River watershed"

Curie, E., "Monitoring Bluff Erosion Rates Using Terrestrial Laser Scanning and Structure-from-Motion Photogrammetry on Minnesota's North Shore Streams"

Minnesota GIS/LIS Consortium

Duluth, Minnesota

Roberts, A., "Application of Remote Sensing Techniques to Acquire Modal Abundances of Minerals"

The Institute on Lake Superior Geology 2018

Iron Mountain, Michigan

Drazan, J., Brengman, L., Fedo C., "Preliminary Petrographic and Geochemical Investigation of Silicified Volcanic Rocks and Silica-rich Exhalative Rocks from the ~ 2.7 Ga Abitibi Greenstone Belt, Canada"

Matko, M., Schardt C., "Microanalysis of Rock and Mineral Textures and its Relationship to Mineralization and Ore Comminution"

Upton, M., Schardt, C., Hudak, G., Quigley, E., "Alteration Mineral Zonation and Geochemical Characteristics of the Back Forty Deposit, MI; a Replacement-style Zinc-and Gold-rich Volcanogenic Massive Sulfide Deposit"

Vall, K., Steinman, B., Pompeani, P., Schreiner, K., Depasqual, S., "Reconstruction of Paleoenvironmental Conditions and Temporal Patterns of Ancient Mining on Isle Royal Using Biogeochemical Analyses of Lake Sediment"

2018 Upper Midwest Stream Restoration Symposium

Dubuque, Iowa

Curie, E., "Monitoring Bluff Erosion Rates Using Terrestrial Laser Scanning and Structure-from-Motion Photogrammetry on Minnesota's North Shore Streams"

Scott, L., "Groundwater Surface-Water Exchange Dynamics Following a Channel Reconfiguration Project: Stewart River, MN"

American Geophysics Union

Washington, DC

Rabine, C., "Paleosea-Level Records from Late Quaternary Coral Reef Terraces on Araki Island, Vanuatu; Comparison with Previous Results from Huon Peninsula, Papua New Guinea"

Undergraduate Student Presenters & Contributors

UMD UROP Showcase - Spring 2018

University of Minnesota Duluth

Belvedere, J., "Topography and Isotopes"

David, M., "High Technology Metal Signatures of the Vermilion-Big Fork Greenstone Belt, Minnesota"

Fossum, L., "Analyzing How the Isotopic Signature of Stream-flow Varies Across a Stream"

Hendrickson, L., "Topography and Isotopes"

Johnson, K., "Quantifying Physical Characteristics of Granular Cherty Material to Determine Transport History and Depositional Setting of Iron Formation from the ~ 1.9 Ga Mesabi Iron Range, MN"

Koski, N., "Spatial and Temporal Analysis of Phenological Observation in England: Assessing the Impact of Climate Change and Environmental Clean-up"

Poppenhagen, C., "Predicting Landslide Hazards in the Greater Duluth Area North to the Knife River Along the North Shore of Lake Superior"

Wetzel, A., "Broadly Constraining Proterozoic Ocean pH by Determining Primary and Secondary carbonate mineral reactions in Iron Formation from the ~ 1.9 Ga Mesabi Iron Range, Minnesota"

The Institute on Lake Superior Geology 2018

Iron Mountain, Michigan

David, M., Schardt, C., "High-technology Metal Behavior in Ore-forming Environments and its Implication for the Vermilion District, Northern Minnesota"

UMD UROP Showcase - Fall 2018

University of Minnesota Duluth

Bouchard, P., "Analyzing Transpiration in Replacement Trees Following Emerald Ash Borer Infestation"

Paulson, M., "Alternative Methods to Mineral Separations by Density?"

Peichel, A., "Testing for an Effect of Mycorrhizae on Isotopic Signatures"

Geological Society of America

Indianapolis, Indiana

Johnson, K., "Grain size distributions and mineralogy of coated grains, detrital sand and silt within the ~1.9 GA Mesabi Iron Range, Minnesota"

GEOLOGY CLUB NEWS



This year the Geology Club has a full and fun schedule. In September we were able to use Starburst to show how plate boundaries work and experiment with convergent and transform boundaries as well as metamorphism. In October we learned about crystallization and made our own Rock Candy which turned out quite well. In November we will be working with Dr. Karen Gran on demonstrations of how a stream table allows you to observe the ability of a stream to erode, transport and deposit materials. After Thanksgiving break we will have our annual rock sale. Anyone can stop by and adopt their own pet rock! In December we will be working with the Environmental Science Club to present the film “Chasing Coral”. This film is about Coral reefs around the world and why they are vanishing at an unprecedented rate. The researchers who created this film are working with us to involve the Duluth community as well.

