



MONTANA GEOLOGICAL SOCIETY

NEWSLETTER

Vol 66 No. 11



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P2 / PRESIDENT'S LETTER

Our President begins his second term & discusses the election results and upcoming Happy Hour.



P4 / HAPPY HOUR & PRESENTATION

Check out the upcoming MGS presentation at a new venue!



P6 / SCHOLARSHIPS

Read the experiences of two student scholarship recipients after their time in the field.



P6 / OILIES

Don't miss out on this year's Oilies party, and make sure to note the change in location.

Upcoming Events:

Nov 15 - MGS Happy Hour, Billings (p. 4)

Dec 2 - Oilies Party (p. 8)

Contact Us:

mtgeo.org / montanageologicalsociety@gmail.com



Add our email address to your contacts so your Newsletters & Luncheon announcements don't end up in Spam!

PO Box 844
Billings, MT 59103

President's Letter

Greetings MGS members!

The election results are in and the membership (~50% of eligible members) has voted to confirm four officers and four board members for the 2022-2023 term. See the election results within the pages of this newsletter. Thank you to those who voted and to the members who have agreed to volunteer their time this year!

The October Happy Hour event at Tiny's Tavern in Billings drew a decent crowd of sixteen to hear Mitchell Lukens provide impressive isotopic chemical evidence for a warm-blooded physiology of Mosasaurs. In celebration of the abundance of life in the Cretaceous seaway, many of the attendees dined on Tiny's famous fish 'n' chips. See the photographic evidence later in the newsletter (don't worry it's G-rated).

This month's Happy Hour will explore a different venue, CJ's Bar & Grill, and we look forward to hosting Dr. Yann Gavillot of the MT Bureau of Mines and Geology to hear his presentation on neotectonics in western Montana. Bring a friend or colleague – all new members receive an MGS beer mug!

You may have already seen the announcement but mark your calendars for Friday December 2nd. The MGS, SPE, BGS and MAPL will once again come together to celebrate the season with great food and complimentary beer & wine at The Red Door in Billings. If you're in the area plan to take part in this great tradition!

Winter is here – stay warm and be safe out there!

Jim Suydam
Geologist & MGS President (2nd term)

2022-2023 MGS Officers

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Jim Suydam 406-259-4124

Vice President/Speaker Coordinator

Michael Hofmann 406-926-1000

2nd Vice President/Treasurer

Brianna Berg 405-921-6649

Secretary

Jacob Thacker

Past President

Spenser Kuhn 406-696-0268

Are you a consultant seeking work?

One of the many perks of MGS membership is inclusion
in the MGS Consultant Directory.

If you'd like to be listed, or edit an existing listing, please contact
montanageologicalsociety@gmail.com
for an application form.

Who's Who of the MGS

BOARD OF DIRECTORS

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Sarah Friedman
Debra Hanneman
P. Ted Doughty

AAPG-ROCKY MOUNTAIN SECTION

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Alternate: Michael Hofmann
Foundation: Rob Diedrich 303-830-5875

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Gary Hughes 861-2072

University Liaison:
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Duncan McBane 252-3170

Montana Oil & Gas Fields Update:
Jim Halvorson 656-0040

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Doretta Brush 259-8790

CHAIRPERSON OF MEDIA & OUTREACH

Jessica Renstrom 208-2504

*How did the
geologist get down
the mountain?*

'e rode

*Have something geological to sell,
give, or find?*

Place a free ad in our MGS Classifieds!

Contact the Newsletter Editor for more information.



Join us for
MGS Happy Hour



When? Tuesday, Nov 15th 5:00PM – 8:00PM (talk starts at 6:30PM)

Where? CJ's Bar & Grill in Billings (2455 Central Ave.)

