



# Colorado Scientific Society

*The objective of the Society is to promote the knowledge and understanding of Earth science, and its application to human needs*

***March Meeting, Thursday, Mar. 15, 2018, 7:00 p.m.  
Shepherd of the Hills Church, 11500 W. 20<sup>th</sup> Ave., Lakewood  
Social time, 6:30; program at 7:00***

## ***“Challenges in Providing Real-time Earthquake Shaking & Impacts Estimates”***

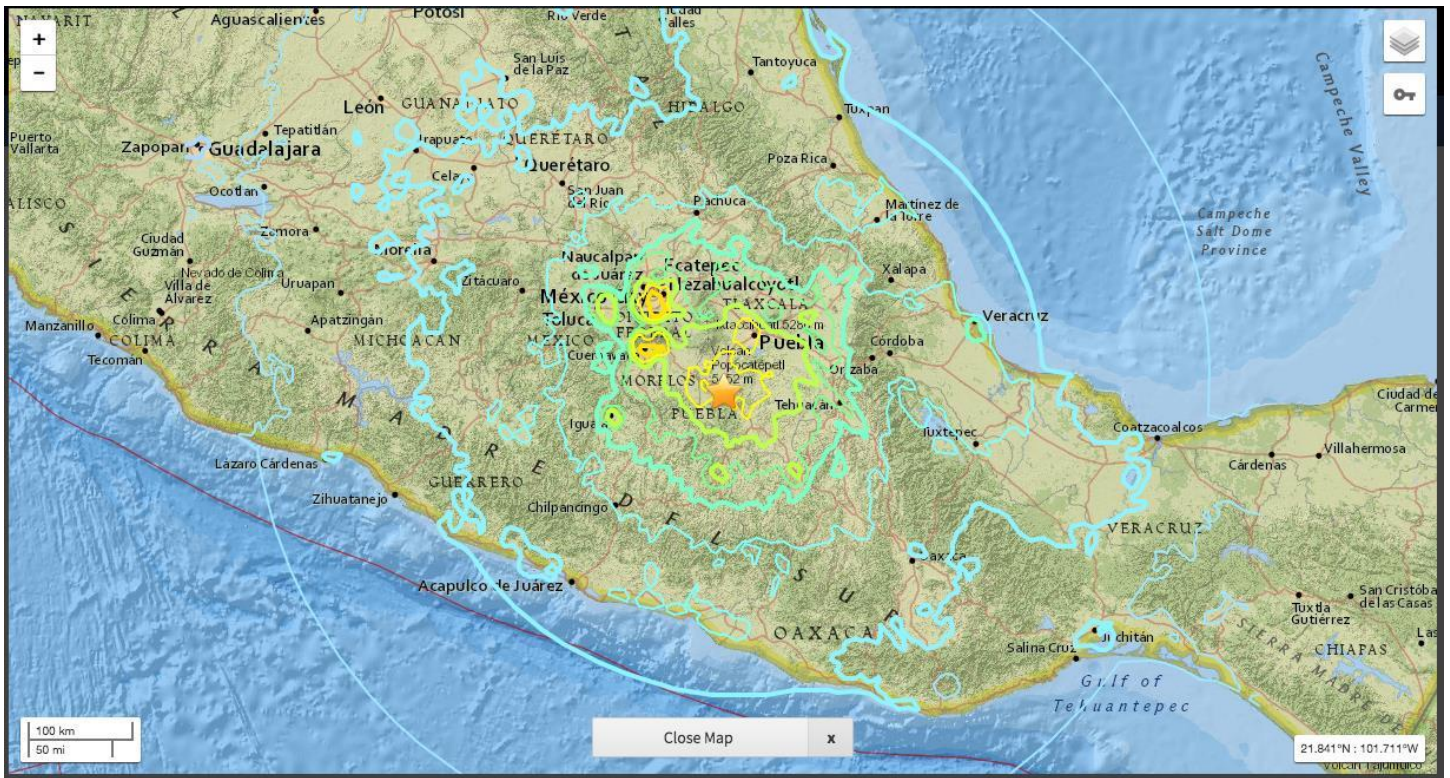
***David J. Wald***

***U.S. Geological Survey, National Earthquake Information Center, and Adjunct Associate  
Professor of Geophysics, Colorado School of Mines, Golden, Colorado***



USGS has recently developed several near-real time earthquake information systems that provide rapid and automated alerting of shaking distribution, critical facility inspection priorities, and estimates of economic and human impacts following earthquakes. I'll describe the science and development behind the components required to rapidly assess an earthquake's impact: rapid faulting characterization, estimates of shaking distribution, losses estimates, and communicating uncertain loss estimates in an appropriate form for actionable decision-making among a variety of critical users.

