Greetings from the President

Derek Turner,
Section President,
Douglas College

Happy New Year everyone! To those of you teaching, I hope your courses are settling in as smoothly as can be expected in these disruptive times. We have had a wild Fall and Winter so far here in British Columbia, with dramatic weather events, mass wasting and flooding. The bright side has been the teaching moments this has created, with daily events being in the news to explore in the classroom. I was teaching an Environmental Geology course last semester and it was incredible to be discussing the hazard and risk of dike failures or debris flows one week and to see it play out in real time the following week. Just another reminder of how important geoscience education is for our students and for society.

Included in this newsletter are some more details for our June 2022 meeting in Pendleton, Oregon. Philip Schmitz originally proposed hosting the meeting back in 2019 for June 2020, so I’m sure many of you have been looking forward to it for almost three years! These conferences have long been excellent opportunities to connect and share with friends and colleagues from across the section, and for new members to get to know other educators.
and geoscientists from across the Pacific Northwest.

As great as the annual meeting is, our section is also here to support other events, such as seminars, workshops, field trips, etc. If you have any ideas that you would like to share and promote, please feel free to email me or another section officer.

See you in June!

2022 NAGT Pacific Northwest Section Conference!

Blue Mountain Community College, Pendleton
Oregon (contact Philip Schmitz, pschmitz@bluecc.edu)
June 20-22

Monday, June 20th – Meeting Day. Meetings and Presentations will be held in person at Blue Mountain Community College but will also be made available for remote viewing using ZOOM.

Tuesday, June 21st - Field Trip - Tower Mountain Caldera Complex. The field trip will head south of Pendleton over the Blue Mountain anticline to the Tower Mountain volcano complex. The caldera forming eruption 32 Ma, produced ring fractures from which domes of rhyolite and dacite emerged which can be viewed from the road. After lunch, the trip will stop at andesite and rhyolite flows associated with Tower Mountain, and as we return back to Pendleton, we will stop at Permian Aged Elkhorn Ridge Argillite.

Wednesday, June 22nd – Morning Field trip – Columbia River Basalts. The field trip will head west where the Umatilla River canyon cuts through the Reith Anticline, exposing the Grande Ronde and Wanapum Basalt.

Afternoon Field Trip – Mountain Home Metamorphic Complex. The Mountain Home Metamorphic Complex consists of variably metamorphosed Mesozoic and Paleozoic igneous and sedimentary rocks that are exposed in areas along the crest of the Blue Mountain anticline. Road damage from flooding in 2020 has restricted access to outcrops in this area, so the field trip will be limited.

Elkhorn Ridge argillite (Tuesday field trip).
Abstract Deadline - May 1, 2022. If you would like to present a talk (15-20 minutes) or poster (teaching techniques, geology research, undergraduate research, etc.) submit your abstract to Philip Schmitz at pschmitz@bluecc.edu. Please include “NAGT Conference Abstract” in the subject heading of your email. Make sure that your abstract includes:

- Whether an oral presentation or poster is being submitted
- Title
- Author(s) name, affiliation, and contact email addresses
- Abstract length: maximum 1 full page (8.5” x 11”) in Times New Roman, 12-point font. You may include legible line diagrams, graphs or tables. Must maintain at least 1.0” margin on all four sides. NAGT Pacific Northwest Section Page 4

- Deadline — May 1, 2022, Due to the limited amount of time during conference day, acceptance for oral presentation will be based on first submitted, first granted basis. If time slots for oral presentations fill before the deadline date, you’ll be contacted in regards to a poster option.

Celebrate and Save these Rare Massachusetts Rocks!

by Prof. Richard D. Little, Prof. Emeritus
Greenfield (MA) Community College

It was 50 years ago that, as a new instructor at Greenfield (MA) Community College (GCC), I found lithified armored mud balls in the Mesozoic Era rocks of the Connecticut River Valley of Massachusetts. They were prominently exposed in quarried blocks, part of a dismantled suspension bridge cable anchor at the edge of the Connecticut River at Unity Park, Turners Falls, MA.

Armored mud balls form as hard mud chunks fall into a stream, become tumbled, round, and have sand and pebbles stick into the exterior of the mud ball (the armor). They must be quickly buried before they disintegrate. Next, add some geologic time for lithification (solidification to rock) of the armored mud balls, along with the surrounding sediment layers.

After several years of bringing many students and others to study and admire the Turners Falls armored mud balls, I researched the literature and discovered that lithified armored
mud balls are extremely rare and that no one had documented them from the sedimentary rocks of our region. I wrote a paper describing them in the Journal of Geology* and also was able to get permission and assistance to have many of the bridge cable anchor stones moved to GCC to preserve them. They became the core attraction of a new Rock Park, now relocated to the Geology Path (picture below)** part of the GCC Outdoor Learning Lab. The Geology Path has, by far, the world’s best examples of lithified armored mud balls.

