

Fall 2012

UMD

Geological

Sciences

## Geological Sciences Newsletter for Alumni &amp; Friends



## News from the Department Head - Ron Morton

Another year has come and gone, but some things, thank goodness, just don't seem to change. One of those is being able to say the same thing I've been happily saying for the past three years. That's thanking all of you for your generous support of the department, not only in terms of your financial donations to our various scholarship funds, but also for your support of both our undergraduate and graduate programs, and for just staying in touch. It was really nice to see all of you who stopped by the department on your travels to and through Duluth to say hello, or who sent e-mails with updates on what you are doing, or inquiring into what is going on in the department.

I am very pleased to tell you the department was able to give out more than \$46,000 in scholarships this past year for support of our undergraduate and graduate programs. Most of this (\$26,000) went to help support students attending field camp, but also included several academic scholarships, including a new one from Northshore Mining for students in the exploration program. Scholarship funds also helped students go on field trips and attend conferences, including the Prospectors and Developers Association of Canada convention in Toronto. So, again, the department thanks you for your donations which allow us to continue to do this.

The department's outstanding alumnus for this year is Terry Swor. Terry is the chairman and CEO of American Engineering Testing, Inc. Terry helped found the company in 1989 and since that time this geotechnical, environmental, materials and forensics consulting firm has grown from eight employees to more than 350. Terry has also established the Jill and Terry Swor Scholarship, which is given to a promising geological science major enrolled in mineralogy.

Speaking of mineralogy, we have our largest mineralogy class since 1995—34 students. That is possibly why Penny Morton took the job as full-time Associate Dean for the Swenson College of Science and Engineering. This means she will no longer be teaching in the department. We were fortunate to be able to hire Nick Deardorff for the academic year. Nick is a volcanologist (Ph.D. on the submarine volcano and vent system at Rota I) and taught mineralogy at Morris last year. We welcome Nick to the department.

There are other major changes also taking place in the department. This is not only my last year as department head, but also my last year at UMD. I will be leaving at the end of this academic year (I don't like the word retiring) with the challenge of writing full-time, and children's books no less. We will be searching for a tenure track economic geologist to take my place. My newest book, and first book for children, is titled "Brinkly and Bree," and will be out this April. If interested, check out our website <http://www.brinklybree.com> which will be up and active in early February. I am also writing a third book with Carl Gawboy with the tentative title of "Wolverine and the Art of the Winter Maker." Speaking of books, it was a real pleasure to be able to give out more than 80 books to those of you who donated \$75 or more to the department last year.

On a further personal note, life is very nice. Penny and I spent two weeks in Columbia and Peru this past June. Penny was the adventuresome one hiking four days on the Inca Trail to reach Machu Picchu; Megan and I took the train! With guides we saw lots on fascinating Inca ruins, museums, and learned about wonderful Peruvian food. Otherwise, our gardens get larger and Tillie and I continue at dog agility classes.

On that note, I truly wish all of you a great and healthy 2013 and, once again, thank you for your continued and enthusiastic support of the department.

## Fall 2012 UMD Geological Sciences

### 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 Geological Sciences, and includes those donations that the University has posted to our department accounts at press time.

Roger Anderson	Michael Fossell	Charles Landmesser &	Dean Peterson	Emily Voytek
Edward Bacig	Thomas Frantes	Holly Ambrose	David Pike	Duane Wagner
William Bangsund	Christina Gallup	Phillip & Kathryn Larson	Cheryl Plesha	Robert Wahlstrom
Scott Beatty	Paul Godfrey	Matt & Julie Lucas	Shelby Plitzuweit	Lawrence Zanko
Nancy Beaudet	Richard Graham	Daniel Marich	Kevin Pylka	David Zins
Jerry & Joanne Bergin	Joyce Grahn	Ellen Marsden	George "Rip" Rapp	
Sharon A. Brenner	James & Christabel	Charles Matsch	Edward & Kathleen	3M Foundation
Kendell Corbett	Grant	Peter Mattson	Ripley	Barr Engineering Company
William & Jean Crain	Lois Gravel	Keith Maurer	Brenda Roberts	Campanula Resources, Ltd.
James Dauerty	John & Jan Green	Jeffrey Mc Manus	Stephen & Frances	Chevron Corporation
Stephen & Deborah	Kirk Haldorson	Bob & Karen Miller	Rowland	ConocoPhillips Company
DeVaney	Jerry & Elizabeth	Mike Miller	Richard & Jean Ruhanen	Dan Harp Construction, Inc.
Daniel Donahue	Hankins	Howard Mooers	Joseph Scipioni	ExxonMobil Foundation
David & Deanna Draves	Alicia Harp	Ron & Penny Morton	James & Linda Scott	Golder Associates
Gretchen & Richard	Steve & Barbara Hauck	Thomas Muhich	Errol Sehnke	Haldorson & Pincombe
Dunn	Jeffrey Hedenquist	James & Elizabeth Munter	Mark & Laurie Severson	Investment Advisors, Inc.
Jayne Englebert	John Heine	Gloria & George Murray	Tricia Shuck	Hjerpe Family Fund-
Karl Everett	Mary Hess	Harry & Mary Nash	Kevin Sikkila	Fidelity Charitable Gift Fund
Earl Fashbaugh	Joanne Hill	Douglas Newby	James Simonet	Idea Drilling, LLC
Sharon Feiner &	Joe Hochevar	Thomas J. Novak	Michael Skelly	Lake Superior Agate, Inc.
Timothy Larson	Rodney & Darlene Ikola	Harold Noyes	David & Patricia Stone	Minnesota Section SME
Andrew Fiskness	Adam Johnson	Dennis & Eileen Ojakangas	David Strand	Northeast Technical Services
Thomas J. Fitz, III	Lucinda Johnson	Dick & Beatrice Ojakangas	Gabriel Sweet	Northshore Mining Company
Julie Flammang	Jeffrey Jones	David Oliver	Terrance Swor	Pace Analytical Services, Inc.
Joseph Flannery	Peter Jongewaard	Darlene Olson	Kent & Lila Syverson	Polymet Mining Corporation
Ian Forrest	John Koeller	Julie Oreskovich	Jeffrey Thole	Shell Oil Company Foundation
Donald & Laurie	Kenneth Krahulec	Richard Owens	Amy Thorson	Superior Geo-Services
Fosnacht	Keith & Kathryn Kraus	Marsha Patelke	James Tieberg	T D Jefferson Geologist, LLC

