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<https://fourcornersgeologicalsociety.org>



NOVEMBER 2021 NEWSLETTER

FOUR CORNERS GEOLOGICAL SOCIETY

NOVEMBER MEETING

SPEAKER:

Dr. Joel Pederson, Utah State University

TITLE:

The Lateral Retreat and Quaternary Evolution of the Book Cliffs, Central Utah

DATE:

Thursday, November 18th

**TIME &
LOCATION**

5:30 pm Social, Drinks and Lots of Various Small Plates!
Appetizers/Happy Hour will be at the Wall of Time Atrium in the Sitter Family Hall Bldg, Fort Lewis College
6:30 pm - 7:30 pm. Move to Room 710 for Speaker, followed by raffle
ZOOM meeting will start at 6:30 pm.

ZOOM LINK: [Click Here for Zoom Meeting Link or https://fortlewis.zoom.us/j/96903387041](https://fortlewis.zoom.us/j/96903387041)

COVID:

Meeting is at FLC: Per Fort Lewis Policy, **VACCINATION IS REQUIRED TO ATTEND IN PERSON.** If you are not vaccinated, please use the Zoom option.

COST:

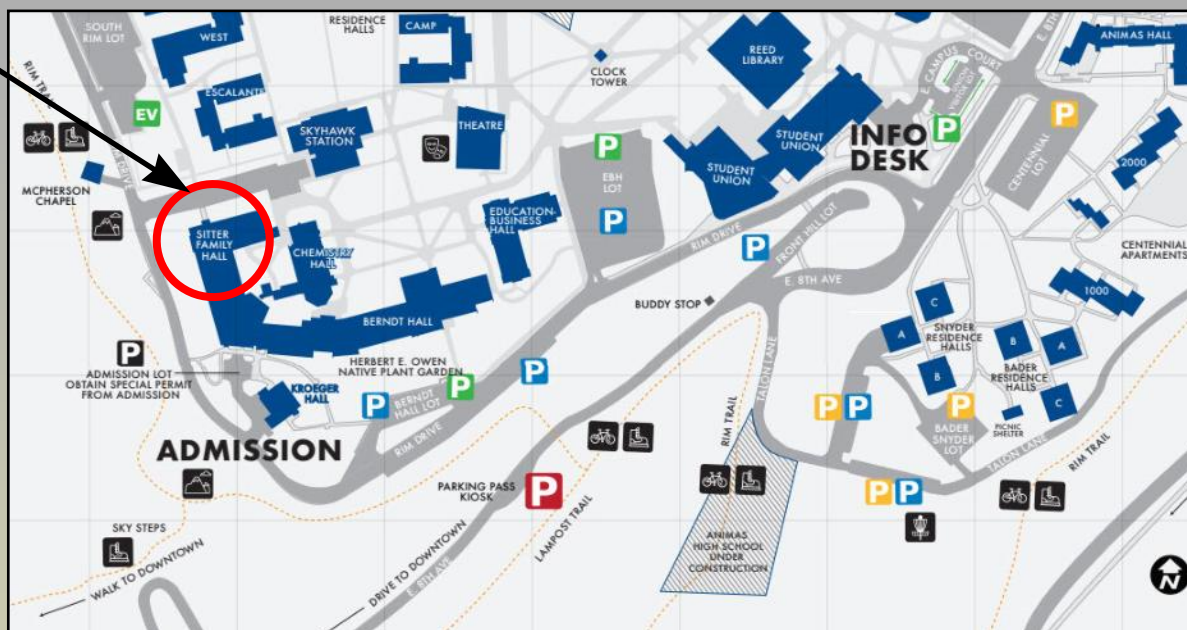
\$20/person. Please RSVP by Tuesday, Nov. 16th at noon if possible. PLEASE go to the website to pay and register: <https://fourcornersgeologicalsociety.org/event>
Or you can email Jon Harvey at jeharvey@fortlewis.edu
The first 10 Students to sign up with Dr. Harvey will be sponsored by Jay Lebeau and Sharon Nez LeBeau and the FCGS.

The cost helps support the students.



Four Corners Geological Society, P.O. Box 1501, Durango, CO 81302
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Map of Meeting Location



Our Speaker:

Joel L. Pederson, Ph.D.