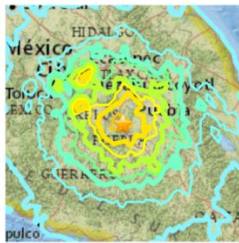
Rapidly and automatically assessing shaking and impact requires aggregating and interpreting a wide range of seismological, demographic, structures, economic and vulnerability information necessary to make such loss estimates strategies. In the course of explaining the end-to-end strategies and science/engineering employed by the USGS Prompt Assessment for Global Earthquake for Response (PAGER) system, we describe other challenges in making such information public rapidly. We'll also cover recent seismological advances like earthquake early warning, and rapid estimates of earthquake-induced landsliding around the globe. Lastly, we'll show how (re)insurers, governments and aid organizations use rapid earthquake information for loss estimation, situational awareness, and financial adjudication. Such financial tools can be a significant benefit to the at-risk public by facilitating risk transfer, fostering sensible management of portfolios, and assisting disaster response.



## M 7.1 – 5km ENE of Raboso, Mexico

2017-09-19 18:14:39 UTC | 18.584°N 98.399°W | 51.0 km depth

### Interactive Map



Contributed by US<sup>1</sup>

### Regional Information



Contributed by US<sup>1</sup>

### Felt Report - Tell Us!

0 0 1 7 4 5

Responses

Contribute to citizen science.  
Please [tell us](#) about your experience.

Citizen Scientist Contributions

### Did You Feel It?

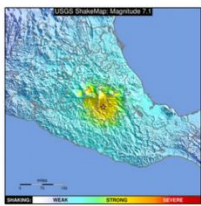
IX



Contributed by US<sup>1</sup>

### ShakeMap

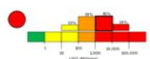
VIII



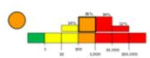
### PAGER

RED

Estimated Economic Losses



Estimated Fatalities



### Origin

Review Status

REVIEWED

Magnitude

7.1 mww

Depth

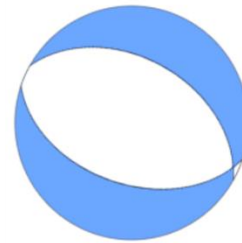
51.0 km

Time

2017-09-19

18:14:39.300 (UTC)

### Moment Tensor



Dr. Wald is a Seismologist with the USGS in Golden, Colorado, and is on the Geophysics Faculty at the School of Mines (CSM). Wald is involved in research, development and operations of real-time information systems at the USGS National



Earthquake Information Center. He developed and manages “ShakeMap”, “Did You Feel it?”, and is responsible for developing other systems for post-earthquake response and pre-earthquake mitigation, including ShakeCast and PAGER.

Wald earned his B.S. in Physics and Geology at St. Lawrence University, an M.S. in Geophysics at the University of Arizona, and his Ph.D. in Geophysics at Caltech. Previously at Caltech, and now at the CSM, Wald has advised dozens of post-doctoral, graduate, and undergraduate students’ research projects. His own scientific interests include the characterization of rupture processes from complex earthquakes; analysis of ground motions and site effects; and modeling earthquake-induced landslides, liquefaction, and shaking-based losses. Wald has been the Seismological Society of America (SSA) Distinguished Lecturer a BSSA’s Associate Editor, and served on the Society’s Board of Directors. He served on the Earthquake Engineering Research Institute’s (EERI) Board of Directors, as Associate Editor for Earthquake Spectra, and was EERI’s 2014 Distinguished Lecturer. He was awarded SSA’s 2009 Frank Press Public Service Award, the Department of the Interior Superior Service Award in 2010, and their Meritorious Service Award in 2016.

