

MSU GEOSCIENCE NEWSLETTER FALL 2017

The MSU Geoscience Department newsletter is published once per semester in electronic format. It contains news of MSU Geoscience activities, what our current students and alumni are up to, descriptions of useful materials, potential job and internship opportunities, and reports of recent scientific discoveries and publications by your current and former MSU professors.

Sign up for the Newsletter by sending a request to be added to msugeoscience@gmail.com. The newsletter is currently edited by Dr. Collette. Please distribute this newsletter to anyone who might find it interesting!

GEOSCIENCE DEPARTMENT NEWS AND HAPPENINGS

A lot has been happening around the department since the last newsletter went out. We have a new student research grant – the Bob and Kathy Mau Undergraduate Student Research Grant that will support one student doing research per semester. AUGITE, the MSU geology club has sponsored a new display of fluorescent minerals that was built by Dr. Collette, and is the first phase in a major revamp of the displays in the ground floor corridor of Cyril Moore. Our new Geosciences computer lab is also up and running now with six machines with large screens that have had various GIS, statistics, and vector graphics software packages installed on them for geoscience student use. Some new classes are in the pipeline, and some important program changes are in the pipeline as well! It also looks like we will be starting up an AAPG student chapter that will dovetail nicely with the mission of A.U.G.I.T.E. as well. To top off the great news, several of our recent graduates have landed geology-related jobs over the

past few months. Look for these stories in the Alumni Happenings section below.

Bob and Kathy Mau Undergraduate Student Research Grant

Thanks to the generosity of one of our alumni and his wife, Robert and Kathy Mau, we are able to offer undergraduate research support directly from the Geosciences Department for the first time. The Bob and Kathy Mau Endowment provides funds to the College of Business and the Department of Geosciences. In Geosciences, the funds have been designated for support of undergraduate student geologic/earth science research in the Geosciences program at Minot State University. Once each semester, the Department of Geosciences accepts proposals from undergraduate students pursuing a program in Geosciences for financial support of their research projects. Funds awarded may be used toward:

- student travel expenses associated with field work, and/or
- equipment or supplies needed for field and/or laboratory work.

Priority will be given to expenses that would otherwise be incurred by the student – things for which other sources of support are not available. A student can apply more than once, but may receive only one grant.

More information can be found outside of Dr. Webster's office (where current students can pick up an application form), or on our Geosciences Department website.

A.U.G.I.T.E. Sponsored New Fluorescent Minerals Display in Cyril Moore

This semester, a new display of fluorescent minerals was designed and built by Dr. Collette with funding from our geology club, A.U.G.I.T.E. The new display is located in the first case as you enter Cyril Moore from the west (library side) entrance on the ground floor.



A small part of the new fluorescent minerals display toward the west side entrance of Moore. The Display is on a 30 minute on, 30 minute off timer to keep the LED emitter temperatures low and give them a long lifespan.

The display uses as its UV source 3w high power UV LEDs with a wavelength of approximately 470nm mounted on an aluminum heatsink for longer life. The system is currently running with 5 emitters, but Dr. Collette hopes to have the display complete by the end of the semester. The light is on a 30 minute on, 30 minute off cycle to keep the light system cool in the enclosed space in which the display resides.

Currently, minerals on display include fluorite, calcite, autunite, andersonite, sulfur, nepheline, and opal, but other mineral specimens will be added as the display grows.

There will also a push to make these displays more interactive – to get students involved in the specimens around them as they walk through Moore. To try and do this, there will be QR codes on the signage for the new displays that students and visitors will be able to scan with their phones. This will bring up a link to a webpage associated with each display where people can get more information on the minerals, rocks, fossils, or other kinds of specimens contained in each revamped display unit.

New Geoscience Computer Lab Up and Running!

We have been talking about this for quite a while – a space where our Geosciences students could go to work on research-related computational problems (like GIS), put together graphics for their presentations, and where smaller classes that require each student to have their own computer station could be taught.

The new computer lab (in Guy Hanley's old office in 'the U' has six work stations, and has had ArcGIS, Adobe Creative Suite (Illustrator, Photoshop, others), and several other graphical and statistical software packages installed. The computer lab is open for Geosciences students only. If you wish to get access to the computer lab, see your research advisor, or ask Karla in the main office to let you in.

