

FCGS Newsletter



P.O. Box 1501 | Durango | CO 81302 | www.fourcornersgeologicalsociety.org

December 2020

SPEAKER: Jessica Jobe, USGS

TITLE: *Cryptic active faults on the margin of the Colorado Plateau and Rio Grande Rift, northern New Mexico*

DATE: Thursday, December 10, 2020

TIME: Please login to meeting a bit before 5:30 pm
5:30 - 6:00 Catching up and socializing (in breakout rooms if it gets too busy in the main room)
6:00 - 6:15 back to meeting for society business announcements and introductory remarks
6:15 - 7:15 pm talk & Q&A

LOCATION: Your own home! This is a Zoom meeting hosted by FLC. [-LINK TO MEETING-](#)

COST: Free but please renew your membership if you have not yet done so this year! (June 1 to May 31 is our calendar year)



HAPPY HOLIDAYS!

Be of Good Cheer and Toast to Field Trips in 2021!

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December 2020

Abstract

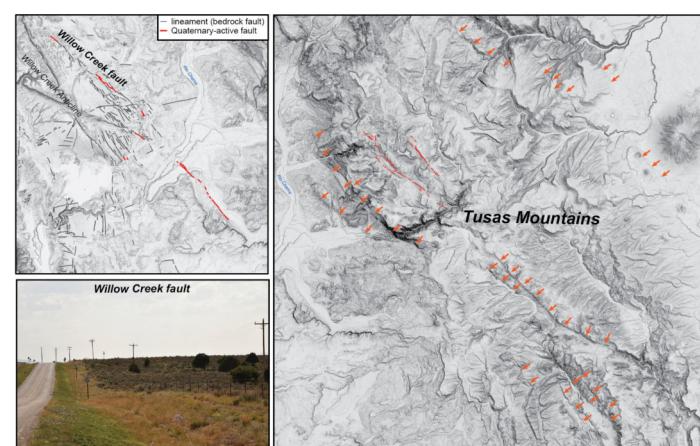
In northern New Mexico, seismic hazard outside of the Rio Grande Rift is generally considered to be low due to limited historical seismicity and no mapped Quaternary faults. Although the region has a long and complex tectonic history with faults of many ages, nearly all known faults are considered inactive because of a lack of identified offset on dated Quaternary deposits and surfaces. Until recently, detailed mapping of potentially active faults in the region has been challenged by vegetation, a lack of dated Quaternary features, and the preservation of older Laramide-aged fault scarps on the landscape. The recent release of high-resolution (~1m) bare-earth lidar data over most of northern New Mexico now allows better identification and characterization of the faults. In this talk, I present work on four faults on the margin of the Colorado Plateau and Rio Grande Rift that demonstrates the faults are active but have cryptic, subtle signatures of recent activity on the landscape. Remote neotectonic mapping on the lidar data and field observations, integrated with existing geologic and geomorphic mapping, reveal that these faults have a primarily normal sense-of-motion with subtle evidence for lateral offsets, and generally have low slip rates of <0.1 mm/yr based on offset volcanic and terrace deposits. The geomorphic expression and offset of Quaternary surfaces on the faults in relationship to folded and faulted Mesozoic stratigraphy indicates that some Laramide-aged faults have been reactivated as normal or dextral-oblique faults in the Quaternary, consistent with regional stress and geodetic data. Although the faults have low slip rates, the length of these faults (15-50 km) suggest they could rupture in M6-7 earthquakes and may pose a previously unrecognized seismic hazard to the region.

Biography

Jessica Thompson Jobe
Geologic Hazards Science Center, USGS



Jessie Thompson Jobe is a Research Geologist at the Geologic Hazards Science Center at the U.S. Geological Survey, focusing on characterizing active faults and seismic hazard throughout the United States. Her broader research interests seek to understand landscape evolution resulting from tectonics over thousands to millions of years. Prior to the USGS, she worked on the Gulf of Mexico Exploration Team at ConocoPhillips for 2.5 years, and then as a Postdoctoral Researcher in salt tectonics at the University of Texas El Paso and Colorado School of Mines, followed by 1.5 years as a Postdoctoral Research Geologist at the U.S. Geological Survey and 1.5 years as a Geologist at the Bureau of Reclamation on the Seismology and Geomorphology Team focusing on seismic hazards. Jessie received a B.S. in Earth, Atmospheric, and Planetary Science from MIT in 2007, and a Ph.D. in Earth Science from the University of California Santa Barbara in 2013 (advisor – Doug Burbank).



December 2020

PREZ SEZ

Season's Greetings FCGS!



Jon Harvey on 2019
hike / train fieldtrip

Last month we heard a fascinating talk from John Fleck and Eric Kuhn about the waters of the Colorado River - and the history of how they were measured and divided up. Please email me at jeharvey@fortlewis.edu if you missed it and would like to see a recording of that talk!