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### ***President’s Message, March 2018***

I’m assisting a colleague of mine, Rutgers professor Craig Fiebel, in teaching for a wonderful semester abroad program run by Stony Brook University in northern Kenya on the shores of Lake Turkana. It is a ten-week program, broken into 5 two-week sections. The curriculum starts with a module on Ecology, then Geology, followed by Paleontology, Archeology, and Paleoanthropology. Called the Origins Field School, it brings together a group of 15-20 students, from Kenya, Ethiopia, Europe, and Long Island to a research and teaching facility established at a remote spot in the Rift Valley on the shores of Lake Turkana. The students are surrounded by rocks...Plio-Pleistocene strata deposited by earlier versions of Lake Turkana. These sediments are fluvial, lake margin and lacustrine and are wonderfully fossiliferous. Modern analogues for these deposits are all around us in the ephemeral streams, lake shore settings and in the open lake as well.



Students learn first of all not to get lost (travel in pairs, learn to use handheld GPS systems, and carry extra batteries) then learn to tame the landscape in the sense of Saint-Exupéry (remember the fox in *Le Petit Prince*?). I paraphrase heavily: “before you tame me, one rock looks very much like every other rock, but once I am tamed, you know my grain size and my sorting and I come to you with joy when you approach”). They learn that each rock has a name; both in terms of lithology and in stratigraphic nomenclature, and that the apparently chaotic landscape is not at all random, but rather the result of a delicate interplay between the forces of erosion and the resistance of the rocks.

Gradually they see that the rocks can be measured, mapped and placed into logical packages reflecting environments of deposition and paleo-landscapes.

Fossils are all around them, they learn to disdain fish bones and to look for elephant and hippo bones. As we tour the field areas we pass small cement markers that indicate where hominid fossils have been found in the past, there is the thrill of knowing that perhaps some student will spy an australopithecine (it has happened).

The students come from a wide range of backgrounds, many are anthropology and biology students and their previous exposure to geology is often modest. They learn from the instructors, from the rocks, and from each other. We travel in trucks with students sharing ear buds and teasing each other about language and tribal stereotypes. Word games and charades are common ways that travel time is passed and the cross cultural differences are dwarfed by the similarities and shared challenges of learning new material.

By the end of two weeks the students are confident, feldspar is a friend and the rock layers are starting to speak to them.

Students from any background are encouraged to consider this opportunity. Stony Brook can help arrange course credit as needed. See the field school program at: <http://www.turkanabasin.org/fieldschool/> . To see blogs about the field school go to: <http://www.kenyastudyabroad.org/blog/>.

**Bob Raynolds, 2018 President, Colo. Sci. Soc.**

## ***Posting more of the Colorado Scientific Society's history***

On our website, check out our enlarged History site at: <http://coloscisoc.org/css-history/>

You can also access it under the "About Us" tab in the CSS website's top menu bar. Then select "History of the Society". You will find information about: our founding in 1882, a paper covering our long year history, a page about our silver gavel, the past presidents of the CSS, the ***Proceedings of the Colorado Scientific Society***, minutes of early CSS meetings, and the Articles of Incorporation of the CSS in 1885.

Volume I of ***The Proceedings of the Colorado Scientific Society***, with articles from 1883 and 1884 is up now. Access it from the History page, or go to <http://coloscisoc.org/css-proceedings/> to see what is available now and what is still to come. Selected articles from additional volumes of the Proceedings are being posted as time permits, thanks to CSS Historian Beth Simmons for scanning the articles and website manager Chris Morrison for posting them. Some of the later articles posted now include "Hot Springs of Colo. and Speculations to Origin and Heat", by Arthur Lakes (v. 8, 1906); "Iron Ores and System of Mining at Sunrise Mine, Wyoming", by B. W. Vallat (v. 8, 1906); "Dinosaur Fossils near Denver", by George L. Cannon (v. 8, 1906); "Vanadium near Placerville, San Miguel County", by R. P. Fischer, J. C. Haff, and J. F. Rominger (v. 15, 1947); and "Black Bear Vein, San Miguel County", by D. J. Varnes (v. 15, 1947).

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## ***CSS Meetings and Field Trips Planned for 2018:***

Please make note of the dates; we'll have more info available in our next newsletter and by email:

**Thurs., Apr. 12**, Colorado Scientific Society's annual **Past Presidents' Dinner**, to be held at Mt. Vernon Country Club, featuring a presentation on **Colorado's Exciting New Dinosaurs** by Dr. Joe Sertich, Denver Museum of Nature and Science. Details will be announced. *All* are invited to attend this dinner and program!

**Sat., Apr. 14, Denver 2018 March for Science**; see <http://marchforsciencedenver.org/>. CSS hopes to have a booth here.