Potential Program Changes in the Works, and Some New Classes

Fluctuations in the number of geology majors is something we have always experienced. These fluctuations are due, at least in part, to variations in the price of oil and activity (i.e., hiring) in the oil patch. However, we have also seen cases in which students drop the geology major because of the requirement to take a 6-credit summer field geology

course (field camp). Because this requirement can affect retention rates of geology majors, we are working on implementing a program change that would provide an alternative to field camp.

Because geology is a field-based science, that field experience is crucially important in the training of geologists. Currently, the field-based core classes that MSU Geoscience students take includes GEOL 300 Geologic Field Methods, and the 6-credit summer field camp. The alternative will be to make one semester of GEOL 290 Regional Geology a requirement (which will still fulfill the IP2 University requirement), and we will be building a new field-based course called GEOL 390. It, together with GEOL 290 will constitute the alternative to summer field camp. GEOL 390 will take an extended fieldtrip immediately after finals in the spring semester, and will take students to areas of more complex geology for section measuring, geological mapping, and structural geology field-based exercises designed to provide a reasonable level of field experience, but without the need to pay for this experience outside of the normal semester, and to break down the field experiences into smaller chunks over multiple classes. Stay tuned for more on this as we go forward through the curriculum change process!

I think it would be good to add a short blurb on Nathan's experimental course that he will be offering next spring?

NEW AAPG Student Chapter in the Works

AAPG – the American Association of Petroleum Geologists has been actively seeking new student chapters throughout the country over the past few years. We are actively seeking student participation in a new startup AAPG chapter here at MSU. AAPG is willing to give any startup chapter \$1000 to get the chapter started, and member benefits include: payment of student member fee (\$10 currently) by Chevron upon request), by providing scientific publications, by hosting several different national and regional conferences per year, and by providing educational and training opportunities for student

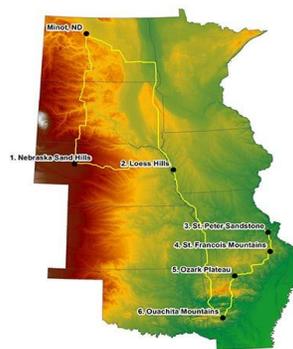
members. Additionally, students may apply for funding to attend one of AAPG meetings, or for the L. Austin Weeks undergraduate Research Grant to get up to \$500 in research funding. For more information on joining AAPG, see either Dr. Webster, or Dr. Collette, or you can find additional information on their website at: <http://www.aapg.org/>

2018 Spring Break GEOL 290 Regional Geology Fieldtrip to the Ozarks and Ouachitas of Missouri and Arkansas

This year's GEOL 290 Regional Geology class will be taught, and the fieldtrip will be led by our newest faculty member, Dr. Nathan Hopkins. The trip will be heading to points south in Missouri and Arkansas and will focus on the latter Paleozoic pulses of mountain building that finished up the assembly of the Appalachians, some even older (1.4Ga) volcanics, adventures and history around old lead mines, the geology of some civil war battlefields, exploring caves and camping, hiking, and exploring of the region. If you are interested in this fieldtrip class, you



Spend spring break on a journey through the south-central United States, exploring the dramatic evolution of the mid-continent and the intersections between geology and society.



Trip Highlights

- 1.4 billion year old volcanism
- 300 million year-old mountain building
- Geology and history of Lead Mining
- Geology of civil war battlefields
- Explore natural caves
- Camping, Hiking, Exploring, Oh My!



Course Information: GEOL 290 is a three-credit course offered in Spring semesters for students completing a degree in geology or those generally interested in the earth sciences. The course meets once to twice weekly up until the mandatory field trip over spring break. This course satisfies general education IP2 requirements. Prerequisites courses are GEOL 101 or 105 or with instructor permission. Interested students are encouraged to contact Dr. Nathan Hopkins for more information (e-mail: nathan.hopkins@ndus.edu; phone: 701-858-4205)

can see the posters hanging on the bulletin board outside of room 112, or email Dr. Hopkins at Nathan.hopkins@minotstateu.edu for more information.

FACULTY NEWS AND HAPPENINGS

Dr. Joseph Collette



Dr. Collette leaning against an outcrop just above the K-T extinction interval on a recent fieldtrip to the North Dakota Badlands.