Occasionally, people have seen and documented contemporary armored mud balls, but the discovery of lithified armored mud balls is very rare.*** The Massachusetts examples are not only rare, but unique in several ways. They have a great range of sizes from less than an inch to over a foot in diameter plus their armor coating is, in most cases, very distinct and colorful. Also, they are found in two different geological formations: the upper Triassic age Sugarloaf Arkose (Greenfield and Deerfield, MA) and the lower Jurassic age Turners Falls Sandstone (Turners Falls and Gill, MA). In between these two sedimentary formations is the 201,000,000 year old (early Jurassic Period, Mesozoic Era) Deerfield Basalt lava flow. Thanks to radiometric dating of the basalt, the armored mud balls are accurately dated in geological time. They are found in sedimentary layers both below and above the lava and indicate several hundred thousand years of armored mud ball formation episodes preserved in a tropical Mesozoic Era rift valley as the supercontinent of Pangea was splitting. Today, they are in a very localized area -- adjacent parts of four towns in Franklin County, MA, along the Connecticut River. Only about 40 specimens have been found, both in situ and in quarried blocks from two local quarries.

If not appreciated the rare lithified armored mud balls of Franklin County are at risk of being forgotten. To bring attention to and “save” these rare features, I have embarked on a project to have them celebrated as an official State “symbol” -- the Massachusetts State “Sedimentary Structure.” (Note: like ripple marks, raindrop impression, and dinosaur footprints, armored mud balls are part of the geological category “sedimentary structures”.) There are over 50 symbols of Massachusetts celebrating bean, bird, donut, dinosaur, pie, horse, mineral, rock, gem, and many others, but the lithified armored mud balls are truly unique, not only for Massachusetts, but in the world. They deserve to be officially recognized.
The story of the Massachusetts armored mud balls plus references and pictures of many other contemporary (unlithified) and lithified armored mud balls is presented on this web site.  https://armoredmudballs.rocks.

I am leading the effort to preserve, protect, and celebrate the Massachusetts lithified armored mud balls and have dozens of geologists plus three State Representatives ****supporting this effort. I work for free but am soliciting help with publicity and funding needed for promotion. There is a “Go Fund Me” link on the above web site.

The next time a bill can be presented to the State Legislature is January 2023, so 2022 is the year for extensive support to be gathered. If you care about science, education, or preserving history please consider adding your name to the petition on the above web site, and/or just send me a note and a comment that might be included in promotional materials. You do not need to be from Massachusetts to add your voice. Effective publicity and education is needed for the citizens of Massachusetts to appreciate this geological heritage and the State of Massachusetts needs to be recognized for having these rare sedimentary structures.

Everyone who sees the armored mud balls is impressed by these intriguing and photogenic sedimentary structures that record such interesting ephemeral events along these ancient dinosaur-age streams. They are a fun and effective way to promote Earth science education!

In conclusion: These ancient lithified armored mud balls are the best in the world and very likely the only ones in the world able to be easily seen and studied. Besides the beautiful scenery that Western Massachusetts offers, these unique features will likely become a favored and fun tourist destination. They preserve not “rock and roll” but “roll and rock”!

Note to all Massachusetts’ and other Earth Science Teachers: please add the topic of armored mud balls as part of your Sedimentary Rocks studies. Text books do not include them. Please forward this letter to other individuals or groups. That would be helpful and appreciated. Thank you, in advance, for your suggestions, comments, and support. If you reply to my email address, I will update you about the progress of this effort.

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https://EarthView.rocks
https://armoredmudballs.rocks

References

Other descriptions and locations are in Little, R.D., 2020, Exploring Franklin County (MA), Earth View LLC, Easthampton MA, 200 p.
and on the https://ArmoredMudBalls.rocks web site.

**The GCC Geology Path Guide is online – https://www.gcc.mass.edu/webdocs/science/geo-path.pdf

Also see Prof. Little’s 8 minute video tour -- https://youtu.be/_qynmJ5P6c

FROM 2YC!

by Karen Layou
Reynolds Community College

1) **First Fridays Geo2YC NAGT webinars:** You may be familiar with the NAGT webinar series, and during spring 2022, the Geo2YC Division is going to be sponsoring webinars with 2YC-relevant content for webinars held on the first Friday of the month. Join us on February 4 for “Building Your Geoscience Community Through NAGT” to learn more about NAGT and how you can best maximize the benefits of your membership. Please register by Wednesday, February 2.

2) **Geo2YC Faculty Development Grants:** Our division is here to support your work with mini grants up to $500 to support fieldtrips, workshops, or other activities that benefit multiple faculty, or travel grants up to $100 for an individual to attend a professional development activity. Apply now to meet the April 15 application deadline.

3) **Submit your ideas to the Geo2YC newsletter:** Your participation is always welcome in *Foundations*, our Geo2YC newsletter—here is the latest issue. Feel free to submit your own articles, ideas for articles, and definitely Geo2YC yellow pencil photos using our handy submission form. Submissions are due by March 1 for the next issue.