For this month's speaker event, I am excited to welcome Dr. Jessica Jobe, from the USGS

Geological Hazards Science Center in Golden, CO. Dr. Jobe has studied active faults all over the world. Recently, her sight has been focused on the Colorado Plateau - Rio Grande Rift transition zone. So, I invited her to come talk to us about new insights on potentially active faults in what is otherwise a tectonically 'boring' part of the western U.S.

Some fun pre-meeting homework: Check out the USGS' Quaternary Faults and Folds database [HERE](#). The link will take you to a web map where you can see all the faults in the USGS database that are thought to have been active in the Quaternary (translation - these are faults that could still present a seismic hazard to nearby areas!). The fault colors depict how recently the fault is known to have been active. You can click on each fault to see some info about the fault's sense of slip, slip rate, etc. Dr. Jobe's neotectonics work in effect helps to improve this map, which is a big part of our collective assessment of seismic hazard in the U.S. The faults she will talk to us about are some the closest to the Four Corners region, so it will be interesting to see what she has learned about them!

I hope to see you all on Thursday, Dec. 10 for her talk.
Otherwise, I wish you all the best during this holiday season.
We will be back with some exciting talks in 2021!

Cheers,

-Jon Harvey

As we did last month in this time of relative isolation and lack of travel, I wanted to point everyone to some very cool 'virtual' field trips that I have come across recently, on the chance it might satiate your appetite for outcrop. Some are more 'guided' and some are more just unguided 3-D photo-spheres. Check them out below:

- Streetcar to Subduction (San Francisco Bay Area):
<https://www.agu.org/learn-and-develop/learn/streetcar2subduction/streetcar2subduction>
- Self-guided tour of building geology in Washington, DC: <https://eos.org/geofizz/self-guided-tour-of-the-geology-in-d-c-buildings>
- Mafic volcanics atop felsic intrusives: Sonora Pass, California:
<https://blogs.agu.org/mountainbeltway/2018/06/25/mafic-volcanics-atop-felsic-intrusives-sonora-pass-california/>
- Tearing through California Part 1: the Central San Andreas:
<https://blogs.agu.org/tremblingearth/2015/04/17/tearing-through-california-part-1-the-central-san-andreas/>
- Moiry Valley, Switzerland (glacial goodness):
<https://vrglaciers.wp.worc.ac.uk/wordpress/moiry-valley-virtual-field-trip/>
- Arizona State University's Virtual Field Trip collection: <https://vft.asu.edu/>
- V3Geo - Virtual outcrop models (lots of industry-relevant outcrops): <https://v3geo.com/search>
- Columns of the Giants, CA:
<http://www.sciencefriday.com/educational-resources/360-degree-expedition/>
- Outclopedia: <http://outclopedia.tectask.org/the-outclopedia-map/>
- Stanford Virtual Field Trips:
<https://fieldeducation.stanford.edu/virtual-field-trips>

VIRTUAL FIELD TRIPS!

December 2020

NEWS FROM AROUND THE REGION

Job Opening: Project Geologist

Westwater Resources, Inc., a well-funded U.S.-based battery-grade graphite development company, is seeking to fill a contract position Project Geologist for its forthcoming core drilling program at its central Alabama graphite project. The planned drilling program will be comprised of 70 to 100 shallow angle and vertical core holes (less than 200 feet in length) within and adjoining a currently defined mineral resource hosted in graphitic schist and other target areas adjoining the known resource. It is expected that the 2021 drilling program will be 4 to 6 months in duration.

The position responsibilities will include core logging, supervision of sampling of core (including the inclusion of QA/QC samples), transmittal of samples to the analytical laboratory, recording of relevant data, supervision of drilling and dirt work contractors, mapping and rock chip sampling and reporting of project progress to the Company's Denver-based management. Field technician support will be provided by the Company.

Interested candidates should hold a degree in geology, have several years of drilling project supervision (experience with core drilling is essential), be proficient in the geology of metamorphic rocks, and have excellent written and spoken communication skills.

Interested candidates should submit a copy of their C. V., references, and salary requirements to:

jobs@westwaterresources.net. No telephone calls please.

Information about the Company is available on our website: www.westwaterresources.net/home.

Job Opening: Mine Surveyor

POSTED November 20, 2020

LOCATION: Colorado

Our client, a Vancouver-based silver company with multiple operating mines is seeking a Mine Surveyor immediately. This position will report to Senior Engineer and be responsible for all underground and surface survey work.

For more info on this opportunity such as responsibilities and qualifications, go to <https://www.miningsearch.com/surveyor/>

Contact: Lindsey Schultz, Corporate VP; 480-659-5847; lschultz@miningsearch.com

Groundwater Week & Groundwater Summit 2020

December 8-11; Online

By registering for Groundwater Summit 2020 you will also have access to all programing and workshops from our Virtual Groundwater Week 2020. To get more info, schedules, and other meeting details or to register, go to <https://virtual.groundwaterweek.com/register>.