## Student Scholarships, Awards and other Notable Mentions

**Ralph & Ellen Marsden and Randy Seeling Outstanding Graduate Student Award:**  
April Abbott

**Outstanding Graduate Teaching Assistant Award:** Melanie Graupner

**Ralph & Ellen Marsden and Minnesota Section SME Outstanding Senior Award:**  
Matthew Manor

**Hugh Roberts Scholarship Outstanding Junior Award:** Patrick Quillen

**Minnesota Section SME Tools-Of-The-Trade Award:** Kaitlin Johnson, Jacob Kolke, Patrick Quillen, Nick Rogers

**Harry & Margaret Walker Research Fund Award:** Jonathan Dyess, Aubrey Lee, Grant Neitzel

**Northshore Mining Scholarship:**  
Michael Buschette

**Estwing Geology Field Methods Award:**  
Patrick Quillen

**Roderick Syck Outstanding Field Camp Performance Award:** Allison Severson

**Kenneth E. Differt Scholarship:** Allison Severson

**UMD Peterson Memorial Scholarship:**  
Erica Evert

**Frantes Graduate Fellowship:** Angela Berthold, Michael Carlsson, Adam Leu, Chelsea Nissen, Alex Steiner, Jillian Votava

### FIELD CAMP SCHOLARSHIPS:

**Robert L. Heller Field Camp Scholarship:**  
Michael Buschette, Jacqueline Doroff, Robert Knoepfler

**"Rip" Rapp Field Camp Scholarship:**  
Tawnya Knoepfler

**Charlie Matsch Field Camp Scholarship:**  
Kenneth Bitzer, Robert Kryzer

**Ralph & Ellen Marsden Scholarship:**  
Nicholas Landon, Wesley Lueck, Matthew Manor, Cullen Phillips, Michael Strain

**Lempi M. & John Pagnucco Scholarship:**  
Allen Best, Wesley Lueck

**Millennium Fund Scholarship:**  
Cullen Phillips, Allison Severson, Autumn Stivers-Biscuso

**Faculty Emeriti Scholarship:**  
Jacqueline Doroff

**R.C. Bright Scholarship:**  
Michael Strain

**Randy Seeling Scholarship:**  
Nicholas Landon

**Roderick Syck Scholarship:**  
Tawnya Knoepfler

## Undergraduate Student Presenters & Contributors

### Spring 2012 UMD UROP Showcase University of Minnesota Duluth

**Godeen, A.**, "Determining Soil Erosion Losses Due to Natural and Anthropogenic Sources, and the Development of Sustainable Mitigation Practices in Central Nepal"

**Kryzer, R.**, "Rogen Moraine Formation in NE Minnesota"

**Shang, H.**, "Fractal Theory and the Evolution of Species"

**Skibsted, R.**, "Determining Erosion Mitigation Practices for Steep Slope Agricultural Farming and Natural Disasters in Central Nepal"

### Geological Society of America 2012 Charlotte, North Carolina

**Spano, N.**, "Characteristic Biota of Blue Hole Five, San Salvador Island, Bahamas"

### National Conference on Undergraduate Research 2012 Weber State University, Ogden, Utah

**Elfelt, M.**, "Ex-Situ Bioremediation of Pah-contaminated Sediments Using the White Rot Fungus *Pleurotus ostreatus*"

### NSF Research Experiences for Undergraduates (REU) 2012

**Leach, K.**, "Factors affecting wood frog (*Rana sylvatica*) deformities on the Kenai Peninsula, Alaska"

### The Institute on Lake Superior Geology 2012

**Severson, A.**, Hudak, G., Monson Geerts, S., Zanko, L., Bandli, B., "The Minnesota Taconite Workers Health Study: Environmental Study of Airborne Particulates-2012 Update"

### AWARDS

The 26th Annual Conference on the Environment's annual Environmental Challenge; third-place winners were **Linnea Henkels**, **Andrew Mickelson** and **Aaron Ostlund** for Environmental Sciences. Congratulations!

---

## Graduate Student Presenters & Contributors

### American Geophysical Union 2012 San Francisco, California

**Hougardy, D.**, Colman, S., Edlund, M., "Reconstructing the History of Lake of the Woods, Minnesota, a Remnant of Glacial Lake Agassiz"

**Neitzel, G.**, "Monitoring stream bluff erosion using repeat terrestrial laser scanning"

**Votava, J.**, "Towards a Selenographic Information System: Apollo 15 Mission Digitization"

**Wick, M.**, Gran, K., "Identifying Riverine Erosional Hotspots Using Airborne Lidar"

### NASA Mappers' Meeting Flagstaff, Arizona

**Graupner, M.**, Hansen, V. L., "Structural and Geologic Mapping of Tellus Regio, Venus"

**Slonecker, A. J.**, Hansen, V. L., "Preliminary Structural and Geologic Mapping of Northern Tellus Regio, Venus"

### The Institute on Lake Superior Geology 2012 Thunder Bay, Ontario, Canada

**Chaffee, M.**, Miller, J., Hollings, P., Heggie, G., MacTavish, A., and Bandli, B., "Petrographic and Geochemical Study of the Hybrid Rock Unit Associated with the Current Lake Intrusive Complex, Magma Metals Thunder Bay North Property"

**Brooker, B., Leu, A.**, Miller, J., Asp, K., Parisi, A., Sletten, D., "2011 Precambrian Field Camp Mapping in the Sawbill Lake Area, Cook County, Northeastern Minnesota"

**Brooker, B.**, Miller, J., "Geology and Petrology of a Mesoproterozoic Layered Mafic Intrusion in Portions of the Brule Lake and Cherokee Lake 7.5' Quadrangles, Northeastern Minnesota"

**Goscina, C.**, Hansen, V.L., "Quartz Fabric Analysis of the Kawishiwi Shear Zone, NE Minnesota"

**Lee, A.**, Albers, P., Miller, J., Severson, M., Deen, T., "Bedrock Geologic Map of the Seine Bay/Bad Vermilion Lake Intrusion, Mine Centre, Ontario"

### AWARDS

**Christopher Goscina** was recipient of the best poster award at ILSG. Congratulations!

---

## Current Faculty News

### Erik Brown

I started the year as Acting Director at the Large Lakes Observatory until Steve Colman returned from a well-deserved sabbatical in August. As always, we encourage you all to drop by the Research Lab Building (UMD's last piece of the "Old Campus") for a visit to see what we're up to.

(continued on next page)

## Fall 2012 UMD Geological Sciences

*(Brown, continued from previous page)*

In January a group from LLO went to East Africa for fieldwork on Lake Malawi. We are evaluating the effects of increased agricultural activity (conversion of forest land to agriculture, increased fertilizer use, irrigation) on the lake and the ecosystem.

I have been working on projects examining the climate history of southwestern North America (very relevant for water resource usage in this country). I organized a workshop in Mexico City (flying out early to avoid the "Leap Year Blizzard") to make plans for a drilling program to recover long climate records preserved in lake sediments. Proposals are submitted so now we just need to "wait and see."

Barbara and I continue to try to get to the cabin with the kids (Andrew, 16; Lianna, 14; and Matthew, 10) most weekends from June through August. Now that the school year has started, we are finding out about the fun of coordinating lives of teens and near-teens!