**Sunday, Apr. 15**, a Colorado Scientific Society SPRING FIELD TRIP: "**Mysterious Front Range Gravels**", led by Cal Ruleman & Bob Raynolds. Details TBA.

**Thur., Apr. 19**, 7:00 p.m., Colorado Scientific Society meeting, a pair of talks on **The role of the USGS and the Colorado Geological Survey**; by Eugene (Buddy) Schweig, Director, USGS Geosciences and Environmental Change Science Center, and Karen Berry, Director and State Geologist, Colorado Geological Survey.

**Tues., May 8**, 7:00 p.m., annual Emmons Lecture sponsored by the Colorado Scientific Society, **High drama at the Paleocene/Eocene boundary in the Bighorn Basin; implications for today**, by Will Clyde, University of New Hampshire. On the CSM campus, location TBA.

**Sat.-Sun. Sept. 8-9**, CSS FALL FIELD TRIP, "**Geology of the Upper Arkansas Valley**"; to be held jointly with RMAG, led by Cal Ruleman & Karl Kellogg. Details TBA.

**Thurs., Sept. 20** [date tentative], **CSS Student Paper Night**. Planned for the Arbor House, 14600 W. 32<sup>nd</sup> Ave., Golden.

**Thurs., Oct. 18**, 7:00 p.m., October meeting, "**Structural geology of Colorado**" by Ned Sterne, plus a possible 2<sup>nd</sup> speaker. Shepherd of the Hills Church.

**Thurs. Nov. 15**, 7:00 p.m., November meeting, "**Geothermal Energy**", by Jeff Winick, DOE, plus a possible 2<sup>nd</sup> speaker. Shepherd of the Hills Church.

**November \_\_\_\_** (plans still tentative) **CSS Family Night**, perhaps at the CSM Geology Museum.

**December \_\_\_\_** (plans still tentative, perhaps Dec. 20), **CSS Annual Meeting, Potluck Dinner, and President's Address**, tentatively to be held in the Denver Museum of Nature and Science, Gates Planetarium.



*CSS Council hard at work! I captured this candid photo of our (your!) officers and councilors at our March council meeting. Jim Reed graciously offered us quarters for the March 6 meeting at his Rockware, Inc. office headquarters in Golden—with pizza and liquid refreshments provided, no less (let this be an inducement to other CSS members to volunteer for officer/council/committee chair positions in the future!). We loved the verde antique conference table, as well as his displays of rocks, minerals, fossils, and geophysical equipment. A big **thanks** to Jim! Clockwise, Lisa Fisher, Don Sweetkind, Chris Morrison, Beth Simmons, Matt Rhoades (newly appointed Councilor), Jim Reed, Bob Raynolds, Tom Casadevall. [Pete Modreski, taking the picture]*

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***A 2018 Denver March for Science*** is planned for Saturday, April 14, 2018. “We will take to the streets of Denver to support science! Meet us in Denver Civic Center Park at 8:30AM. Musicians and inspiring speakers begin at 9AM. We march at 10AM. Scientists and educators will host a giant teach-in (hands on science fair) for students of all ages starting at 10AM!” For more information (forthcoming) see <http://marchforsciencedenver.org/> and <https://www.facebook.com/events/482837878778622/>. The Colorado Scientific Society hopes to have a booth at the informational teach-in this day—we’ll share more news about this as available.

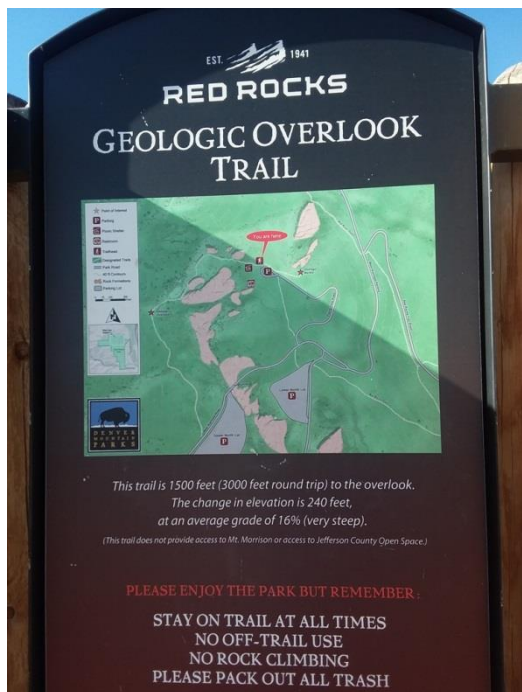
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***If you’ve not yet done so, please renew your membership in the Colorado Scientific Society*** for 2018! Dues are \$25 for regular members, \$10 for corresponding members (outside the Colorado Front Range area) and \$5 for students. A Lifetime Membership is \$395.00. Mail a check to the CSS or pay with a credit card using PayPal on the CSS website, <http://coloscisoc.org/membership-payment/>. Send payments to **Colorado Scientific Society, P.O. Box 150495, Lakewood CO 80215-0495**. For more news & information about the Society, always check our website, [www.coloscisoc.org](http://www.coloscisoc.org), or see our facebook page, <https://www.facebook.com/groups/511533159044226/>.