Geoscience and the Energy Transition – Abundance and Opportunity in Challenging Times

AAPG Visiting Geologist Program (VGP) Super Session

Friday, 11 Dec.; 11:30 a.m. (CST); Virtual

Presented by Dr. Julio Friedmann, Senior Research Scholar, Center on Global Energy Policy, Columbia University

SAVE THE DATES!

January 21st - TBD

(trying to get Bob Biek from UGS, waiting for confirmation that that date works.)

Feb 18th -

Dan Bassett SM Energy, Denver
(young, smart and personable)

Mar 11 or 18 - TBD

Thurs, Apr 22 - FLC student presentations
(most fun meeting of the year!)

Summary:

In a world moving to net-zero emissions during the COVID-driven oil price collapse, important scientific and business opportunities remain for geoscientists, particularly those with expertise in stratigraphy, sedimentology, reservoir geology and hydrocarbon production. The challenges we face are not necessarily scientific or technical, but rather involve shifts in our business models, policies and global market trends.

So get ready for a different future. Many opportunities will be local, enabled by favorable geology, existing infrastructure and existing policy frameworks. In this, as in observational science, fortune favors the prepared mind. **Attendance is free.** To register, go to https://aapg.zoom.us/webinar/register/WN_OAY4KXZ2SpqCji0kPlge4g

GRAND JUNCTION GEOLOGICAL SOCIETY DECEMBER MEETING

WEDNESDAY, DECEMBER 16, 2020; 7:30 PM (MST)

Joint meeting with the CMU Geology Students

Dr. Emmett Evanoff, Department of Earth and Atmospheric Sciences, University of Northern Colorado, Greeley, CO

"The Upper Eocene to Lower Oligocene White River Sequence of the Northern Great Plains and Middle Rocky Mountains"

The meeting will only be presented via Zoom.

Join Zoom Meeting:

<https://coloradomesa.zoom.us/j/97296998448?pwd=V3VMOWpkWE9Hb0R6UHhaNFA4VnZYz09>

Meeting ID: 972 9699 8448

Passcode: 989389

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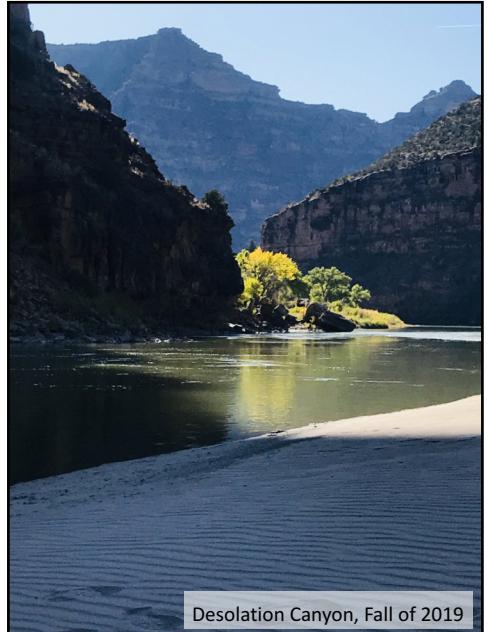
Meeting Zoom Link:
<https://fortlewis.zoom.us/j/91328269174>

UP THIS MONTH:

CRYPTIC ACTIVE FAULTS ON THE MARGIN OF THE COLORADO PLATEAU
AND RIO GRANDE RIFT, NORTHERN NEW MEXICO



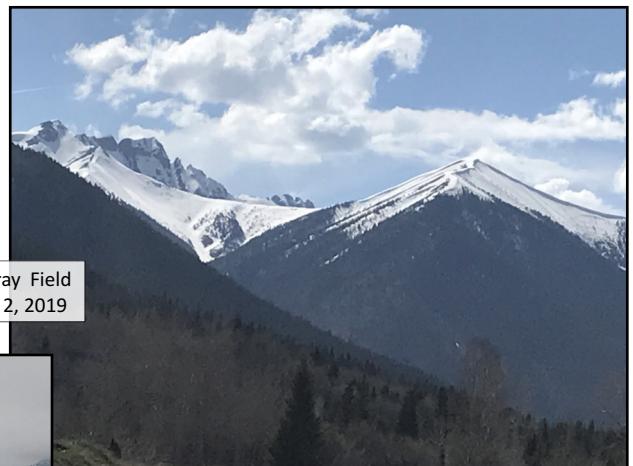
Dr. Jon Harvey
The full moon from Jon's house.
Outcrop of Junction Creek SS.



Desolation Canyon, Fall of 2019



FCGS Ouray Field
Trip, June 2, 2019



Jack Rosenthal
Dakota and Fountain Formations at Red Rocks



FOUR CORNERS GEOLOGICAL SOCIETY

P.O. Box 1501, Durango, CO 81302

MEMBERSHIP RENEWAL or APPLICATION: June 1, 2020 to May 31, 2021



*Name: _____

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

→ *Email: _____ Phone: _____

*Employer: _____

***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)

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 .