Professor and Head of the Department of Geosciences, Utah State University

Dr. Joel Pederson received his bachelor's degree in Geology from Gustavus Adolphus College near where he grew up in rural Minnesota. After gaining work experience in environmental remediation, he came to the Southwest for graduate school, earning a master's degree in Geology from Northern Arizona University and a doctorate in Earth and Planetary Sciences from the University of New Mexico in 1999. Joel has been a faculty member at Utah State University his entire academic career, teaching geomorphology and other courses, mentoring a score of graduate students and many undergraduate researchers, and serving as the Department Head of Geosciences. His geomorphology and geoscience-education research are focused on the landscapes of the Colorado Plateau and the Intermountain West – how those landscapes have evolved by erosion over geologic time, how they respond to climate changes, and the context they provide for prehistoric cultures. Joel is a Fellow of the Geological Society of America and a recipient of GSA's Biggs Earth Science Teaching Award.



**A BIG Thank You to Jay and Sharon LeBeau
for sponsoring 5 students this month**



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Abstract

THE LATERAL RETREAT AND QUATERNARY EVOLUTION OF THE BOOK CLIFFS, CENTRAL UTAH

Geologists have long invoked escarpment retreat as a prevailing mode of erosion in the Colorado Plateau and other drylands. Yet, research on the evolution of desert escarpments and what controls their erosion is rare and limited by a lack of well dated and complete geomorphic records. We are addressing this research need through work on the Book Cliffs.

Prior investigations of escarpments in the Colorado Plateau and globally garner two end-member conceptual models of how they operate -- one focused on bottom-up baselevel drivers and autogenic variations in erosion processes, the other focused on climate as a top-down control on sediment production and transport from cliffs. We test these conceptual models along a section of the Book Cliffs in central Utah, where four generations of talus flatirons and piedmont terraces are mapped and dated by optically stimulated luminescence and ^{10}Be -exposure techniques.

Chronostratigraphic results indicate depositional ages cluster into distinct episodes over the late Quaternary, with sediment production and cliff retreat corresponding to times of climate change or disturbance, rather than to glacial epochs as long presumed. Thus, climate is a primary control driving pulses of mass wasting and sediment storage, with wetter climates of glacial epochs marked by greater piedmont erosion and sediment transport. Timing of sediment production/storage and erosion along the Book Cliffs does not correlate with similarly well-constrained records in Spain or the Negev, yet they all share the pattern of enhanced sediment production and cliff retreat corresponding to climate instability or disturbance.

Assuming that escarpments defined by layered strata maintain their relief and profile over geologic time, geometry dictates that the lateral component of erosion is faster than vertical incision, but has rarely been measured or tested. Terrain analysis on 46 remnant talus-flatiron landforms serves to quantify both escarpment retreat and stream incision over the late Quaternary. Results confirm that lateral cliff retreat proceeds several times faster than vertical incision of toeslopes (~ 2 m/ky vs. ~ 0.5 m/ky, respectively) and that retreat rates are similar to the estimates in the Colorado Plateau made by early workers without age control.



Dr. Pederson samples a Pleistocene deposit near the mouth of Horse Canyon in his study area. The escarpment and lower slope in the middle-background is bedrock of the Cretaceous Blackhawk Fm.





This distant landscape shot is taken from near Woodside, UT, looking across the study area at the Book Cliffs in the distance. Research on these these deposits and landforms will help us understand the evolution of the landscape. (See Dr. Pederson's abstract above.)



Nice field
area!!

Zoom Link is: (click)

<https://fortlewis.zoom.us/j/92488867564>

NEWS FROM THE FOUNDATION



The Four Corners Geological Foundation is pleased to announce the appointment of Gordon Greve to fill a previously vacant directorship. Gordon joins continuing directors Mary Gillam, Ron Brogden, Patti Phillips and Jim Fassett on the Foundation board. After obtaining a PhD in Geophysics from Stanford University, Gordon joined Pan American/Amoco. Starting in Farmington, he rose through the ranks to become Manager of Geophysical Research and later Chief Geophysicist. He was elected President of the Society of Exploration Geophysics (SEG) and then retired to Durango. He's also a longtime member of FCGS. Welcome, Gordon!

SAVE THE DATE!

Dec. 9: Dr. Ron Hill (EOG Chief Geoscientist): Unconventional petroleum systems in the Western US



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“PREZ SEZ” by David Schiowitz

November 2021

Welcome FCGS members,

Thank you to everyone that was able to participate in last month's meeting. It was great to be back at the “Wall of Time”, and we had an excellent talk by Dr. Jeff Geslin (current Prez-elect) about a source-to-sink depositional system within the Pyrenean Fold and Thrust Belt of Spain.