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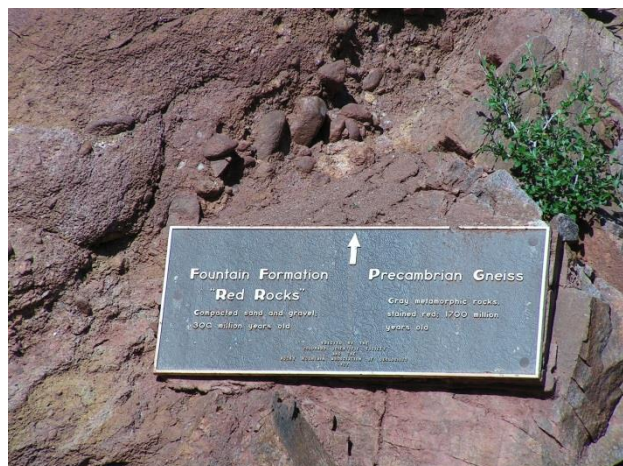
***Surplus copies of CSS “Proceedings” to be available at March meeting:*** As you’ll have read on the preceding page of this newsletter, Beth Simmons and Chris Morrison have been scanning and uploading to our website, complete copies of the past volumes of the Proceedings of the Colorado Scientific Society (the series, volumes 1 through 17, was published from 1883 to 1956). The society has a supply of assorted past issues of the Proceedings. Retaining about two copies of each for reference, we are going to make the rest available for sale to our members. The Council agreed upon an initial “members price” of \$10 per issue (each volume consisted of several issues, each containing one to several articles; some quite lengthy, some short). Beth Simmons, our historian, will bring copies to our March meeting, for sale. As the more popular issues become depleted, we may decide to lower the price in the future for those that remain.





**Did you know** that a new “Geologic Overlook Trail” has been constructed at Red Rocks Park? Here’s the trailhead sign; it begins next to the small picnic pavilion on the knoll by the “Geologic Marker”, reached by turning off to the right on the road up to the small parking lot and turn-around at the top of the amphitheater (where the “Great Unconformity” plaque\* is located). It says the trail is 1500’ feet long (3000’ round trip), with a 240’ elevation gain, and a steep (16%) average grade. So, the classic “Panorama of Front Range Foothills” geologic sign (erected 1962 by the CSS + RMAG), reached by just a short path to the top of the knoll, is called the “Geologic Marker”, and this longer, steeper trail leads to the “Geologic Overlook”.

\*Erected in 1977, again by the CSS + RMAG.



Also, a new trail segment has been added to the south end of the “Dakota Ridge Trail”, on the south extension of Dinosaur Ridge. It’s a new 1.3-mile segment, that goes south along the ridge crest, then switchbacks down to connect to the trail into Red Rocks Park. It’s been designed mainly for mountain bikers: “The trail’s naturally rugged features were incorporated into rocky ramps and drop-offs meant to be ridden clockwise by cyclists and walked counterclockwise by runners and hikers. But the trail directions are a guideline, not a rule. People can go either way... The idea is that hikers don’t have to have bikers coming up behind them.” --- from <https://theknow.denverpost.com/2018/01/18/denver-hikes-jefferson-county-trail-extension/173197/>.



