



GEOSCIENCES



MSU GEOSCIENCE NEWSLETTER FALL 2018

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. Our first student recipient of the Bob and Kathy Mau Undergraduate Student Research Grant, Jesse Dalle, used her support for her senior research project, which was spent in Wisconsin over the summer. We were joined on this trip by Chris Dahl - a new major, and Ana Swor – a previous graduate with experience working in these rocks. The extra sets of hands and eyes was greatly helpful in locating new material, and in helping to sweep outcrops in preparation for data collection – go team Cambrian!



Jesse Dalle using a molding gauge to 'collect' ripples on a 500 million year old sandstone surface. The molding gauge produced a facsimile of a few ripples and this was traced onto roll paper and repeated until an entire exposed surface was replicated in cross section on paper.

Victor Abonyi defended his Senior Research project this semester in Senior Seminar. Victor talked about his research with his faculty advisor examining recharge of the Minot Aquifer via the Souris River in several locations in and around Minot using both field- and lab-based data and measurement techniques. Great job Victor, and congratulations on the completion of your project!



Victor Abonyi in the field, measuring the water level in a piezometer that has been installed in the Souris River. Looks cold!

This coming Spring semester, we should have several students defending their Senior Research Projects – stay tuned next semester for seminar presentations of research projects by Jesse Dalle, Haley Hanna, and Calob Were (and potentially others!)

Geosciences Working on New Degree Program: Bachelor of Science in Geology! The Department has been working on a proposal for a new degree option in Geology – a Bachelor of Science degree with a major in Geology. This is something we have

thought about for some time, but recent interest shown by geology students has spurred the effort. In part, questions raised by students has demonstrated to us that there is demand for a BS program that we currently cannot meet, and so likely students we currently are not attracting. We have worked on designing a program that does not require development of new courses, something that would be difficult now that we are down to three faculty members.

The proposed BS program would utilize the same core of geology courses as used in the current BA program. The only addition is a requirement to take Introduction to GIS. The major differences between the BA and the proposed BS are: (1) the BS does not require a minor or concentrations, but (2) the BS would require more support science and math courses, including a full year of chemistry, a year of physics, and two semesters of calculus. It is possible that the program would be approved in time to appear in next year’s catalog. If not, we hope at least to have it approved by the end of spring semester.

– Dr. Webster

New CCS6 Designation for GEOL-300 Geological Field Methods. Because Field methods is an inherently collaborative course, we felt that this course should count toward the CCS6 GenEd requirement for collaboration. CCS6 focuses on collaboration; because all of the projects that are part of the Field Methods course are collaborative field efforts, this is definitely a GenEd requirements that we can fulfill in-house and allow our students greater flexibility in taking other courses that are of interest to them personally instead of having to take one of the limited offerings currently available that fulfill the CCS6 graduation requirement.

New Majors. We also have a great crop of new majors this semester! With all of the new majors in the department, we are now up to around 20 majors! If current trends continue, by next year we hopefully be around 25 majors – right about where we want to be!

Geosciences Receives Generous Donation.

Geosciences was the recipient of a generous anonymous donation in memory of DeWayne Martin, who was a longtime faculty member in Geosciences (then known as Earth Science). The donation was also partially matched by the donor's employer. In all, we have about \$12,500 to spend on a project that would honor Mr. Martin. We have two goals with the use of these funds: (1) that they provide the department with something or things that will last a long time, and (2) that they support teaching and learning in areas that were a passion for Mr. Martin. We have not yet made a final decision, but we are considering things that will improve our rock preparation lab equipment, or some new polarized-light petrographic microscopes – or perhaps some combination. We should have news on this in the spring, but for now we want to express our sincere gratitude for the generous gift.

–Dr. Webster

MSU Giving Day and the Division of Science.

Giving Day, on Wednesday, April 10, 2019, is Minot State University's second one-day fundraising event. The goal is to inspire people everywhere to come together, demonstrate their pride for MSU by making a gift of any size while providing essential resources for generations of MSU students.

In the past, the Division of Science' Giving Day priorities were to help fund instrumentation maintenance, repair, and replacement. It is likely that will remain a part of our priorities going forward, but it would be nice to seek funds for a Geosciences-specific competitive scholarship which will be given to one need-based, high-achieving incoming freshman declared major to help defray educational costs associated with the decision to attend college. Stay tuned for more on this in the Spring Newsletter. You can visit the Division of Science Instrumentation Page linked [HERE](#) for more information on what we are seeking funding to accomplish.

FACULTY NEWS AND HAPPENINGS

Dr. Joseph Collette



Dr. Collette (center) accompanying 'Team Cambrian' in the field in August 2018 somewhere in central Wisconsin. Present in this photo: Jesse Dalle (far right), Ana Swor (near right), and Chris Dahl (near left). If you're interested in doing a field-based project, Minot State Geosciences can make your project a reality, and chances are that your project could end up being published!

