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ASSOCIATION OF ENVIRONMENTAL &
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The Official

AEG OREGON CHAPTER NEWSLETTER

http://www.aegoregon.org

Meeting Details:
Date: Tuesday, February 20th, 2024 7:00 pm Hybrid

RSVP
In-Person $25 Cash or check.
Cards please use link above.

Old Market Pub
6959 SW Multnomah Blvd.

Agenda:
5:30- 6:30 pm social
6:30-7:00 pm dinner
7:00 pm presentation

UPCOMING MEETINGS:

March 5, 2024-- Jahns Distinguished Lecturer Cynthia Palomares
April 16, 2024--AEG President Sarah Kalika
May 2024--Student Poster Night

The Role of Trees in Progressive Rock Failure

Jill A. Marshall, Portland State University

In thin-soiled settings, we presume that trees play a significant role in converting rock into mobile sediment via physical weathering, with most models centered on tree throw. However, little is known regarding how - or how often - trees damage rock. Combining novel force sensors at the tree-rock boundary with precipitation, solar radiation, wind, tree sway, and acoustic emission data, I have begun to quantify tree-driven rock damage mechanisms. Charismatic tree throw may matter less than belowground damage. Results suggest that while wind forces matter, conifers bang repeatedly on rock while bendy deciduous trees can dampen wind loads significantly. Field data and physical modeling shows that even daily root water uptake can generate significant cracking. Finally, I will posit (speculate wildly) that current soil production functions should be recast to consider a 'Middle Earth' production function, one that combines disturbance agents like trees and water from above with non-steady fracture mechanics from below. This recasting might unify conflicting soil production functions (humped vs. exponential) and provide a framework for a more general theory of how bedrock vs. soil-mantled landscapes emerge and persist under steady state conditions – as well as provide insight as to the why and when rock cracks and fails under subcritical cracking conditions.

Geologists have a saying - rocks remember.

Neal Armstrong

Dr. Marshall is a geomorphologist and Critical Zone scientist. The Critical Zone is the life-sustaining, constantly evolving, surface and near-surface earth region extending from the top of the vegetative canopy where it intersects with the atmosphere to the subsurface limit of groundwater. Her research delves deeply into the role of biota, climate and lithology (or more specifically rock properties) in determining the rates and styles of surface processes through time. Broadly, her current work centers on two overlapping themes: 1) how variations in rock properties and climate- mediated changes in processes (such as bedrock weathering via trees vs. frost) control the rates and style of landscape evolution starting with progressive rock failure, and 2) dis-entangling the legacy of Pleistocene glacial intervals in regions that remained unglaciated during cold intervals. She has a particular interest in how past processes shape modern sub-surface architecture (e.g. fracturing and porosity) of the Critical Zone as the physical architecture supports diverse functions such as hydrologic routing, net primary productivity, carbon and water storage, and mineral supplies for the geochemical reactor. She has recently started working in the Arctic – where the trees are short but the opportunity to study frosty vs. more temperate processes in a warming world is dishearteningly outstanding.

Before returning to school for her PhD, Dr. Marshall worked for several decades on applied problems in water quality, with a focus on watershed and stream studies, and restoration design. As a stream specialist for the State of California, she pioneered the development of stream protection policies, developed stream monitoring and restoration trainings for both urban and rural communities, led studies on mercury transport in rivers, designed effective mercury containment projects at an abandoned mercury mine and developed water quality standards to protect fish-eating birds and humans from ill health effects due to eating mercury- contaminated fish. She is looking forward to (re) learning more about the wonderful Oregon landscapes and continuing her recent work meshing findings from experimental rock physics on crack propagation with improving predictions on near-surface properties and bedrock to sediment production via the trajectory of fracturing, porosity, and permeability attributes through time.

Message from the Chapter Chair

Happy February Oregon Chapter Members,

I want to start out this month's newsletter with a big thank you to all of you for your resiliency during the winter weather that wreaked havoc in our region for a few days at mid-month. We were anxiously paying close attention to weather forecasts, trying to decipher whether it would create unsafe conditions for a drive over the river and through the woods to the Old Market Pub. Turns out we made the correct decision to delay our annual joint meeting with ASCE. I also want to send out a huge thank you to our speakers, Eric Paslack, James Walters, and Tom Braibish. Not only were they willing to pivot to a later date at the last minute, but they also permitted us to record their presentation so that folks that couldn't attend the original date would be able to view it later. Thank you gentlemen! If you, like myself, were unable to attend the January meeting, you can view a recording of their presentation here:

https://drive.google.com/file/d/1jIDw96TAD6lOgXfKqbBRqRGD9c8qWLvU/view?usp=sharing

We hope that you'll join us on February 20th, as we are excited to hear from Dr. Jill Marshall, Assistant Professor of Geology at Portland State University, on the Role of Trees in Progressive Rock Failure. Her talk promises to increase your depth of knowledge on rock/tree mechanics. I can personally attest to the role trees play in dislodging rocks from steep slopes during a wind storm, and look forward to learning more about the process.

In March we will host the Jahns Distinguished Lecturer, Cynthia Palomares, who will give two talks: 1) Diversity, Equity and Inclusion in the Geosciences: What Can We Do?, and 2) How Climate Change Impacts Infrastructure. Between now and then, I hope your February is off to a great start!

Ryan Cole
AEG Oregon Chapter Chair 2023-2024

Geologists are never at a loss for paperweights.

Bill Bryson

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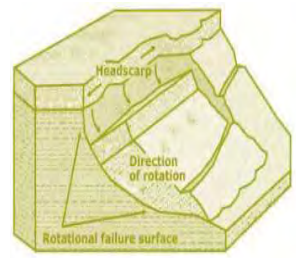
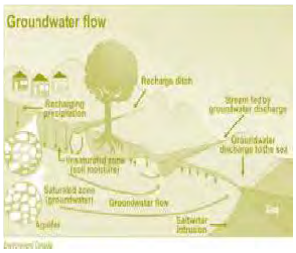
Bill Bryson





We learn geology the morning after the earthquake.

Ralph Waldo Emerson

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The AEG Oregon Chapter Newsletter

The Association of Engineering Geologists (AEG) contributes to its members' professional success and the public welfare by providing leadership, advocacy, and applied research in environmental and engineering geology. AEG's values are based on the belief that its members have a responsibility to assume stewardship over their fields of expertise. AEG is the acknowledged international leader in environmental and engineering geology, and is greatly respected for its stewardship of the profession.

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