## Calendar of Coming Events

**Mon, Mar. 12, 7:00 p.m., “From past life to “petrified trees” to PRPA: Preserving the past for the future in America's National Parks”,** by Jason Kenworthy, National Park Service. At the monthly meeting of WIPS (Western Interior Paleontology Society), at the Denver Museum of Nature & Science, in the Gates Planetarium. All are welcome; enter through the Leprino Atrium on the west side of the museum; doors open at 6:30 p.m., meeting begins at 7:00.

also on **Mon., Mar. 12, 7:00 p.m., Minerals Exploration Funding – Present & Future Status and Strategies, and, The Story of Pembridge Resources, PLC,** by Peter Bojtos. Monthly meeting of Denver Regional Exploration Geologists Society (DREGS), Berthoud Hall Room 241, CSM campus, Golden. All are welcome; social hour at 6 p.m., meeting begins at 7.

**Tues., Mar. 13, 7:00 p.m.,** Speakers’ Bureau Lecture at the Western Museum of Mining & Industry, Colorado Springs, **“Cripple Creek High Grading: The Untold Stories”,** by Steve Veatch, Geoscientist and Geoscience Educator, and Ben Elick, WMMI and Middle School student, Douglas County School District. Doors open at 6:00 p.m., lecture 7:00 - 8:00 p.m.; \$5 admission, WMMI museum members admitted free. RSVP by calling 719-488-0880 or emailing [rsvp@wmmi.org](mailto:rsvp@wmmi.org).

Related to this, a special exhibit on **“Gold Mining in Colorado”** is on display at the WMMI from Feb. 15 through June 9. It takes the visitor through the story of gold mining in Colorado, from the origins of gold to contemporary gold mining, via illustrations, diagrams, maps, and artifacts (all from the museum’s extensive collection; many of them have not been exhibited for years, if at all). A version of this exhibit was on display in eleven exhibit cases for three days at the Denver Gem and Mineral Show this past September, but it was desired to put the exhibit back on display so WMMI members as well as the public could appreciate the research and work that went into preparing it. Museum hours are 9 a.m. – 4 p.m., Mon.-Sat. Regular admission is \$10; there are Military, Senior, Student, and Child discounts.

**Tues., Mar. 13, 6-8 p.m.,** “Golden Beer Talks at Windy Saddle Café”, 1110 Washington Ave, Golden. This month's talk given by Catherine Costello of USGS on **GEOMAC online wildfire mapping application**. Contact [barb@goldentoday.com](mailto:barb@goldentoday.com) for more info.

**Thurs., Mar. 15, 4:00 p.m.,** Van Tuyl lecture at Colorado School of Mines, **“Novel Applications of Non-traditional Stable Isotopes to Geochemical Kinetics”,** by Chen Zhu, Indiana University. Berthoud Hall Room 241; all are welcome.

**Thurs., Mar. 15, 7:00 p.m., Challenges in Providing Real-time Earthquake Shaking & Impacts Estimates,** by Dr. David Wald, U.S. Geological Survey, National Earthquake Information Center and Adjunct Associate Professor of Geophysics, Colorado School of Mines. At the monthly meeting of the Colorado Scientific Society, Shepherd of the Hills Church, 11500 W. 20th Ave., Lakewood CO; social time begins at 6:30, program at 7:00; all are welcome.

**Sun., Mar. 18, noon, “Nature, causes and effects of US energy revolution”,** by Bob Knapp, UCCS. At the monthly meeting of the Florissant Scientific Society, taking place this month at University of Colorado-Colorado Springs, Osborne Center, Room B215. Bob’s talk will include “origin and formation of hydrocarbon deposits; fracking history & technology; wildcatters who pioneered fracking techniques; Peak Oil theory; economic and political effects”. Potluck lunch at 12:00-1:00, presentation, 1:00-2:30. FSS holds monthly meetings or field trips at various places in the Front Range area; anyone is welcome—there is no dues or registration required. See <http://www.fss-co.org/>, or for extra directions to this meeting place, contact Bob at [rknapp@uccs.edu](mailto:rknapp@uccs.edu), 719-260-7178, or Beth Simmons at [cloverknoll@comcast.net](mailto:cloverknoll@comcast.net).

**Mon., Mar. 19, 3:00 p.m.,** Denver Museum of Nature & Science Earth Sciences Colloquium, **“Floral responses to global environmental change: the end-Permian biotic crisis”,** by Cindy Looy, UC-Berkeley. VIP Room, DMNS; all are welcome, Museum admission fee not required.

**Tues., Mar. 20, 10:30 a.m.,** USGS Rocky Mountain Science Seminar, Building 25 Lecture Hall, Denver Federal Center, **“Great Megathrust Earthquakes in Alaska”,** by Rich Briggs, USGS.