### Steve Colman

The first half of 2012 was spent at Woods Hole Oceanographic Institution, the second half of my sabbatical leave there. With my two major recent NSF projects (Lake Agassiz-Superior and Lake Qinghai, China, with Nigel Watrus and Erik Brown, respectively) having ended, it was good to spend some time catching up, writing papers, and drafting a new NSF proposal. It was something of a shock to return in July to administrative challenges, departmental rivalries, and bureaucratic snafus, but such is academic life these days. It was good to get out into the field with graduate student Devin Hougardy in August, doing seismic-reflection stratigraphy on Lake of the Woods, Minnesota. Teaching Geological Limnology this fall for the first time has been a challenge, but one that is gradually falling into place. I have rotated off the National Geographic Committee for Research and Exploration, but I continue my work on the Scientific Steering Committee for IGBP-PAGES. I write this from Reykjavik, where I am serving on an expert panel for the Icelandic Research Fund. Never a dull moment.

### Christina Gallup

I am very pleased to have a new graduate student, Angela Berthold, who received her undergraduate degree at the University of Wisconsin Eau Claire. She will be working with me on fossil corals from Barbados and San Salvador. I am fortunate to be teaching Coral Reef Field Studies in San Salvador this January with Paul Bates in Biology. Angela will be our TA and will have the opportunity to take samples for her thesis work. It is exciting to be getting the lab back up and running. Undergraduate Autumn Stivers-Biscuso will be working on a project parallel to Angela's.

I continue to enjoy my role as Co-Director of the Environmental Science program. Several of the students in the program have gotten internships and have been able to receive two college credits towards their electives through our Cooperative Education course. After completing their internships, the students write up what they did and learned, and the employer writes up what they did and how they performed. This is a great way to earn college credit while getting real world experience that can shape the student's future employment. We are always seeking good internship opportunities for our Geological Sciences and Environmental Science majors, so if you know of opportunities for our students, please let us know!

### John Goodge

As clear from my profile, I have been to the buffet many times – a full plate of teaching, serving as editor of Lithosphere, Director of Graduate Studies, working with undergraduate students on Antarctic research, helping Amy Radakovich finish her MS thesis and Chelsea Nissen get started on hers, and keeping my own research going. Overseas trips to Costa Rica, Austria, Korea and Australia kept things hopping, as did providing photos of the Duluth flooding to MPR and CNN. The passing of my father in early spring was a personal challenge. I continue to help

(Goode, continued from previous page)

undergraduate students Bob Kryzer and Allison Severson raise funds for the Geology Club, and am working with Michael Buschette on a planned UROP study of granite petrogenesis in Antarctica. I continue study of glacial rock clasts as a proxy of Antarctic crustal history with UMD alum Jeff Vervoort, and of garnet deformation with Bryan Bandli. I have a new project funded by the NSF to design and build a drilling platform for ice and rock coring in Antarctica that will provide access to records of geologic and climatic change on a variety of timescales, from the billion-year rock record to thousand-year ice and climate histories. My goal, with co-PI Jeff Severinghaus (Scripps Institution of Oceanography), is to gain rapid access to deep (i.e., old) ice up to 11,000 ft deep, followed by coring of ice, the ice-sheet bed interface, and the bedrock substrate below. This has never been done before and will provide an entirely new way to obtain *in situ* measurements and samples for interdisciplinary studies in geology, glaciology, paleoclimate, microbiology, and astrophysics.

## Karen Gran

This has been another good year in Duluth. I think the biggest news (on the geomorphology front) was the major flooding event this summer. Several of our graduate students were in the middle of research projects in basins that sustained flooding, leading to some amazing datasets and a few revisions of thesis projects. I currently have a bunch of students working on class research projects at a levee break site in Jay Cooke State Park. The power of that much water is pretty amazing.

Research continues in the Minnesota River watershed. My collaborators and I have received funding from NSF and several state agencies to continue work there for at least the next five years. I have one graduate student working there now, focusing on sediment sources and erosion processes in the Greater Blue Earth River basin, and I hope to bring on one or two more students next year. This past year two graduate students (Andrea Johnson and Stephanie Day) defended their Minnesota River-related dissertations. Stephanie was my first PhD student to defend. She has moved on to a faculty position at North Dakota State University, and I look forward to continued collaborations with her.

Nothing new on the home front, other than Alex and Peter keep getting older (5 and 9). Everyone picked me up at field camp this summer and we had a great week of camping in the Utah deserts. We followed that up in August with our first family trip to the Boundary Waters. This spring I'm looking forward to a semester leave from teaching. I'm using the opportunity to finish up some lingering research on riparian vegetation and channel change at Mount Pinatubo, in collaboration with Michal Tal at the University of Aix-Marseille.

## Vicki Hansen

This past year has been one of public Venus talks as a speaker for the JPL Venus Colloquium Series: Gustavus, Mankato State, Carleton, University of Missouri Science and Technology, and University of Iowa. In June I spoke at the Franklin Institute in Philadelphia [incredible place!], celebrating the transit of Venus, and taking part in a *Moving Forward in Space Project* supported by NASA and NSF involving mentoring of young faculty (how did I get to be one of the ones doing the mentoring?). Cloudy skies in Philly had us watching the transit via the web, but allowed lots of time to talk with kids fascinated by how planets work. Such fun to share Venus-Earth comparisons with folks at all levels. On other fronts: GSA Google Venus is published, and Ivan Lopez (Madrid) and I have received NASA funding for 1:10M mapping of ~25% of Venus' surface. Jon Dyess (PhD candidate) had a successful season in the BWCA, followed by challenging lab work; Chris Goscinak (MS) won best poster at ILSG, took a job at Barr, and is writing his thesis (right, Chris?); Melanie Graupner (MS) and Aaron Slonecker (MS) are making excellent progress mapping Venus' southern and northern Tellus, respectively—each mapping ~5,000 km<sup>2</sup>, with results to be presented at LPSC in March, 2013. Mel, Aaron and I presented at the NASA Mappers' Meeting in Flagstaff — the day of Duluth's massive

(continued on next page)

*(Hansen, continued from previous page)*

flooding. Finally, we wrapped up a four-year NSF-funded effort to improve the environment for women STEM faculty at UMD through a data-driven approach; our efforts culminated in the design and implementation of a brand new campus-wide Department **Heads Leadership Program (HELP)** working with Jeannette Lang. The chancellor and vice chancellor assured us that **HELP** will continue.