What? Drinks, Presentation, Dinner

RSVP to montanageologicalsociety@gmail.com by latest Monday November 14th

SPEAKER: DR. YANN GAVILLOT

ASSOC. PROF. – RESEARCH GEOLOGIST, MONTANA BUREAU OF MINES AND GEOLOGY,

MONTANA TECHNOLOGICAL UNIVERSITY, BUTTE, MONTANA

Yann Gavillot recently joined the Montana Bureau of Mines and Geology leading the Geohazards Program working on various projects on active faults, earthquake geology, seismic hazards assessments, landslides, LiDAR, geological mapping, and Quaternary dating. He came in as a Postdoc from Oregon State University working on seismic hazards studies with the USGS in Northern California. He earned a Ph.D. in Geology from Oregon State University focusing on the neotectonics of the Kashmir Himalaya; a M.S. in Geology from the University of California Los Angeles focusing on the tectonics of the Zagros fold-thrust belt; and a B.S. in Geosciences from the University of Arizona with an emphasis on the structural geology. He worked as a geologist for the United Nations with UNESCO in Paris.



The Bitterroot Fault, Western Montana:

Recent work and results on active faulting, geological mapping, Quaternary dating, Pleistocene glaciation, and paleo-earthquakes for the Bitterroot-Missoula valleys.

The Bitterroot fault is a 100-km-long active normal fault that bounds the eastern margin of the north-south trending Bitterroot Mountains and accommodates extension within the Intermountain Seismic Belt. New detailed mapping using LiDAR along the southern Bitterroot Range documents multiple generations of fault scarps in Holocene-Pleistocene deposits with vertical offsets that increase in magnitude with age. Fault mapping indicates a complex fault geometry characterized by an *en echelon* pattern of discontinuous segments of 45–70° east-dipping normal faults that appear to cut the older Eocene detachment fault, and locally 70–80° west-dipping antithetic normal faults. ¹⁰Be cosmogenic radionuclides surface exposure dating technique provides age control for >32 boulders sampled in glacial deposits. Near Como Dam, a dated 16–17 ka Pinedale moraine offset by the Bitterroot fault scarp with a vertical separation of 3.5 m, yields a fault slip

rate of 0.2–0.3 mm/yr. Glacial Lake Missoula shorelines inset into a dated ~15 ka Pinedale moraine and vertically offset 4.6 m by an antithetic strand of the Bitterroot fault, yield fault slip rates of 0.2–0.4 mm/yr. In the Ward Creek Fan located ~15 km to the north of Como Dam, two dated ~17 ka and 63–70 ka fan surfaces offset by the Bitterroot fault with vertical separations of 2.4 m and 4.5 m, yield fault slip rates of 0.1–0.2 mm/yr and 0.1 mm/yr, respectively. Our results indicate broadly consistent fault slip rates with an along-strike preferred average of 0.2–0.3 mm/yr for the southern Bitterroot fault. Fault scaling relations, structural model constraints and our slip rate results indicate both a seismogenic low angle and high angle fault geometry are possible at depth, which could generate a $M_w \sim 7.2$ earthquake or larger. We speculate the Bitterroot fault is likely characterized by millennia-timescale earthquake recurrence interval. Forthcoming paleoseismic trench results on the Bitterroot fault will aim to develop a Holocene-Pleistocene paleoearthquake chronology. Data from this study suggest seismic hazards from the Bitterroot fault potentially pose a significant risk to the rapidly growing Missoula metropolitan area, and major infrastructures across the Missoula-Bitterroot valleys.

A Look Back at: *October's Happy Hour in Billings*



Don't forget to...

Renew your MGS Membership!

*Use our convenient online renewal system at mtgeo.org,
or print & complete the renewal form at the back of the Newsletter!*



Scholarship Recipients

The MGS is proud to have granted scholarships to two students this past year to attend an Advanced Paleontology course through MSU-Billings and Elevation Science Institute. Below are excerpts from both students detailing their experiences.

Casimir Szupica

My opportunity in Montana this summer was one of the most fun and interesting experiences I have ever had. I learned so much that I would not have been able to learn otherwise. It was my first time I went to Montana, and I was blown away by the natural beauty of the state, even just flying over the state towards Billings. The geologic aspects of the state were apparent from the bird's eye view I had in the plane, and when I finally entered Billings, I was struck away by the rocks of the Eagle Sandstone that rimmed the city. In my class, I learned about the formations of the Bighorn Basin, and their scientific and economic value. Learning about the rocks was one thing, but being able to see them in person, with their distinctive layering and coloring, seen in person and across the basin was amazing. The first time I saw a dinosaur fossil in the ground was also one of the coolest things I have ever had the privilege of experiencing. When we did a hike for the mock BLM report for a class project, I was blown away by the wide variety of flora and fauna growing in such a seemingly desolate place, and I loved seeing the wide variety in rock type as well. I hope to return to Montana again soon sometime, and I want to express my gratitude to the Montana Geological Society for their support.