**Tues., Mar. 20, 5:30 p.m., "Mapping Pluto and Its Moons"** by Catherine Olkin, Planetary Scientist, Southwest Research Institute, Boulder; Rocky Mountain Map Society Annual and March meeting, Denver Public Library, 5th Floor, Gates Room, free and open to the public.

**Wed., Mar. 21, 4:00 p.m., The Galápagos: A Fluke of Geology, Ocean Circulation, Penguins and Climate Colloquium**, by Kris Karnauskas, CU Boulder – ATOC/CIRES. Benson Earth Sciences Building Auditorium 180; social hour with refreshments follows in Benson 185. All are welcome.

**Thurs., Mar. 22, 4:00 p.m., Van Tuyl lecture at Colorado School of Mines, Ancient Carbonate Channel-Levee Systems: Browse Basin, NW Shelf Australia**, by Dallas Dunlap, Univ. of Texas at Austin. Berthoud Hall Room 241.

**Mar 23-25, Fort Collins Rockhound Club Gem & Mineral Show**, at The Ranch/Larimer County Fairgrounds, Thomas M. McKee 4-H Building, 5280 Arena Circle, Loveland, CO (I-25 exit 259, Crossroads Blvd; 4-8 p.m. Fri, 9-6 Sat., 10-5 Sun.)

**Tues, Mar. 27, 3:00 p.m., Denver Museum of Nature & Science Earth Sciences Colloquium, "Origins of life: Why did only Earth succeed?"**, by Ramon Brassier, Tokyo Tech., & Steve Mojzsis, CU Boulder. VIP Room, DMNS.

**Tues., Apr. 3, 10:30 a.m., USGS Rocky Mountain Science Seminar, Building 25 Lecture Hall, Denver Federal Center, "Three ways to evaluate how well we know the carbon cycle"**, by Mary Whelan, Carnegie Inst./Stanford Univ.

**Wed., Apr. 4, 4:00 p.m., CU Geological Science Colloquium, Emplacement and exhumation of a Laramide subduction complex in western Arizona**, John Singleton, CSU. Benson Earth Sciences Building Auditorium 180; social hour with refreshments follows in Benson 185. All are welcome.

**Thurs., Apr. 5, 4:00 p.m., Van Tuyl lecture at Colorado School of Mines, Precambrian Layered Mafic Intrusions (?) of the Zimbabwean Craton: Their Economic Importance and Origin**, by Jeff Chaumba, University of North Carolina at Pembroke. Berthoud Hall Room 241; all are welcome.

**Thurs., Apr. 12, 4:00 p.m., Van Tuyl lecture at Colorado School of Mines, Alpine Hydrogeology: The Critical Role of Groundwater in Sourcing the Headwaters of the World**, by Masaki Hayashi, Univ. of Calgary. Berthoud Hall Room 241; all are welcome.

**Thurs., Apr. 12, Colorado Scientific Society's annual Past Presidents' Dinner**, to be held at Mt. Vernon Country Club, featuring a presentation on **Colorado's Exciting New Dinosaurs** by Dr. Joe Sertich, Denver Museum of Nature and Science. Details will be announced.

**Fri., Apr. 13, 4:00 p.m., CU Geological Science Colloquium, Masaki Hayashi, Darcy Distinguished Lecture**, Univ. of Calgary (title TBA). Benson Earth Sciences Building Auditorium 180; social hour with refreshments follows in Benson 185. All are welcome.

**Fri., Apr. 13, North Jeffco Gem & Mineral Club Silent Auction**, APEX Community Recreation Center, 6842 Wadsworth Blvd., Arvada. Auction begins at 6:45 p.m.; all are welcome. For more information call Bill Jones at 303-503-6288 or email at [sidewindermin@comcast.net](mailto:sidewindermin@comcast.net).

**Fri.-Sat.-Sun., Apr. 13-15, Colorado Mineral & Fossil Spring Show**, Crowne Plaza Hotel DIA, 15500 E 40<sup>th</sup> Ave., Denver CO. Free admission; hours 9-6 Fri. & Sat., 10-5 Sun.

**Sat., Apr. 14, Denver 2018 March for Science**; see <http://marchforsciencedenver.org/>.

**Sunday, Apr. 15, a Colorado Scientific Society Spring Field Trip: "Mysterious Front Range Gravels"**, led by Cal Ruleman & Bob Reynolds. Details TBA.