Tom Johnson

Life at UMD continues to be stimulating and fun! My MS student, Ben Chorn, defended his thesis in June, on volcanic ash deposits in the Lake Malawi (East Africa) drill cores. He analyzed various ash horizons by electron microprobe, and was able to establish stratigraphic ties between the two Malawi drill sites. All but one of the tephra layers were derived from the Rungwe volcanoes in Tanzania, just north of the lake. The one outlier was the most exciting discovery – it is derived from the Toba volcano in Indonesia, which erupted 74,000 years ago. Toba was by far the most violent eruption in the past two million years, and thought by some to have created a “volcanic winter” world-wide, and the cause of the “Human Bottleneck” at about that time – a period when our species were few in number and nearly went extinct. This was the first discovery of Toba ash in Africa, where our few remaining ancestors were living at the time. We find that the sediment accumulating in Lake Malawi exhibits nearly no change in composition or diatom assemblage in passing through the Toba horizon, which strongly implies that African climate was not significantly disrupted by this event and that Toba was not the cause of the Human Bottleneck. Ben has gone on to the oil prospecting business in Montana, and is doing well. My research remains centered on analyzing African lake cores for past climate change. I am advising a new graduate student this year, Jillian Votava, who came to us from Michigan Tech and is analyzing new cores that were recovered from Lake Kivu last January. Kivu is a fascinating lake, holding promise for a unique paleoclimate record and, of more immediate concern, a record of past massive, catastrophic degassing events. The deep waters contain high and rising concentrations of carbon dioxide and methane derived from hydrothermal vents on the lake floor. More on this next year as Jillian proceeds with her analyses! Jillian, Julie Halbur and I are off to Malawi in January, to turn around instrumented moorings anchored in the lake that are continuously recording temperature and sediment flux throughout the year. Family is doing very well and Kate is having a great time with her studio/gallery down in Canal Park.

Jim Miller

As many may be aware, this past year has been a heartbreaking one for me and my family. In September, my wife, Ginny, passed away after a 16-month battle with cancer. She was my soul mate and best friend, and I am doing my best to carry on without her physical presence in my life. I greatly appreciate the kindness, concern and help given to Ginny and to me during this long ordeal by my colleagues at UMD, and the understanding of my graduate students. Thankfully, I had the flexibility I needed to care for my wife.

Beginning in mid-October, I returned to a work routine with the main focus of re-engaging with my graduate students. I have two (Matt Chaffee and Ben Brooker) who are in the 3W phase of their theses (writing while working) and who I hope can defend before the end of the calendar year. Aubrey Lee, who was a TA at the PRC field camp this past summer, is moving into her second year of study of an Fe-Ti oxide-rich mafic layered intrusion near Mine Centre, Ontario. I have two first year graduate students, Adam Leu from the University of Cincinnati and Alex Steiner from Indiana State University, who both have thesis projects lined up. Adam, who also TA'd field camp, is conducting a USGS-EDMAP funded mapping project of a Duluth Complex intrusion that was freshly exposed by last fall's Pagami Creek fire in the BWCA. Alex will be working on a study of the sulfide mineralization in the granitic footwall of the Nokomis Cu-Ni-PGE deposit in the Duluth Complex that will be funded by Twin Metals Minnesota. Besides working with my A-team, I have lots of other things on my To-Do list for the rest of the year, so I better get to it.

Thanks again to everyone's heartfelt words of condolence and encouragement. Best wishes for a brighter 2013 for us all.

## Howard Mooers

Happy Holidays! Another year has passed; my 21<sup>st</sup> here at UMD. Where did the time go? I am no longer Honors Program Director, but am still involved with the Planetarium. Last year I mentioned that the England project on the history of acid rain was winding up, but I have found a colleague at the University of Birmingham and we are pursuing a new avenue trying to use the acid precipitation data to reconstruct air quality. The two, acidity and air quality, are related, but the details are complicated. The bottom line is that there will be more trips to the UK. On the home front, I have three new graduate students working on paleoenvironmental reconstruction of mid-Holocene hydrology, fate of sulfide minerals in till, and (get ready) origin of Soudan-type iron formations. Anyway, things are going well and I hope all is well with you. Stop by anytime.

## John Swenson

I hope this annual missive finds everyone healthy and happy. For Sarah and myself, this latest trip around the sun was relatively uneventful, and for that we are thankful. The kids remain spunky and in good health. Steffi has reached the ripe old age of nine and has gone completely gray; she also has slowed considerably—not that one can easily discern slowing in poodles. (Can a tree sloth slow down?) Remarkably, Fozzie is now seven and most certainly not slowing down. Given his strict adherence to the labradoodle creed of ‘when in doubt, eat it’, his longevity never ceases to amaze me. As the arctic sea ice sang its swan song, Duluth enjoyed the warmest summer on record; we made the most of it. Our flower garden grew by an order of magnitude, while the orchard saw a more typical annual addition of freshly grafted fruit trees. It was a great year for soft fruits (berries of all sorts), with the extra heat units pushing up ripening dates by two weeks. We had our first substantial apple crop, the last of which we finished off this week. Barring disaster, next year should see the first plum and grape crops, with pears and cherries the year after that. That pretty much sums up the past year. I wish you all the best in the coming year.

## Nigel Watrus

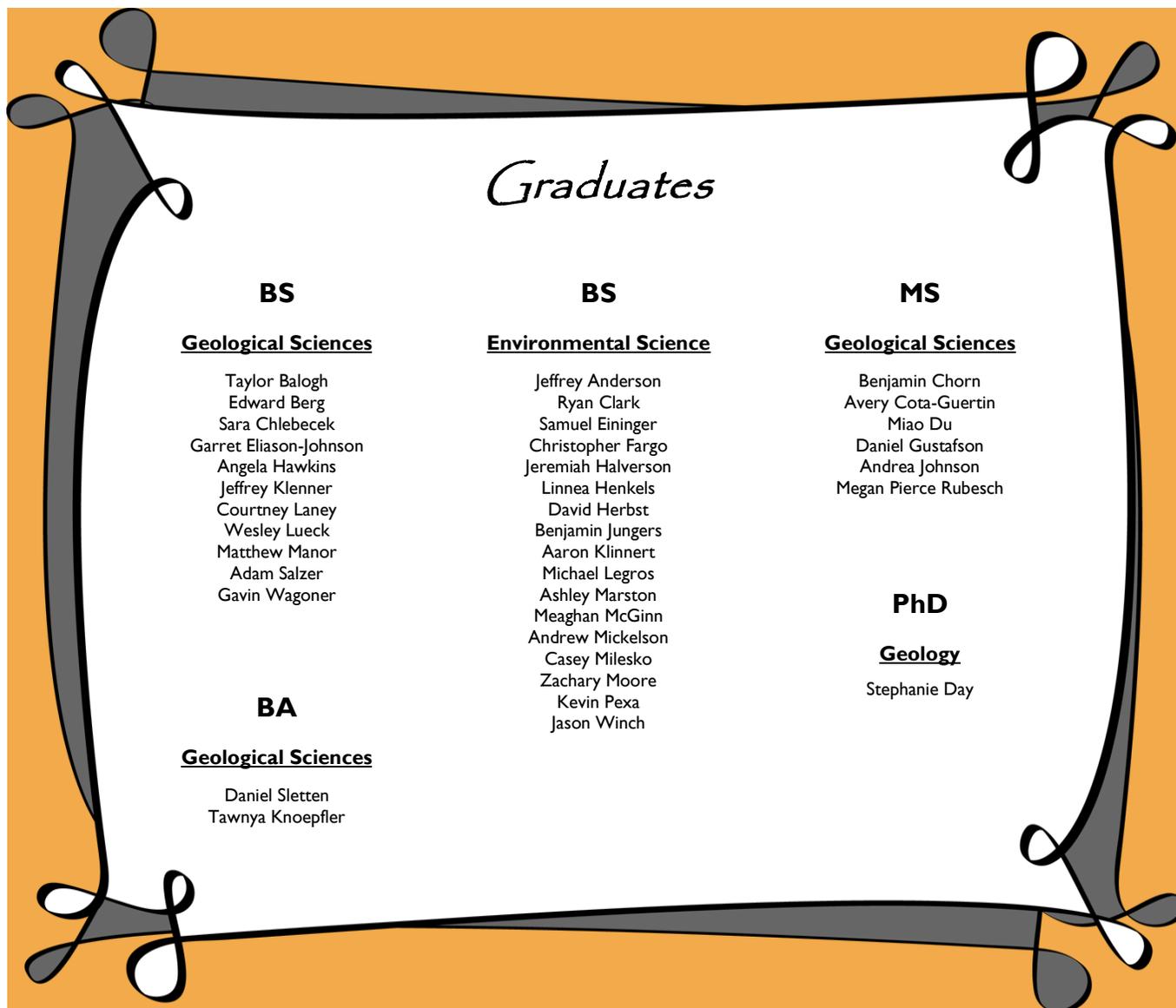
Travel seems to be a constant thread running through my life at UMD. At the beginning of the year, I visited the UK to work with a colleague at Royal Holloway College on seismic data we collected in Indonesia two years ago. That was quickly followed by workshops in Mexico City and Indonesia to discuss and plan future drilling proposals.