4) **Outstanding Adjunct Faculty Award:** If you are an adjunct doing great work in your classes, or if you have a 2yc adjunct colleague you would like to recognize, please submit a nomination so we can potentially recognize your efforts.

Please feel free to contact me (klayou@reynolds.edu) if you have any questions about Geo2YC Division activities,

**News From Washington**

by Andy Buddington
Spokane Community College

The Washington Geological Survey has updated & expanded their website (https://www.dnr.wa.gov/geology), and wow do they have a lot of great stuff to offer! The geologic history of specific regions (including high quality maps and diagrams), tips on geotourism, a blog page, Washington State geology news, lidar and a lidar portal, photographs, and so much more! If you haven’t looked at the WGS site lately, you really should!

The WA100 page is a virtual guide to a wide variety of geologic “wonders” from all around the state (https://www.dnr.wa.gov/wa100). Have you ever visited Gardner Cave or the Ginkgo Petrified Forest? Easily accessible downloadable images and maps for presentations; this is a great resource for faculty and students. Check out WA100!

Interactive map of Puget Sound with Lidar imagery of specific glacial features, Washington Geological Survey.


Also be sure to check out the WGS News site and the recent (Jan. 26) article “Remembering the last Cascadia earthquake with new tsunami evacuation maps” at (https://washingtonstategeology.wordpress.com/). This is a great article highlighting the 1700 event and provides new “walk time”, evacuation maps for areas around Puget Sound and the Olympic Peninsula.


**News From Oregon**  
by Hal Wershow  
*Central Oregon Community College*

Faculty at Central Oregon Community College are participating in the **World-Wide Climate & Justice Teach In** on Wednesday March 30th.

If you are interested in hosting this event at your institution, check out the easy-to-implement model: https://gps.bard.edu/world-wide-teach-in/how-to#highered.

**NEW Ice Age Floodscapes!**  
by Bruce Bjornstad

The scale of destruction by repeated, cataclysmic Ice Age megafloods in the Pacific Northwest is far beyond any event of modern times. The evidence is clearly written across the multiple scarred landscapes of the region. However, the enormity of these events is often hidden if only examined at close range. Thus, aerial surveys often provide the best perspectives for studying megaflood events and the features they left behind. Thanks to recent advances in remote-controlled drone technology, we now have a useful and relatively inexpensive new tool in which to comprehend and appreciate the incredible power and magnitude of these earth-changing events.

"The region is unique: let the observer take the wings of the morning to the uttermost parts of earth: he will nowhere find it's likeness."

*J Harlen Bretz (1928)*

- **Primordial Potholes Coulee:**  
  https://www.youtube.com/watch?v=9NuIk0gZMzk

This event will draw faculty and students from all disciplines to engage on how climate change intersects with their disciplines, studies and lives. The model is simple; get as many faculty from your institution as possible to sit on a panel and give a 5 minute perspective on how climate change is relevant in their discipline. Then, open it up for a student-moderated discussion amongst panelists and the audience. The goal is to have a conversation about just climate solutions. This model three-hour teach-in is designed to maximize student engagement by maximizing faculty involvement.

Potholes Coulee
• White Bluffs Geology:
  https://www.youtube.com/watch?v=JpFxDXWudg&t=6s

![White Bluffs & Saddle Mountains anticline](image)

This brand-new, hard-cover book was released in March 2021. The 180-page coffee-table-style book features ~300 mostly color photos, maps and illustrations as well as captions to describe dozens of the most spectacular and significant megaflood features from, not only cataclysmic outbursts from Glacial Lake Missoula, but also Glacial Lake Columbia and Lake Bonneville. Published by Springer Nature.

**OEST AWARD!**

The deadline for nominations for the Outstanding Earth Science Teacher (OEST) award is March 31st. The OEST awards are given for "exceptional contributions to the stimulation of interest in the Earth Sciences at the pre-college level." Any teacher or other K-12 educator who covers a significant amount of earth science content with their students is eligible. Ten awards are given out annually, with one from the Pacific Northwest section. Individuals may apply themselves or nominate a colleague for the award.

You can submit a nomination for our section’s award using this link: [https://nagt.org/nagt/awards/oest_nomination_pacific_northwest.html](https://nagt.org/nagt/awards/oest_nomination_pacific_northwest.html).

Please contact our **OEST Coordinator Jodie Harnden** for more information ([Jodie.Harnden@pendleton.k12.or.us](mailto:Jodie.Harnden@pendleton.k12.or.us)).
From the Field

Haleakala summit valley & cinder cones from Sliding Sands trail, Maui (photo, Andy Buddington).

Ptygmatic folds in Vishnu Schist boulder, Trail of Time, Grand Canyon (photo, Greg Cripe)