Update – Fall 2017.—The start of my fourth year here at MSU has been quite productive. The two manuscripts that I had been working on over the Spring 2017 semester are now published. The first is on a rare extinct arthropod called a euthycarcinoid that was collected in Antarctica from Permian proglacial lake deposit, and the second (currently in press) is on several new species of phyllocarid arthropods from the Holy Cross mountains of Poland that have implications for faunal exchange, and thus paleoceanography, between Laurentia and core Gondwana during the late Devonian.

One of my research students, Ana Swor, is nearing the completion of her senior seminar project which she will be defending soon – sometime around Thanksgiving. It looks like I will be doing some more fieldwork in Wisconsin this coming summer with Jesse Dalle – the newest member of my undergraduate research group, who will be trying to use sedimentology and primary structures to get at water depth in these nearshore environments in an attempt to understand any potential effects related to tectonics having changed bedding orientations

since deposition during the Cambrian. We will be doing this to attempt to verify the nearshore slope and geometry data that Liz Bauder and Ana Swor collected previously.

Dr. Nathan Hopkins



Dr. Hopkins' recent Fall Geomorphology fieldtrip to the badlands of North Dakota. Behind the students, Painted Canyon in Theodore Roosevelt National Park can be seen.

Update – Fall 2017.—My second year here at MSU is somehow busier than my first. I mostly blame my new son, Sterling, for that. As of this writing, Sterling is four months old, happy, and healthy. I have admittedly been more distracted than in previous semesters, but research and teaching continues to go well. Over the summer, I developed a brand-new course for MSU, focusing on the collection and use of satellite and airborne observations of Earth. This semester marked the inaugural Geomorphology Badlands field trip, and I am currently planning the Regional Geology spring break trip to the Ozarks and Ouachitas of Missouri and Arkansas.

Research activity continues, despite my new distraction at home. I completed 7 days of fieldwork in western Sweden at the end of September as part of an ongoing project to assess the ice flow history of the Fennoscandian Ice sheet. Pending positive results, more fieldwork in that region is in the pipeline. More locally, I am supervising two students' undergraduate theses. Chandler Jacob is evaluating the relationships between large-scale rotational landslides and the tributaries of the Des Lacs river in the vicinity of Donnybrook. Haley Hanna

is using high-resolution LiDAR data to map glacial landforms of the Souris Lobe. Expect to see their conclusions this Spring!

Dr. Kati Kilroy



Dr. Kilroy at American Geophysical Union, AGU, Meeting in San Francisco, CA

Update – Fall 2017.—2017 was an exceptional year for me. I taught GEOL 105, SCI 480, and Applied Hydrogeology in the Fall (2016) with one student, Shane Keller. We worked with Tawie Machiva (chemistry) to get his senior research project started. Oof! We did some well measurements, well tests, and hand augured wells in the Souris River flood plain. Shane is very mathematically oriented, so the class focused on exploring the various types of math used in hydrologic investigations. Tawie later quit school, but not before saying “It is easy to think of Americans as fat cats when viewing you on TV from overseas, but now that I am here I can see that you all work really hard!”. I took that as a rare compliment coming from a student. I went to GSA in Denver in September and went to many good talks, particularly about measuring aquifer recharge properties. I spent Winter Break in Minot, a first for me, and went cross-country skiing in all that snow. I also traveled to Bismarck, and worked on courses for Spring Semester.

In the Spring of 2017, I taught GEOL 105, and 108, and SCI 240. I also got started preparing a 100-level,

on-line lab course about water resources called: Water Planet. Meanwhile, my father’s house that my sisters and I rent out (Dad passed away in 2006) nearly burned to the ground because the tenant put live coals in a plastic bucket next to the house on a windy day. Oof! Oof! Luckily, we had fire insurance and so did he! The house was rebuilt over the summer and is now on the market. I had a lovely visit to Virginia and Delaware over Spring Break to see family (and Dad’s miserably burned house) and the weather there was oh so uplifting (warm). We all shuddered in May when decisions about layoffs and cutbacks were finalized.

Over the summer I went back to see old friends in Carson City NV after one of them died suddenly of a blood clot (following hip replacement surgery). You may recall that I did my Ph.D. studies in NV and worked at the USGS there.