I'll be returning to Indonesia early next spring to collect additional seismic on lakes Matano and Towuti. This will be an exciting expedition as we'll be collecting multi-channel seismic data – something which hasn't been done on these lakes before. We hope that it will help us understand the early fluvial package that lies below the lacustrine sediments we imaged previously. This interval was of great interest to the evolutionary biologists at the Indonesian drilling workshop. They are interested in dating the age of the system and learning what it might say about evolution of the fish community now found in the lake.

My summer wasn't as hectic as some recent ones, although I did spend ten days in Mexico collecting CHIRP seismic data on a couple of small lakes in western Mexico with a colleague from UNAM. I took one of my graduate students, Devin Hougardy, with me to help collect the data. He has become quite an expert with the system. In August he took it to Lake of the Woods to collect a beautiful dataset for his MS thesis.

This spring my graduate student, Dan Gustafson, successfully defended his thesis looking at the development of dewatering structures on the floor of Lake Superior. He is now working in Oklahoma for Chesapeake Energy. I sit and wait for bags of donations that I am sure will arrive any day now!

On the home front, we are now officially “empty-nesters”! My son graduated high school this year and is now successfully “launched” into his undergraduate studies at Harvard. Jane and I have visited him several times since he left for Boston, and he seems to have settled in well. It is, needless to say, a very nice place to be a student! My daughter, Sally, also has seen some big changes in her life. This summer she graduated with a degree in elementary education from Augsburg College and is now a kindergarten teacher in St. Paul. My wife, Jane, continues her work at St. Scholastica where, in addition to teaching, she runs their new state-of-art rooftop greenhouse.



## EMERITUS FACULTY NEWS

Jim Grant

The good news this year is that there is renewed interest in the bedrock of the Minnesota River Valley, and I have dusted off my field maps (unpublished from the Roarin' Sixties) and tried to decipher, once again, my field notes from the same era. I went through all that for the Centennial Volume, and the notes have not improved from being out-of-sight-out-of-mind since then. Things look much truer when they are neatly entered on a well-drafted map!

I still get tweaked that my 1986 isocon paper is the most-cited article quoted in Economic Geology. In fact, when I finish this letter, I'm going back to reviewing a paper from the University of Tehran using isocon analysis.

This August Christabel and I took the Amtrak out to a family wedding in the Willamette Valley in Oregon, in the wine country that owes much to the Missoula Floods and resultant soils. We toured the Columbia Gorge, and drove up Mount St. Helens (wild flowers making the desolation come alive again) and the iconic Mount Hood, country I'd talked about in class, but never visited until now. We came to distinguish between wines that are rare delicacies, and those that are merely crafted to be really good to drink! We're both doing well, as are the kids and grandkids, again looking forward to being together in Park City next February. Best wishes to all!

## John Green

We've had another good year, which was centered on a genuine Geological Event right here in the Northland: a huge local flood, from up to 10" of rain in southern St. Louis and northern Carlton counties, that did a lot of destruction in late June. Particularly hard hit was Jay Cooke State Park on the St. Louis River just southwest of Duluth, which is only recently partly open for visitors (the highway and Swinging Bridge are still demolished in the eastern part). Closer to home for us (about ¼ mile), the Sucker River blasted through our road; we'll be lucky if it's fixed next year.

In May I enjoyed the annual Institute on Lake Superior Geology, with a field trip to the fascinating local evidence for the 1.85 Ga Sudbury meteorite impact.

On the home front, I've been busy with folks bringing in "meteorites" and other Funny Rocks; with the help of Bryan Bandli, our Analytical Lab expert, they usually go away wiser. I'm still leading geology field trips for various groups, as well as the occasional talk. I'm currently preparing a display on the geology of Cook County for the US Forest Service's district office in Grand Marais, with the help of Terry Boerboom of the Minnesota Geological Society.

Jan has been busy, as usual, on the Board of Hawk Ridge Bird Observatory and Audubon Minnesota, and with the Minnesota Breeding Bird Atlas, where she's in charge of surveying (with volunteer help) the 68 townships in southern St. Louis County. Finally, she's put together a meaty nomination of the entire Superior National Forest as an Important Bird Area for Audubon Minnesota.

## Charlie Matsch

The past year found me staying pretty close to home. In years past, before my retirement, I spent most of the summers at field camp in Utah or vacationing in Maine, or both. Now I am a year-round inhabitant of Duluth, with a spring break to visit Rip in Tucson, Arizona, to warm up after surviving a long cold winter in the northland. It's a great place to get back in shape hiking in the foothills of the Catalina Mountains. I still share an office in Heller Hall with John Green and so keep in touch with the Department and UMD, my "village". I am totally happy in retirement and still in awe of the North Shore's beauty. I am always pleased when asked to lead a field trip, and I have noticed leading with a slower gait (Charlie, don't trip!). The past summer I had lots of visitors, family and friends, with whom to share the summer, and lots of time to enjoy outdoors, with binoculars in hand, enjoying the trails and spotting birds. Have a great holiday.