Maggie Williams

This summer I had the opportunity to take the Field Paleontology course offered by MSU- Billings in collaboration with Elevation Science Institute. Field paleontology was the last course I took for my undergraduate degree in geology. I have always been interested in understanding how paleontologists conduct fieldwork and then use what they find to piece together important parts of history. By taking this course I learned more than I ever expected. The use of classes and field instruction made the material easy to understand across many academic disciplines. During my time in Montana, I was immersed in a new environment but felt comfortable and confident that I was learning skills that would apply to my future.

Elevation Science Institute is an incredible group of people who have built a unique, welcoming environment to learn about something that captivates so many of us.





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OILIES CHRISTMAS PARTY

In the spirit of the season and our tradition,
let us gather together for good cheer and friendly festivities

The Red Door Lounge
(East Side Banquet Room)

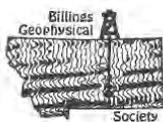
3875 Grand Ave., Billings, Montana

Friday December 2nd, 2022

5:30pm - 9pm

Great food
Complimentary beer and selected wines

Organized by our professional associations and societies - land, geology, engineering and geophysics



Application form for Montana Geological Society K-12 Earth Science Teacher of the Year Award

*What better way to promote earth science in the state of Montana
than to recognize and reward those who do it every day?*

The MGS applauds the hard work of outstanding **K-12 Earth Science Teachers** in Montana. Each year Teacher of the Year (TOTY) applications are reviewed and the most deserving candidate is selected by the MGS Awards Committee to receive \$1000. The MGS winner is then eligible to apply for the regional Teacher of the Year Award (an additional \$2000) through the Rocky Mountain Section of the American Association of Petroleum Geologists (RMS-AAPG). The winner of the RMS-AAPG award becomes the RMS-AAPG nominee for the national American Association of Petroleum Geologists award, which is \$6000 (\$3000 for the teacher and \$3000 for their school). That's the potential for \$9000 in cash awards!

If you teach and promote Earth Science in your classroom or in the outdoors, the MGS encourages you to apply for the TOTY Award. The following completed application form and letter of support is all you need. The 2023 Application Deadline is February 28, 2023.

Qualifications for Nomination

- Teaching must be at a Montana accredited school, any level from K-12.
- Minimum 3 years teaching experience.
- Teaching at least one unit per year on natural resources, defined as:
 - 1) Organic materials such as petroleum, natural gas, and coal,
 - 2) Inorganic substances such as mineral ores, building stone and aggregates,
 - 3) Energy resources from the earth such as geothermal energy.
- Teaching should relate to the scientific study of natural resources, and may include their origin, extraction, historic use, and present use.
- Teaching should also include the use of earth science for decision making related to the preservation of the environment, reclamation, and conservation of resources.

Teacher Contact Information

Name of Teacher	
School	
School Address	
City, ST Zip Code	
Home Phone/Work Phone	
E-Mail Address	

Additional Teacher Information

Current Position	
Grades Taught	
Number of Years Teaching	
Degree(s) Earned	

Applicant's Statement

Please attach a short, succinct statement (no more than 500 words) describing your qualifications. In the statement, please discuss, with regard to the natural resources unit, your:

- Teaching philosophy
- Methods
- Course content
- Creative or innovative projects
- Ability to balance economic, societal, and environmental issues
- Objectivity
- Class size(s)

Letter of Support

Include one letter of support from an administrator, fellow teacher, or other person/organization familiar with your teaching philosophy and style. The letter should describe the applicant's qualifications as "Teacher of the Year" in Earth Sciences. We are particularly interested in what the applicant does to promote geologic education and increase student interest in geology. The statement should include the applicant's name, be signed by the letter's author, and should be returned with the rest of this application form.