Then, I drove to Virginia again for the family thing, and spent July on my bike in the Netherlands. It was a good ride, but many folks wondered why I would leave a place that is Flat and Windy to ride in the Netherlands where it is: Flat and Windy! Let me just explain that: the food is better (especially the fish); the towns are only 5-kilometers apart, not 50-miles apart; and there is an ocean right there. I spent most of the trip riding along the 300-mile sand road (cycle path) paralleling the coast, where there are many fine restaurants and campgrounds. I was most impressed with the unparalleled Dutch cycle trails and node point navigation system; hundreds of cyclists I passed everywhere; the stunningly large bike parking areas; and the numerous little old men and ladies on electric bikes that passed me constantly. I think an electric bike may be in my future. All in all it was a good year.

Dr. John Webster

Update – Fall 2017.—Since last spring, the work I was doing with MSU’s reaccreditation process through the Higher Learning Commission (HLC) has come to an end. Over the summer, the final revisions were

made to the self-study, and just recently the HLC team made its visit to MSU. The final outcome should be known early next year.

The first two months of my summer were spent doing heavy mineral analysis of some Brule Formation samples collected from the Little Badlands area (southwest of Dickinson). These samples were collected by Clint Boyd and Jeff Person of the North Dakota Geological Survey. I disaggregated, sieved, and then analyzed four samples collected from different stratigraphic positions or different channel sands. For one sample, I quantified heavy mineral abundances in four different size fractions to study the effects of grain size. The main focus, however, was on determining whether the four samples provided any indications of changing sources through time. While there was some variation among these samples, their heavy minerals were all dominated by calcic pyroxene and hornblende. The calcic pyroxene, called augite in the literature, looked identical to what I've called diopside in study of the older Medicine Pole Hills (MPH) sandstone (late Eocene). The MPH sandstone also contained abundant hornblende.



Clint Boyd and Jeff Person (North Dakota Geological Survey) studying the "Golden Brown" unit at Reva Gap in the Slim Buttes. This unit has been described in the literature as the lower member (informal) of the late Eocene Chadron Formation at this locality. Based on their experience, Clint and Jeff believe these strata are equivalent to the early Eocene Golden Valley Formation of North Dakota. Heavy mineral analysis could help answer this question.

The similarity in abundances of augite/diopside and hornblende (heavy minerals derived from Tertiary volcanic sources) in the MPH sandstone and Brule Formation raised some interesting stratigraphic questions. These questions led to some more fieldwork this fall to collect additional samples. During a day in the field in September with Clint Boyd and Jeff Person, we collected samples of the Chadron Formation in the Little Badlands area, and also the underlying Golden Valley Formation. Later in the day we collected some additional sample from the Stover site near Bucyrus, ND. I previously worked on heavy mineral analysis of a very fine-grained sample provided from that site, but wanted to collect some coarser material for additional analysis. This site is significant because it is producing vertebrate fossils, and was thought perhaps to be equivalent to the Medicine Pole Hills sandstone. The following day I collected Brule Formation samples from a Long Pine Hills locality (southeastern Montana), where I previously collected Chadron Formation samples.

During another day in the field with Clint and Jeff in October, we did some sampling in the Slim Buttes of northwestern South Dakota. We sampled the Chadron and Brule Formations, and we sampled a unit that Clint and Jeff recognized as most likely equivalent to the Golden Valley Formation. This unit at Slim Buttes was previously called, informally, the "Golden Brown" unit of the Chadron Formation.

In all, I have 27 new samples that will expand the geographic and stratigraphic reach of my heavy mineral analysis studies. The goal remains to determine the sources and depositional history of late Eocene (Chadron Formation) strata, especially the Chalky Buttes Member. Expanding the work to older (early Eocene Golden Valley Formation) and younger (South Heart Member, and the Oligocene Brule Formation) rocks will help in that effort. Right now, I am starting work on new samples from the Stover site to determine if coarser samples yield similar results to the very fine-grained sample I've already studied. Clint Boyd wants to publish a NDGS report on the paleontological and heavy mineral research on this site early next year.

ALUMNI NEWS AND HAPPENINGS

Nurkhair Teleu – '15

**Geotechnical Engineer - Voskhod Oriel -
Yildirim Group, and soon to be Grad Student**



Nurk Teleu in the field during GEOL 300 mapping project at Tent Canyon in 2014.