For our next meeting, Thursday, November 18th, we have a geomorphology talk by Dr. Joel Pederson of Utah State University. He will be discussing the landscape evolution in the Book Cliffs of Utah. Please RSVP for the talk and see page 1 for details and COVID requirements. For those who can't attend in-person we will have a Zoom option starting around 6:30 pm.

In other news, we lucked out, and had wonderful fall weather for our “Talks on the Rocks” field trip led by Dr. Gary Gianniny. The field trip was looking at depositional facies and bedforms of the Jurassic Entrada Sandstones (eolian sandstones) of Durango. Everyone on the trip saw some great examples of eolian structures. It was interesting to see the change in the Entrada Sandstone as the depositional environment transitioned from a classic eolian deposit into lake deposits, as seen in the Pony Express Limestone.

On a final note, I want to share a few online mapping (GIS) tools/pages that I use in my work as a water resources consultant. I feel privileged to live in a time where so much data is readily available to the general public. I believe that we truly are living in the “golden age” of spatial data. (Click on links below.)

[MapView \(beta\) | NGMDB](#)

If you haven't checked out the latest version of MapView by the USGS, I highly recommend you give it a spin. This site allows you to find geologic maps or datasets in any given location in the US. Zoom-in and click on a location and the window on the left will show you all the geologic maps available in that location. Most documents are available for download (pdf, geotif, kmz) or the USGS provides a link for the host website.

[Geocortex Viewer for HTML5 - Colorado's DWR Map Viewer](#)

This mapping tool allows the user to find and explore all the registered water wells, water rights and a plethora of other layers available within Colorado. Get far enough into the Colorado Decision Support Systems and well logs, diversion records, and decrees can be obtained for most features.

[National Water Dashboard](#)

The USGS finally updated their mapping service out of the late 1990's with a fresh National Water Dashboard. You can easily find realtime stream gage information for all of the USGS stream gages.

Until next time,

David

THANK YOU TO ALL WHO RENEWED THEIR DUES THIS YEAR!



SOCIETY NEWS

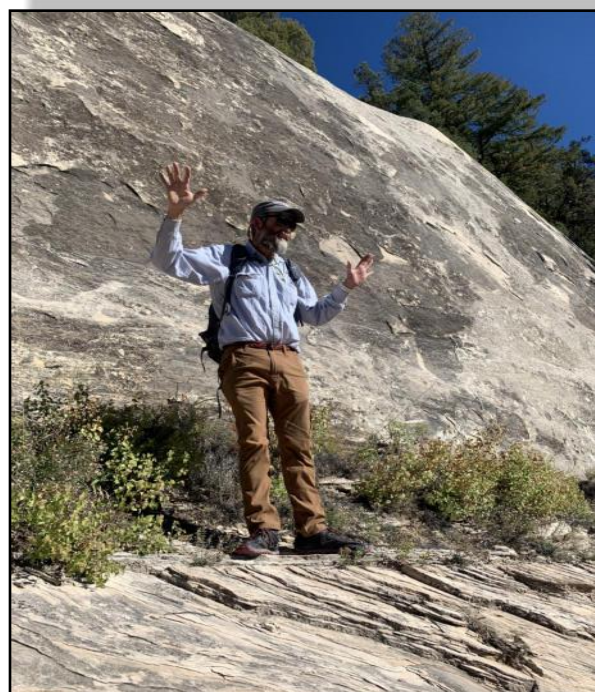


Talks On The Rocks October Field Trip was GREAT!!

THANK YOU DR. GARY GIANNINY!



Nose to the rocks! Hand lens time at the Entrada SS! Anna Riling photo



Gary getting "Stoked" about horizontal deflation surface in the Je. Anna Riling photo



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An Entrada Fm Pony Express Member Stromatolite at East Animas. Finger nail 1.2 cm across for scale. Gianniny photo



Thank You to David Schiowitz and Jim Corken for all the fantastic photos.





NEWS FROM AROUND THE REGION

Ore Deposit Hub Webinair

In case you missed last week's Ore Deposit Hub webinars, or have not registered with ODH to receive their bi-weekly notices, one of particular interest is the following talk:

"The Colorado Plateau Uranium-Vanadium Model – what makes it tick?"