## Dick Ojakangas

I have been keeping busy giving PowerPoint presentations, helping to educate the public about our great geological science. I gave presentations on ROADSIDE GEOLOGY OF MINNESOTA to the Minnesota Geological Society, Minnesota Science Teachers Association, Minnesota Minerals Education Workshop, Minnesota Mineral Club (twice), Sugarloaf, and Dr. Carlos Carranza-Torres's Engineering Geology 3425 class (twice). I also presented THE WORLD'S OIL AND GLOBAL WARMING at Grand Rapids Library and POPULATION: THE WORLD'S BIGGEST PROBLEM at First Lutheran in Duluth.

I taught an eight-week course on GEOLOGY OF MINNESOTA AND THE GREAT LAKES REGION for the UMD University for Seniors program.

I attended the 2012 Institute on Lake Superior Geology Annual Meeting and proudly saw Jim Miller receive the Goldich Medal. John Green and I drove up, and John (the "fount of wisdom of the North Shore") showed me some new geology along the way.

Naturally, Peach and I had to take a couple cruises on which I lectured on the geology of the regions. One was Lima, Peru to Punta Arenas, Chile. We just returned from a Singapore-Indonesia-northern and eastern Australia cruise—highlights were Komodo Dragons and jumping 18' marine crocodiles. Unfortunately, no volcanic eruptions!

I am busy writing up Archean glacials from India, as well as some other reports. Why does writing take so much more time than it used to?

*(continued on next page)*

(Ojakangas, continued from previous page)

Family news: Cathy is in Neurology at the University of Chicago, and has started a company called Accent-American, and she lives 1½ blocks from President Obama's home. (We've seen him twice on the street.) Greg is busy teaching physics at Drury University in Springfield, Missouri, and is a consultant for NASA on orbital debris. He is also leading a research project on Me-sabi stromatolites. On the side, he is a sheep rancher. Susanna is now teaching Middle School Earth Science at Mahtomedi and loves it! Peaches just completed her 29<sup>th</sup> cookbook: THE BEST SOUP AND BREAD BOOK by Rodale Press will be out next November. And one last thing—I am more bionic than ever, with a new reverse shoulder! Now I can scratch my own back!

## Rip Rapp

For Rip Rapp it remains the same old routine: happy still writing scientific articles and a book or two on his Shang Dynasty geochronology in China. He just completed a paper on Johan Gunnar Andersson, a Swedish geologist who defined the Chinese Neolithic Period and discovered major archaeological sites in China. In September Rip spent two weeks (including his 82nd birthday) in Austria to, 1) present a paper at the annual meeting of the International Association of Sedimentologists; and, 2) indulge his life-long dedication to classical music by immersing in Mozart, Beethoven, etc., in Salzburg and Vienna. Looking toward 2013, he is on the organizing committee for an international symposium in August 2013 on chert and other knappable materials to be held in Romania. Rip's new website <http://www.rip-rapp.com> should be up and running in November.

---

---

## PRECAMBRIAN RESEARCH CENTER

Now in its 6<sup>th</sup> year, the Precambrian Research Center at UMD had a major year of growth in all programs. The Precambrian field camp, the centerpiece program of the PRC, again attracted 22 students from 16 different schools from across the US. Other than mailing out field camp posters in January to all geology departments in the US, our main means of advertising the camp is now word-of-mouth. This past year we had to turn eight students away. I will let our TA for the 2012 camp, Aubrey Lee, tell you more details about last summer's camp elsewhere in this newsletter. Some updates on our other programs:



*"The rocks are the final court of appeal" Francis Pettijohn*

**Professional Workshops** – This past October, the PRC partnered with the Twin Cities SME chapter to organize a two-day conference on Silica Sand Resources of Minnesota and Wisconsin that included a technical session of 16 invited talks and a field trip to sand operations in Wisconsin. The technical session was attended by 344 participants and the field trip by 120.

**Outreach** – In June, the PRC once again served as the principal organizer for the 15<sup>th</sup> Annual Minnesota Minerals Education Workshop held at Winona State University. The MMEW was attended by a record 96 K-12 earth science teachers from across the state. Next year's MMEW will be held in Hibbing.

**Student Grants and Assistantships** – Because of record fundraising in 2011 (~\$140,000), the PRC was able to award multiple graduate research assistantships this year. In the spring semester, GRA's were given to Ben Brooker, Matt Chaffee, and Chris Goscinak. This fall semester, Adam Leu, Aubrey Lee, and Jon Dyess are receiving graduate assistantships. In addition, over \$5,000 in student research grants were awarded this past year.

**Student Mentoring** – The PRC takes a major advisory role in the new Society of Economic Geologists student chapter that was started at UMD last fall. A field trip to the Marquette area of Upper Michigan in October was partially funded by the PRC. In addition, the PRC sponsored two undergraduate and three graduate students to attend the Prospectors and Developers Association of Canada convention last March in Toronto.

**Professional Field Course** – This is a new program that we plan to launch next fall. This one-week-long course for new professional geologists will focus on a specific type of geology and related ore deposits. Next fall's course will be on mapping mafic layered intrusions, and will be offered immediately after the 2013 PRC Workshop on Cu-Ni-PGE Deposits of the Lake Superior Region.

For more info on these and other programs and on how to become a supporting member, please visit the PRC website: <http://www.d.umn.edu/prc>

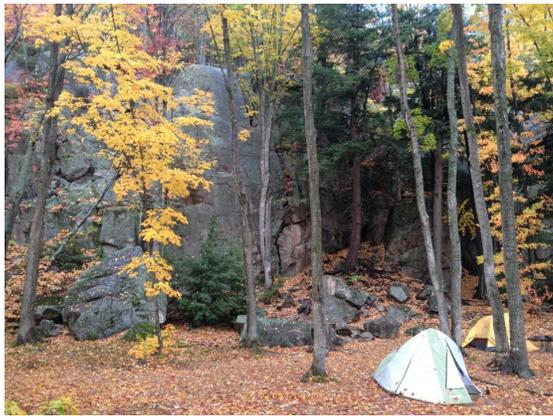
Dr. Jim Miller

2012 GOLDICH MEDAL RECIPIENT



Dr. Jim Miller is indeed a worthy recipient of the 2012 Goldich Medal. Jim exemplifies the best of what this award represents on the basis of his contributions to our understanding of Lake Superior geology and his long-standing involvement with the Institute on Lake Superior Geology.

Congratulations, Jim !



Weekend in the UPPER PENNINSULA

## GEOLOGY CLUB NEWS

The first weekend in October, Geology Club members Allison Severson, Bob Kryzer, and Nathan Lentsch took a trip to the Upper Peninsula of Michigan. The three students teamed up with a couple of students associated with the Geology Club at Michigan State, spending the weekend camping in the season's first snow next to granite outcroppings near Marquette, Michigan. Side excursions consisted of a trip to Jasper Knob to view the BIF (Banded Iron Formation) and the geology of southern shore, Lake Superior.