“After graduating from university, I was planning to continue with my studies at graduate school. Once I’ve applied and got accepted for Fall term, I traveled back home to visit my family. Little did I know that my plans would change all of a sudden upon my arrival. The First job offer I received came from National Geological Exploration Company, then from National Company Kazakhstan Temir Zholy. A few days later another job offer from Falcon Oil & Gas Company. I chose the last option, and I didn’t regret it since it gave me an opportunity to get my hands-on experience, to put theory into practice while I was working as petroleum geologist at rig site. Most of my duties involve well log studies, core analysis, surveys and geophysical interpretations etc. It is a lot of work, but on the flip side after your shift ends, you get to taste the real fruits of your labor. I worked there not for long, at least until the completion of well.

“The next phase of my career was becoming a geotechnical engineer in chrome ore mining industry. I have been working for Voskhod Oriel - Yildirim Group of companies (one of the largest and richest chromite deposits in the world) now for almost two years, and I am still keen to learn more

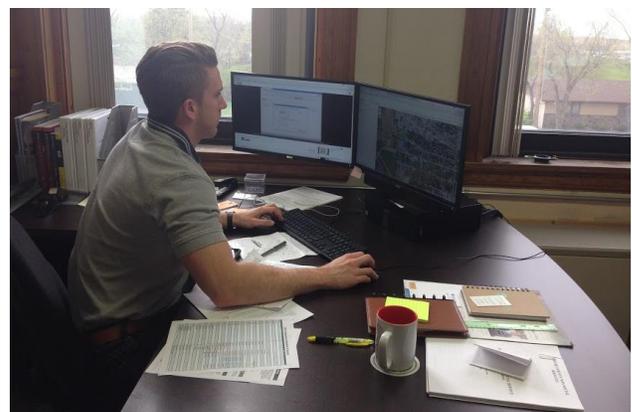
about methods and ways of analyzing ground movement in different deposits. The principle objective of ground control is to maintain safe excavations in rock mass. Rock masses exhibit extremely complex behavior, and it is my job to figure this out. In many ways, I believe ground control is a craft more than a science. Ground control requires an understanding of structural geology, rock properties, groundwater, and ground stress regimes and of how these factors interact. Geological classes that I took in colleges and universities laid a good foundation in my understanding of geotechnics. Working as a geotechnical engineer with the background in geology has allowed me to expand my knowledge and practical skills in the fields such as exploration geology and geotechnical investigation. I am convinced that having education background in geology would have a great long-term impact in someone’s career whether he/she is choosing career in geomechanics, petroleum engineering or other natural sciences.

“Having gained a professional experience in metal & mining industry, the next phase (or goal) for me is to continue my studies at graduate school in the direction of geotechnical engineering field.”

-Nurk Teleu

Ryan Curzon – '16

Reservoir Dogs Geological Consulting



Ryan Curzon working on a GIS-based project in the Divide Country Courthouse in May of this Year. Ryan will be beginning a new job in just a few weeks (read below).

Ryan Curzon has just accepted a job at Reservoir Dogs Geological Consulting in Regina, Saskatchewan, Canada!

"I am excited to start working back in Canada close to home in a field I studied. For the past six months, I have worked at the Divide County Courthouse doing the local government's GIS mapping. My time here has been good, I've learned a lot about ArcGIS and local government. My coworkers were great and I am sad to be leaving them.

"I am ready to begin my career in geology as well as working towards attaining my professional geologist designation. I know that the skills and lessons I learned from you and other professors in the geology/science department will help me succeed at my new job." –Ryan Curzon

Cortney Crites – '17

US Forestry Service Hydrology Technician, Black Hills National Forest



Cortney Crites in the field during her field camp over summer 2016. Cortney now hikes around the Black Hills for her job as a Hydrology Tech.

"I work for the United States Forest Service as a Hydrology Technician. Work days are Monday - Thursday every week for 10 hours/day. The majority of the time I am hiking in the Black Hills National Forest conducting surveys, identifying signs of mass movement (mostly creep, slumping and debris

flows), often mapping pre-historic/historic landslides in the Black Hills. I also inventory/map springs, streams and wetlands. While in the field, I use a Trimble or Garmin GPS unit to collect data (such as spring locations). I then take the data collected from the field and enter it into GIS to create a map and write a report. These maps and reports are important as our Timber shop uses these to evaluate areas for collecting and selling of timber in the BBNF. I spend about 90% of my time out in the field surveying. Other duties include assisting other shops with projects such as building buck and rail fences around botanical areas or wildlife." –Cortney Crites

MSU Geoscience Alums - KEEP IN TOUCH!