Ali Jaffri, Applied Stratigraphix

The recording of the webinar, including Q&A session, is available at (public Youtube link): <https://youtu.be/YYFzuC7gBMo>

To get connected to ODH, go to <https://oredepositshub.com> or contact them at info@oredepositshub.com

GRAND JUNCTION GEOLOGICAL SOCIETY NOVEMBER MEETING

WEDNESDAY, NOVEMBER 17, 2021; 7:30 PM; In-person and via Zoom

Joint meeting with the CMU Geology Students

Weldon Lecture Hall, (Room 131 in the Wubben-Science Building)

Dr. J.G.M. "Hans" Thewissen, Northeast Ohio Medical University

""The Walking Whales: Fossil Discoveries in India and Pakistan"

ABSTRACT:

The ancestors of whales lived on land, and their transition to life in water is one of the best examples of evolution as documented by fossils. It was not always that way, the first fossils that showed us what happened were only found in the mid-1990s. J. G. M. 'Hans' Thewissen discovered the first fossils that showed that the oldest whales could walk on land., including the skeleton of the walking whale *Ambulocetus natans*. Field work in Pakistan and India delivered 45-million-year-old cetaceans that looked like crocodiles, seals, and otters and elucidated the remarkable path evolution took to turn a land mammal into a whale.

Dr. Thewissen is Ingalls-Brown Professor of Anatomy at Northeast Ohio Medical University. He holds degrees in Geology and Biology and wrote the popular book 'The Walking Whales', which was translated into Korean and Japanese. He edited 'The Bowhead Whale' (with Craig George) and 'The Encyclopedia of Marine Mammals' (with Bernd Würsig and Kit Kovacs) and consulted for Hollywood on aquatic superheroes.

Join Zoom Meeting: <https://coloradomesa.zoom.us/j/95080876490?pwd=WGpQTmRNCVExalhod2dQc1dCTkhwQT09>

Meeting ID: 950 8087 6490; Passcode: 296147

One tap mobile

Meeting ID: 950 8087 6490; Passcode: 296147

Find your local number:

<https://coloradomesa.zoom.us/j/95080876490?pwd=WGpQTmRNCVExalhod2dQc1dCTkhwQT09>



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FOUR CORNERS GEOLOGICAL SOCIETY

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MEMBERSHIP RENEWAL or APPLICATION: June 1, 2021 to May 31, 2022



*Name: _____

*Address: _____ City: _____ State: _____ Zip: _____

*Email: _____ Phone: _____

*Employer: _____

Please Identify a Membership Category:

Active Member	\$25	Any person engaged in the practice or teaching of geology or who holds a Bachelor's Degree in geological science from a college of acceptable academic standards. Degree requirement may be waived if applicant has adequate professional experience. <i>*Highest Degree, Type and Year:</i> _____ <i>*College / University:</i> _____
Associate Member	\$25	Any person who is a graduate of a college of acceptable academic standards with major studies related to, or associated with, geology. Degree requirement may be waived if applicant has adequate professional experience. <i>*Highest Degree, Type and Year:</i> _____ <i>*College / University:</i> _____
Student Member	Free	Any undergraduate or graduate student majoring in geology at a college of acceptable academic standards. <i>*College / University:</i> _____ <i>*Year expected to graduate:</i> _____
Emeritus Member	Free	An Active Member of 65 years old or older who has been a member for 25 years including time spent in military service. <i>*Year emeritus status was awarded:</i> _____
Honorary Member	Free	An Active Member who has contributed distinguished service to the profession of geology and to the betterment of the FCGS. Determination is made by the FCGS Executive Committee. <i>*Year honorarium was awarded:</i> _____.

Other Professional Interests:

** Required information for new members. Current Members, please update.*

Please either print, complete and return this form with your check for dues made payable to: "Four Corners Geological Society" and mail to the address above or go online to fourcornersgeologicalsociety.org.

Please donate to the Foundation to support student research. Make out your check to: "Four Corners Geological Foundation" and include it in the envelope with your dues.

*Please check your interests:

- ☐ Sedimentology & stratigraphy
- ☐ Structure & tectonics
- ☐ Mineralogy, petrology, geochemistry
- ☐ Igneous geology, volcanology
- ☐ Ore geology and hard rock mining
- ☐ Other mineral extraction
- ☐ Petroleum geology
- ☐ Geophysics
- ☐ Geological engineering
- ☐ Geomorphology
- ☐ Quaternary geology
- ☐ Hydrology & water resources
- ☐ Environmental geology
- ☐ Geography / GIS
- ☐ Other interest (see box)