This year we updated our social media and created our own website. If you are interested and want to keep up with what we are doing this year, please follow us @GeoClubUMD on Facebook and Instagram or check out our website at geoclubumd.wordpress.com.

by Heidi Krauss

ENVIRONMENTAL SCIENCES CLUB NEWS

The Environmental Science club has evolved into a well-established club at UMD through a growing desire for students to be more environmentally conscious. This year, the club has many fun and educational activities planned. These plans include touring local environmental agencies such as the EPA, NRRI, and LLO. Also, we will focus on continuing to fundraise for the club through our newly established Buffalo Wild Wings partnership, as well as annually through t-shirt sales. With this money, we like to focus on providing our members with a few exclusive activities as a thank you for their hard work. These activities range anywhere from a quick fire, hike or a night of bowling or a club trivia night. During our monthly meetings, we take time to think about what we can do as individuals to better our lifestyle environmentally, from shutting off the lights when you leave a room, to riding a bike instead of driving to school. In all, our focus is to provide our members with the necessary skills to graduate and make an everlasting difference in the world.



Environmental Science Club member Hanna Leapaltdt pauses to admire the falling water of Tischer Creek as part of her day out taking water samples.

Pictured to the right is a bog just north of Duluth that Environmental Science students often attend to conduct field research.



by Jackson Miller

WASATCH-UINTA FIELD CAMP



Top of the World

Top row left to right: Nic Alfonso, Calvin Gaudette, Christa Wood, Tate Lange, Lino Rauzi, Andrew Henke, Jake Heitzman, Dr. Karen Gran, Nate Snaza. Bottom row left to right: Allison Severson (Danger), Jen Swartz, Mady David, Ben Wirth.

This crew did more than look at rocks for the Wasatch-Uinta Field Camp summer 2018. Named after the ever-present mountain range, field camp was an adventure across the great American southwest. From the swarms of gnats in the San Rafael swell, to the mountain lions in Chalk Creek, all the way to those crazy miners down in Carlin, Nevada, we experienced many an adventure during field camp.

We shared our mornings standing in line guessing what it was going to be for breakfast and dinner from Ed Hosenfeld and his amazing staff at the Chateau de Après. Every day was a new adventure. Most of the daylight hours were spent hiking in the sun, and the never-ending feeling of walking uphill, building anticipation for the shower we got at the end of a day in the field. Most nights were spent in the cafeteria rushing to complete our maps, cross sections, and unit descriptions on time. Sometimes it felt as if there were never enough hours in the day. Time slowed down during the amazing camping trips we had the privilege to take. Some of the neat things we were able to enjoy during these trips were backpacking in the Grand Tetons National Park, gazing at the stars in the San Rafael Swell, and watching a local baseball game at the city park in Carlin, Nevada.

The Wasatch-Uinta field camp teaches you about so many incredible things. Above all, one experiences an incredible amount of geology. Field camp is really a once in a lifetime experience, where you are able to develop field techniques as well as learn about the geology of the Utah, Wyoming, Nevada region. With the folks at the Newmont Mining Corporation allowing us to collect as many samples as we wish, and taking home hand samples, all of our rock collections grew substantially. Within the six weeks of camp, we learned more than geoscience; our experiences at field camp taught us a lot about ourselves and helped develop personal skills that will be used for the rest of our lives such as communication and team building skills, tolerance, patience, and perseverance. Some of us learned to love the Turtle, our cherished Van Terra turtle-top van, which was the ride of choice for a select few and has one mean turn radius.

We are so incredibly thankful that we were able to learn from everyone and enjoy time with individuals that are so skilled and knowledgeable, and to have so many new experiences that will change our perceptions forever.

by Mady David and Jennifer Swartz

Department of Earth & Environmental Sciences
1114 Kirby Drive, Heller Hall 229
Duluth, MN 55812
218.726.8385 phone
218.726.8275 fax
dees@d.umn.edu

ADDRESS SERVICE REQUESTED



What's New?

Please contact us at dees@d.umn.edu with your update to be included in a future issue of our newsletter. We'd love to share your good news. Did you change your job, get married, receive special recognition from a professional organization? Let us know by sending:

Name

Contact information

Degree earned and graduation year

A short paragraph with your news