Name of Letter of Support Author	
Phone Number	
Email address	
Relationship to Nominee	

MGS can accept applications in any standard format by email to: montanageologicalsociety@gmail.com or by regular mail to:

MGS
P. O. Box 844
Billings, MT 59103

2023 Deadline: Nominations must be RECEIVED by midnight, February 28, 2023.

MGS expects an award to be made by March 15, 2023.



Montana Geological Society 2022-2023 Annual Research Scholarships

Purpose

The Montana Geological Society (MGS) is a non-profit organization created in 1949 "...to promote interest and research in geology and allied sciences and their practical application, and to encourage fellowship and cooperation among the members." This annual award supports these goals by providing financial assistance for up to two student dissertation, thesis, or senior projects involving Montana geology and by providing a venue for students to present their work to geology professionals in Montana.

Award

Up to two scholarships, one for **\$2,000**, and one for **\$1,000**, may be awarded each year to the most qualified applicants. The successful applicants agree to present their research results at a luncheon meeting of the MGS in Billings, MT, and will receive reimbursement for travel expenses to and from Billings in addition to the scholarship amount.

Basis of Award

All projects will be reviewed by a committee composed of Officers and Board Members of the MGS. The award will be made based on project merit, difficulty, and innovation appropriate for the applicant's educational level. Projects in the early to middle stages of research will receive preferential consideration over those at or near completion. The awards will only be made to fully qualified and deserving applicants, if any, as determined by the committee.

Eligibility

Scholarships are available only to full-time students working toward a BA, BS, MS, or Ph. D degree in an accredited geology or earth science program at a Montana college or university. The research area must be based at least partially in the state of Montana.

Application Packet

Applicants must submit **1.)** a **brief** cover letter that summarizes the applicant's educational background, current student status (B.S., M.S., Ph. D), anticipated graduation date, and research interests. Include name, mailing address, email address, and phone number, **2.)** a **short** (300 words or less), **concise** summary of their approved or proposed project that includes study area, purpose, and applicability of research to Montana geology, along with an advisor's signature, **3.)** a work flow timeline, and **4.)** an estimated itemized annual budget which specifies how the funds from this award will be used. The budget must include the amount and source of all other project funding.

Deadlines

Applications can be emailed (preferred) or mailed. Emailed applications (as attached file(s) in any standard format) must be sent to montanageologicalsociety@gmail.com no later than 11:59 p.m., **February 28th**. Mailed applications must be post marked no later than **March 1st**, and should be addressed to: Montana Geological Society, PO Box 844, Billings, MT 59103. Awards will be announced and payment made in the form of a check to the successful applicant no later than **April 15th**.

MONTANA GEOLOGICAL SOCIETY

P.O. Box 844

Billings, MT 59103

Membership Renewal

Last Name _____

First Name _____ Middle Initial _____

ANNUAL DUES:

_____ \$20.00 Regular

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AAPG Member (please circle) YES NO

Education (School, Degree, Year)

Degree #1 _____

Degree #2 _____

Degree #3 _____

MONTANA GEOLOGICAL SOCIETY

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2006 AAPG Datapages - MGS Publications DVD		\$180.00	
2006 AAPG Datapages - MGS Publications DVD (MGS Member price)		\$150.00	
2000 50th Anniversary Symposium		\$20.00	
1999 Thrust Systems of the Helena Salient		\$20.00	
1998 8th Int'l Williston Basin Symposium		\$20.00	
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1997 Big Horn Basin Symposium		\$20.00	
1997 MGS-TRGS: The Edge of the Craziess		\$20.00	
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1996 AAPG - Rocky Mtn. Section Meeting / Abstract Volume		\$10.00	
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1991 6th International Williston Basin Symposium		\$20.00	
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1991 AAPG - RMS Field Trip: Eagle Sandstone, Billings		\$7.50	
1991 RMS Field Trip #1 Nye-Bowler Linemont		\$7.50	
1991 Sequence Stratigraphy of Eagle Sandstone		\$7.50	
1990 Bakken Workshop Short Course Study Notes #1		\$10.00	
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1985 Montana Oil & Gas Fields		\$20.00	
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1969 Economic Geology of Montana		\$20.00	
Shipping and Handling charges - \$5.00 per CD/DVD \$8.00 per book			
Total Due			

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