The Geology Club also took part in organizing and planning a first Natural Sciences Fall Picnic held on campus. Other groups involved were the Astronomy Club, Biology Club, Chemistry/Biochemistry Club, Environmental Science Club, and Society of Physics students. The

event was a huge hit with over 250 students attending, ending an hour and a half earlier than planned because we ran out of hamburgers. There is already collaboration in planning for a similar spring event.

On November 1st the Geology Club hosted a lesson for the local Cub Scout Webelos II Den, held in Heller Hall. The lesson aimed to prepare the Scouts for earning their Geologist Pin, and included basic plate tectonic theory, scenarios of magmatism and mountain building, rock-type identification, and activities using Heller Hallway floor and Venus maps.

*by Bob Kryzer*

## ENVIRONMENTAL SCIENCE CLUB NEWS

The Environmental Science Club has strived to give club members a well-rounded club experience by taking part in multidisciplinary events, each targeting a different aspect of Environmental Science ranging from industry, conservation, education and community service.

To start the semester, the club toured the Keetac Mine, learning about their environmental policies and practices as well as the taconite refining process. We have obtained a private tour of the Great Lakes Aquarium in December and plan to tour New Page Paper during the spring semester. In order to help club members find valuable work experience this summer, a list of over 100 paid internship positions specifically for Environmental Science majors will be put together and distributed amongst club members.

New to this year was the stream clean up, where members hauled out sixteen bags of trash from Tischer Creek. It was a great success and we will be doing it again in the spring in conjunction with other clubs. We were also recently asked to volunteer as judges in early December at the South Ridge School science fair 40 minutes north of Duluth. The club would really like to be more involved in the community, and this is a great opportunity to do just that.

Interest has been strong so far, and we aim to keep that alive and growing by planning more exciting and fulfilling events that will benefit our club members, our school, and our community.

*by Andy Godeen, Richard Skibsted & Erica Evert*

## Terry Swor named Outstanding Alumnus

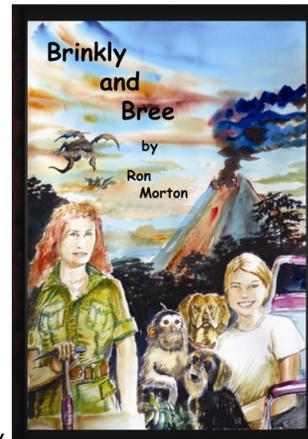


Terry Swor graduated with a Bachelor of Science degree in geology in 1966 and completed the UMD pre-engineering program. While a student, Swor worked for Lake Head Testing Laboratories in Duluth where he was introduced to the engineering geology aspects of modern construction. Upon graduation he joined the U.S. Army reserves and later accepted a position at Lake Head Testing Laboratories. Soon after, he took a position with Twin City Testing Corporation, working for them from 1967 to 1988 and advancing from field geologist/engineer to senior vice president.

In 1989, with two others, Swor started American Engineering Testing, Inc. and served as the company's president from inception until 2011; currently he is the company's chairman and CEO. Growing from a staff of 10 to 350, the company has twice been named "firm of the year" by the American Council of Engineering Companies-Minnesota.

## Professor Ron Morton's newest book

### "Brinkly and Bree"



*Last year this was such a great success, we thought we would try it again...*

So, with a donation to the department of \$75 or more, we would like to say "thank you" by sending you a copy of Professor Ron Morton's newest book "Brinkly and Bree". This is a children's book full of adventure, humor, and science, with a publication date of April, 2013. For more information, you can check out <http://www.brinklybree.com> beginning in February. If you would also like a copy of the award winning "Ancient Earth and the First Ancestors", let us know and we will send that along as well.

## Alumni News

Abbott, April, MS 11, is currently studying at Oregon State University for her Post-Doc. April passed her written discipline exams in August.

Bannister, Roger, MS 06, moved to Normal, Illinois, and is currently working for Groundwater and Environmental Services, Inc., as a Project Hydrogeologist and GIS Service Line Manager.

Berke, Melissa, MS 11, is a Post Doctoral Fellow in Biology Ecosystem at the University of Utah.

Brenner, Sharon, BA 74, started a new job as an accountant at the Leadville Hospital in Colorado.

Chorn, Benjamin, MS 12, is working for Sunburt Consulting in Billings, Montana as a Well Site Geologist.

Cota-Guertin, Avery, MS 11, is currently working with the Minnesota Department of Natural Resources as a hydrogeologist.

Gustafson, Daniel, MS 11, is working for Chesapeake Energy in Oklahoma City, Oklahoma.

Hoffman, Adam, MS 07, received his degree in nursing last December and works as a registered nurse in the impatient float staff for Mayo Clinic. Wife, Jess, is in her fifth year with the Mayo Clinic as a registered nurse in the Cardiac Intervention Unit at St. Mary's Hospital. A new addition to the family, Cora Mae Hoffman, was born January 21, 2012. Their oldest daughter, Audrey, is two years old.

Lundgren, Lucas, BA 09, took a job with Newmont Mining in Nevada.

Manor, Matthew, BS 12, is at University of British Columbia in Vancouver, BC Canada, pursuing a master's degree.

Syverson, Kent, BS 86, Professor and Chair of the Department of Geology, was awarded the 2012 University of Wisconsin Eau Claire Excellence in Teaching Award!

Zigich, Daniel, BS 77, has taken a hydrogeology position at Denver Federal Center.



### In Memory of Glenn B. Morey

Glenn Morey, BA 57, Professor Emeritus, University of Minnesota, Winchell School of Earth Science, passed away August 2, 2012, at the age of 76. After Glenn earned a bachelor of Arts degree from the University of Minnesota, Duluth in 1957, he enrolled in graduate studies in the Department of Geology and Geophysics, University of Minnesota, Twin Cities. This resulted in a Master's degree in 1962, and a Ph.D. in 1965. Both degrees focused upon aspects of rocks of Precambrian age in the Lake Superior region. He joined the professional staff of the Minnesota Geological Survey as a Geologist in 1965, and became Principal Geologist and General Supervisor of geologic activities in the Precambrian terrane of Minnesota in 1973. Glenn was named Associate Director of the Survey in 1976, and in 1979 Chief Geologist was added to his title. From 1986 to 2001, the year of his retirement, Dr. Morey held the titles of Professor in the Department of Geology and Geophysics, where he was a member of the graduate faculty. Dr. Morey was also our Outstanding Alumnus in 2006. He will be greatly missed.

## Precambrian Field Camp 2012

2012 Precambrian field camp students at Soudan Underground Mine State Park



The Precambrian Research Center's (PRC) annual summer Precambrian Field Camp was, yet again, a great success. Twenty-two students from fourteen universities, all new to mapping in Precambrian terrains, spent six weeks in July and August immersed in northern Minnesota geology. The principal instructors, Jim Miller, George Hudak, and Dean Peterson, along with TAs Aubrey Lee and Adam Leu, provided students with invaluable insight and their vast knowledge gained during their many years in academia and industry.