Update Fall 2018.—I try really hard to get as many students as possible out into the field to do their research projects and this past summer was no exception! Jesse Dalle, Chris Dahl, and Ana Swor accompanied me on a research trip to the Cambrian beaches of central Wisconsin funded in part by our new Mau Research grant (see photo above). 500 million years ago, Wisconsin was located close to the paleoequator and was a hub of activity related to animals making early attempts to go ashore for the first time in the history of life. Ana Swor conducted fieldwork in 'Cheeseconsin' in the same quarries in 2016 attempting to quantify the geometry of the nearshore environments because the geometry could have had a strong impact on selection pressures and may have 'preadapted' animals to move onto the shore. Ana was able to ascertain that the average dip of the beds in this region of Wisconsin today is approximately 0.27 degrees and that based on this slope, the intertidal zone would have been approximately 0.5km in width. Ana hypothesized further that the bed

orientation hasn't changed substantially from when these beds were deposited because of their position in the cratonic interior far away from orogenic events of the east and west coasts.

Jesse's project focuses on trying to test this second hypothesis by looking at an indicator of paleodepth that is not effected by tectonics – ripples. Ripple morphology is effected primarily by sediment grain size, and by wave energy. As wave energy drops off with depth, if the grain size is known, then depth can be estimated on rippled surfaces. By surveying large rippled surfaces, Jesse hopes to construct paleodepth surface maps and compute the slope based on these maps. She can then compare these ripple-based slope data to the geometry-based slope data Ana collected in order to determine whether tectonics did, or did not alter the bedding orientations of 500 million year old sandstones in these quarries. An interesting approach! Jesse is currently working on turning her dataset (several thousand ripple measurements) into paleodepth surface models. She should be presenting her work some time during Spring Semester 2019!

I'm STILL working on a study revising an unusual phyllocarid crustacean (think: cocktail shrimp, but with a bivalved carapace instead of a single valve covering the thorax). One of the things that is so odd about these crustaceans is the unusual ornament of the exoskeleton – it is ornamented with tiny triangular scales that cover the entire abdomen (see below). I've hypothesized previously that these scales could be useful if the animal burrowed by preventing back-slippage in the sediment and allow forward motion only, or that alternatively, they might somehow break up the turbulent boundary layer as these animals swam making swimming easier. I have just created a 3 dimensional model of the animal's abdomen and will be using this model, in several different sediment grain sizes, to test the amount of force necessary to move the model, thereby testing at least one of my previous hypotheses about the purpose of this unusual ornament.

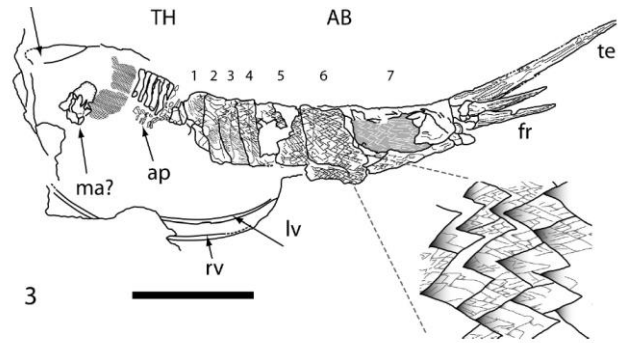


Figure 3.3 from Collette and Rudkin (2010) showing a camera lucida drawing of the unusual abdominal ornament of the phyllocarid *Ceratiocaris papilio*, ROM specimen number 58933.

If you want to read more about these unusual crustaceans, you can do a search on Google Scholar for: Collette, J.H. and Rudkin, D.M. 2010. Phyllocarid crustaceans from the Silurian Eramosa Lagerstatte (Ontario, Canada): Taxonomy and functional morphology. *Journal of Paleontology*, 84:118–127.

Dr. Kati Kilroy



Dr. Kilroy in the Galapagos Islands over Christmas Break 2017.

Dr. John Webster



John Webster (the one with the sore knees) and his son Ethan at the Confluence Overlook trailhead after finishing a backcountry hike in the northern part of the Needles District of Canyonlands National Park in May 2018.

Update Fall 2018.—I spent some of the summer reorganizing my office/lab and research collections. I did get a little heavy mineral processing done, but I took more time off in the summer than usual. That included a May trip to Utah and places in between with my son Ethan. We did a three-day backcountry hike in the northern part of the Needles section of Canyonlands National Park. My knees took a beating, but it was a great hike and a great trip.