We are making a concerted effort to keep in touch with our Geoscience Department alumni, and to build and maintain a master alum email contact list. If you know folks that have not received this newsletter who are MSU Geoscience alums, please ask them to submit their current email address to msugeosciences@gmail.com. Specifically, we're looking for emails for: Awalt, Brody; Blacklock, Sara; Brandiezs, Bryan; Christensen, Allison; Collins, David; Dahl, Cordell; Evans, Colleen; Feist, Susan; Fogarty, Heather; Graves, Adam; Hodenfield, Cody; Hoff, Ryan; Hughes, Jean; Jacobson, Todd; Kight, Roy; Larsen, Jennifer; Longtin, Max; Marchand, Arin; McLeod, Jesse; Mohr, Brett; Pitt, Patrick; Ronning-Schemetz, Kathleen; Sande, Brent; Stover, Monica; Vachal, Lynnette; Warner, Colleen; Webb, Tina; Webb, Tina; Weidler, Jordan; Whitlow, Tim; Wiebe, Joseph.

Likewise, if you wish to continue receiving this newsletter once per semester, please make sure you send an update (and long-term stable) email address to msugeosciences@gmail.com with any email address changes that you may have.

If you would like to submit a piece for inclusion in the Alumni News and Happenings section of the newsletter, please write up a few paragraphs about where you are currently living, where you work, the

kinds of work you are doing, and a photo of yourself (preferably in the field or lab) at work.

Also, if you would like to perhaps come in to MSU and give a talk to our current students about how you went about getting a job in geology, what you do in your current job, and some suggestions that might be helpful to people about to enter the workplace, we would love to host you! Please send an email to msugeosciences@gmail.com.

A.U.G.I.T.E. NEWS AND HAPPENINGS

Haley Hanna – President
Jesse Dalle– Vice President
Calob Werre – Treasurer
Jordan Torgunrud – Secretary

A.U.G.I.T.E.—The **A**ssociation of **U**ndergraduate **G**eologists in **I**ndustry, **T**echnology, and **E**ducation is the Minot State University Geology Club. It is an active University entity that sponsors geology-related fieldtrips outreach events, and brings in occasional speakers from geological industry to discuss issues that graduating students might soon face when entering the professional geological workplace.

During the 2017 Fall semester, A.U.G.I.T.E. worked on two projects. The club participated in the 2017 Minot State University Homecoming parade. The



A.U.G.I.T.E. members in costume for the 2017 Fall Homecoming parade.

Homecoming theme this year was “Beavers into battle,” and so the club interpreted that (very liberally) in terms of Earth history as ‘dinosaurs versus asteroid!’ Everyone involved had a great time, and the dinosaurs (names) and the asteroid (name) all handed out candy. There may have been some small children that found the experience frightening, but all was in good fun.

At the end of October, the club also participated in the MSU-sponsored Halloween party at the Auditorium in Minot. Thanks to Jesse Dalle and Haley Hanna, the T-Rexes were there to hand out candy.

MSU A.U.G.I.T.E. is excited to welcome new recruits in the 2017-2018 academic year and all of the events to come! If you would like more information on the club, please see the A.U.G.I.T.E. link from the [MSU Geoscience website](#).
–Jordan Torgunrud

SIGN UP FOR THE MSU GEOSCIENCES NEWSLETTER

If you are not receiving the MSU Geosciences Newsletter and want to, you can sign up by sending an email request to: msugeosciences@gmail.com.

We are always looking for news and information on alumni and what you are all doing now. If you would like to share some of your experiences, news, events, information, current or upcoming internships, or other information you think is interesting, please send a 2-3 paragraph write up about your news item to msugeosciences@gmail.com and I will add it to the next newsletter scheduled for Spring semester 2018.

If you know someone who is not receiving this newsletter who should, please feel free to share your copy, or to shoot us an email suggesting we add someone to our mailing list!

**LOOK FOR OUR NEXT NEWSLETTER IN
SPRING 2018!**