Students were introduced in weeks one and two to Duluth geology by mapping greywacke, basalt flows, and intrusive rocks at Grandview, mapping Duluth Complex layered series rocks at Spirit Mountain, and collecting and analyzing geophysical data near Esko. Three days at Wolf Ridge Environmental Learning Center in Finland were spent mapping rocks of the North Shore volcanic group; a common favorite project among PRC students. Weeks three and four brought students to Ely, where they stayed at Vermilion Community College, the perfect jumping-off point for studying greenstone belts, iron formation, and the basal Duluth Complex. They familiarized themselves with structural, textural, and mineralogical characteristics of Archean and Proterozoic rocks, and many saw their first pillowed basalts and schist-n-bif (coined by Dean Peterson to describe rocks of the Soudan Underground Mine State Park). These two weeks had an exploration twist, as students toured the United Taconite Plant, measured stratigraphic sections of the Biwabik Iron Formation, logged drill core at the Minnesota Department of Natural Resources core library in Hibbing, walked the drift at 2,341 feet underground at the Soudan Mine, and met economic geologists and PRC alumni at the Twin Metals office in Ely.

Once acquainted with mapping various Precambrian rocks and tectonic environments, students were cut loose in week five for their capstone mapping project. They split into five groups; three groups mapped layered rocks and anorthosites in the Duluth Complex, one mapped Archean volcanic rocks of the Ely Greenstone belt, and one mapped Archean metasedimentary rocks near the Canadian border in the BWCAW. Week six saw students back at UMD compiling their capstone data and generating geologic maps. For many, this was their first introduction to ArcGIS and Adobe Illustrator. They presented posters on their capstone projects the final day of camp in the presence of all instructors and many industry advocates of PRC, using the day to network and show off their newly acquired skills.

*by Aubrey Lee*

---

## SOCIETY OF ECONOMIC GEOLOGISTS

With help from faculty, industry, alumni, and students, our first fully active year as an SEG Student Chapter has been successful thus far. As you are well aware, the Geological Sciences Department at UMD has long been known for producing well-prepared undergraduate and graduate students for the economic geology/exploration work force; we hope to uphold the department's academic achievement in economic geology. Coupled perfectly with the recently revived exploration and mining focus in geology, we were fortunate enough to get quickly up and running.

(SEG, continued from previous page)

Between this year and last, we were able to host two local field trips, one to the Iron Range, and the other to the Upper Peninsula of Michigan. More globally, we were able to send three students to northern Chile to attend a short course on high- and low-sulfidation porphyry deposits, as well as sending one student to Spain and Portugal, and another to Peru. Likewise, with help from PRC and Newmont Mining Corporation, we are also fortunate enough to send graduating seniors to the Prospectors and Developers Conference in Toronto where students will be exposed to the economic industry at an unparalleled magnitude. During this year's spring break, we will be traveling down to the southwestern states to visit various mine and prospect sites. Fortunately, funding for our Chapter has been coming in, and we hope to continue to bring in money through various industry sponsors and departmental fundraisers, so be prepared for an epic raffle at this year's banquet. We continue to strive as students and members of the economic community, and hope to continue to push the Geological Sciences Department to more competitive levels. A huge thank you goes out to our faculty advisors, Jim Miller, George Hudak, and Ron Morton, for being the mechanism to our movement! I would also like to thank alumni for your continuous support towards our Chapter.

by Allison Severson, SEG Student Chapter President



## Wasatch-Uinta Field Camp 2012

### 2012 Little Grand Canyon in the San Rafael Swell Canyon, Utah

Tanya Knoepfler, Michael Strain, Cullen Phillips, Devin Hougardy, Alan Best, Matthew Manor, Jackie Doroff, Bob Kryzer, Wes Lueck, Michael Buschette, Allison Severson, Dr. Karen Gran, Nick Landon, Drew Solberg and Kenny Bitzer

The 2012 Wasatch-Uinta Field Camp consisted of 20 undergraduate UMD students with 59 students overall. Professor Karen Gran and graduate student Devin Hougardy generously volunteered three weeks of their summer to help us out. With groups heading in every direction to field camp at various times, we somehow managed to get to Park City, Utah on time (yes, even the group who locked their keys in the vehicle). Our six-week field course began with the introduction of the region's geology and eventually progressed into two individual mapping projects our final week. The weeks between are somewhat of a blur—let's be honest, those of you who have attended field camp know that we count our time by project due dates, not by the day of the week. We were based mostly out of the ever-classy Chateau de Aprés (again, I'm being facetious) with field trips to the Tetons for the 4<sup>th</sup> of July, to the San Rafael Swell with Tim Demko to learn about the petroleum industry, and to Nevada where we toured a few of Newmont's Carlin-trend gold operations. With multiple mapping projects, probably sounding familiar to you, including Chalk Creek, Deer Creek, Bonanza, Antelope Island, Ankareh Ridge, Jupiter Ridge, and Albion Basin, there was nary a dull moment. Our few free days were spent "relaxing" in Salt Lake City or at the dog park playing soccer, Frisbee, football, and stickball. Some would say it was a *Good Year*, not only because we learned so much, but also because of the six vehicles, we somehow managed to total 11 flat tires! Overall, the course was a great experience that every geologist should get to benefit from! Though taking a class for six weeks during the summer may be rough for most, this was not the case. What geologist wouldn't want to spend his/her summer outside, hiking in some of the most magnificent and spectacular places on earth? The projects became exceedingly more difficult, but enabled us to apply our *agglomeration* of classroom knowledge as a *conglomeration*. Great skills were learned and great memories were made that will stay with us forever. I look forward to using these life-skills in the future as I continue to learn the ways of a geologist! When I was younger, my eyes used to glaze over when my parents, both of whom are geologists, started discussing in detail the geology on our family vacations; only now do I fully appreciate these conversations and instead, make *their* eyes glaze over! Field geology is an acquired passion, but once you map, you never go back.

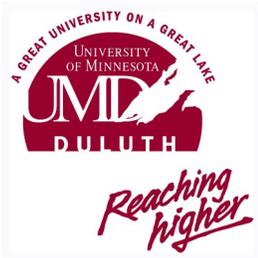
by Allison Severson

## Fall 2012 UMD Geological Sciences

Department of Geological Sciences  
University of Minnesota Duluth  
1114 Kirby Drive  
Duluth, MN 55812

Phone: 218-726-8385  
Fax: 218-726-8275  
E-mail: [geol@d.umn.edu](mailto:geol@d.umn.edu)

**ADDRESS SERVICE REQUESTED**



The University of Minnesota is an equal opportunity educator and employer.



Ok, so where IS this Geology meeting???

What's New ?

Please contact us at [geol@d.umn.edu](mailto:geol@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