During the fall semester, most of my time has been spent on teaching: Energy Resources, Methods in Mineralogy and Petrology, Seminar, and a Special Topics course in Advanced Environmental Geology, which was offered in place of Soils because of the departure of Nathan Hopkins. For Methods in Min-Pet I was able to get and keep the scanning electron

microscope functioning for the most part, but it seems to have died again late in the semester. I have also been busy with departmental business and some committee work. The group of faculty members I have been working with is nearly finished putting together a Stage II Request for a new degree program at MSU – Bachelor of Individualized Studies (a design-your-own-major program). We are hoping the request is approved by the State Board of Higher Education in time for inclusion in next year's catalog. I did make a little progress with research, but plan to ramp up things next semester, including work on heavy minerals in the South Heart Member of the Chadron Formation with April Whittaker.

ALUMNI NEWS AND HAPPENINGS

Chandler Jacob – '18



Chandler Jacob at work in the field with Materials Testing Services headquartered in Minot, ND. "The truck pounds the split spoon into the ground collecting a sample. I break it open and classify the sample."

"I work at Material Testing Services out of Minot. We provide numerous construction testing services. Specifically I work on a geotechnical drill rig. I am the logger on the drill rig. When structures, buildings, or bridges, large or small, are in the beginning stages of planning we are sent out to do soil borings that range in depth anywhere from 5-100 feet. I log and classify all of the soils. I also measure the N value of the soils (basically soil strength). I give my logs to our geotechnical engineer and he writes up a report on how to build the structures based on the type of materials that we ran into and the strength of the soil.

-Chandler Jacob

Justin Dauphinais – '01



Justin teaching a group of students about the importance of wild salmon conservation and watershed management during a fieldtrip for a non-profit he volunteers for called Salmon Watch. Way to go, Justin!

Justin works at ERM (Environmental Resources Management), in Portland, Oregon. Justin's environmental remediation and investigation project experience includes ports, harbors, bulk fueling facilities, active gasoline stations, industrial manufacturing facilities, metal processing facilities, wood mills, agricultural facilities, hydroelectric facilities, airports, active military installations, food manufacturing plants, and remote abandoned

properties. These projects have involved working with impacted soil, groundwater, sediment, storm water, surface water, and air. Justin's health safety and environment (HSE) experience includes developing site-specific health and safety (HASp) plans and delivering HSE related training. His HSE compliance auditing experience includes Tech R&D facilities, manufacturing and logistics facilities, environmental construction, field project and personnel audits, and other HSE compliance audits.

Justin also forwarded us the active job posting at ERM linked below! Thanks for the heads-up Justin!

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

Jesse Dalle – President
Eric Bollefer – Vice President
Calob Werre – Treasurer
April Whittaker – 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 geological workplace.

During the Fall 2018 Semester, **A.U.G.I.T.E.** worked on one project. The club participated in the 2018 Block Party in September. Members led several activities, including handing out geology-themed coloring pages to children. Great job everyone and many thanks for your hard work in this outreach!

SIGN UP FOR THE MSU GEOSCIENCES NEWSLETTER

MSU Geoscience Alums - KEEP IN TOUCH! We are continuing our efforts to keep in touch with our Geoscience alumni, and to enlarge and maintain our alum email contact list. If you know folks that have not received this newsletter who are MSU

Geoscience alums, please ask them to get in touch with us so that they can be added to the list at msugeosciences@gmail.com. Likewise, if you think your company would be interested in receiving this newsletter, or if your school would be interested in receiving this list, please let us know! Specifically, we're looking for emails for: Sara Blacklock, Bryan Brandiezs, David Collins, Cordell Dahl, Colleen Evans, Susan Feist, Heather Fogarty, Adam Graves, Cody Hodenfield, Ryan Hoff, Jean Hughes, Todd Jacobson, Roy Kight, Jennifer Larsen, Max Longtin, Jesse McLeod, Brett Mohr, Patrick Pitt, Kathleen Ronning-Schemetz, Brent Sande, Monica Stover, Lynnette Vachal, Colleen Warner, Tina Webb, Jordan Weidler, and Tim Whitlow.

We Are Always Seeking News Pieces and Short Features From Alumni! 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 writeup to msugeosciences@gmail.com and I will add it to the next newsletter scheduled for Spring 2019.

Would You Like to Give A Talk About What You Do In Your Geology-Related Job? If so, we would love for you to come in to MSU and let out current students know about it! 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! If you're interested please send an email to msugeosciences@gmail.com.

GEOSCIENCES Job and Internship Opportunities

Many thanks to Justin Dauphinais for sending us the following job opportunity in the beautiful Pacific Northwest! Thanks again, Justin!

These postings are VERY TIME SENSITIVE – meaning go apply NOW if you are interested!

ERM, the company Justin works for has a job opening currently in Portland, Oregon for an entry level Geologist/Environmental Scientist/Engineer. This would be an ideal job for a new or recent grad looking for a career in the geosciences and willing to move to a really awesome area with lots of stuff to do! You can find a description of the job posting and info on how to apply at www.erm.com under Portland Oregon.

**LOOK FOR OUR NEXT NEWSLETTER IN
SPRING 2019!**