**Tues., Apr. 17, 10:30 a.m.,** USGS Rocky Mountain Science Seminar, Building 25 Lecture Hall, Denver Federal Center, **“Emplacement and exhumation of a Laramide subduction complex in western Arizona”**, by John Singleton, CSU.

**Wed., Apr. 18, 4:00 p.m.,** CU Geological Science Colloquium, **Chris Scholz, AAPG Distinguished Lecturer**, Syracuse Univ. (title TBA), Benson Earth Sciences Building Auditorium 180; social hour with refreshments follows in Benson 185. All are welcome.

**Thurs., Apr. 19, 4:00 p.m.,** Van Tuyl lecture at Colorado School of Mines, **Probing Weathered Bedrock in Earth’s Critical Zone: Rock Moisture and its Implications for Weathering and Biogeochemical Processes**, by Daniella Rempe, Jackson School of Geosciences, University of Texas at Austin. Berthoud Hall Room 241; all are welcome.

**Thurs., Apr. 19, 7:00 p.m.,** Colorado Scientific Society meeting, a pair of talks on **The role of the USGS and the Colorado Geological Survey**; by Eugene (Buddy) Schweig, Director, USGS Geosciences and Environmental Change Science Center, and Karen Berry, Director and State Geologist, Colorado Geological Survey.

**Sun., Apr. 22, Earth Day Geology Hike**, in Red Rocks Park (1 p.m.) with optional (12 noon) shared potluck lunch at the Discovery Center at Dinosaur Ridge. Meet at the Discovery Center, 17681 W. Alameda Parkway. At about 1 p.m. we’ll drive to the Geologic Marker and hike the new Geologic Overlook Trail—a short, 3000’ (3/5 mile) round trip, 240’ elevation gain. We’ll also demonstrate use of the “ROCKD” geologic map app. This will be a joint “general public” + Florissant Scientific Society event; all interested persons are invited. Contact Pete Modreski, pmodreski@aol.com, or (cell) 720-205-2553.

**Wed., Apr. 25, 4:00 p.m.,** CU Geological Science Colloquium, **Geophysics from the Top-Down: the Exoplanet Opportunity**, by Nick Cowan, McGill Univ. Benson Earth Sciences Building Auditorium 180; social hour with refreshments follows in Benson 185. All are welcome.

**Wed. & Thurs., Apr. 25-26, Robert Hazen**, of the Carnegie Institution of Washington, will give several talks at Colorado School of Mines on the theme of **Mineral Evolution, Mineral Ecology, and “Big Data”**. Details will be announced.

**Thurs., Apr. 26, 4:00 p.m.,** Van Tuyl lecture at Colorado School of Mines, **Algorithms for Hurricane Storm Surge Modeling: Current State and Future Outlook**, by Clint Dawson, Univ. of Texas at Austin. Berthoud Hall Room 241; all welcome.

**Tues., May 1, 10:30 a.m.,** USGS Rocky Mountain Science Seminar, Building 25 Lecture Hall, Denver Federal Center, **“Exploring sedimentary environments in Gale Crater with the Mars Science Laboratory Rover”**, by Lauren Edgar, USGS – Flagstaff.

**Thurs., May 3, 7:00 p.m.,** First Thursday lecture series of the Friends of the Colorado School of Mines Geology Museum, **The Colorado-Wyoming State Line Kimberlite District**, by Philip Persson. All are welcome. Expected location: Ben H. Parker Student Center, Ballroom "E", Maple Street, Golden.

**Sat., May 5, 11 a.m. – 2:45 p.m., Colorado Mineral Society Silent Auction**, Holy Shepherd Lutheran Church, 920 Kipling St. (3 blocks north of West 6th Ave.) Lakewood.

**Tues., May 8, 7:00 p.m.,** annual Emmons Lecture sponsored by the Colorado Scientific Society, **High drama at the Paleocene/Eocene boundary in the Bighorn Basin; implications for today**, by Will Clyde, University of New Hampshire. On the CSM campus, location TBA.

**Thurs., May 10, 7:30 p.m.,** Friends of Mineralogy, Colorado Chapter, bimonthly meeting, at Lakeview Event Center, 7864 W. Jewell Ave.: **Five Days on Xuebaoding Mountain, Sichuan Province, China: minerals and geology**, by Markus Raschke, CU.

**Sat., May 12, Dinosaur Discovery Day**, featuring **Boy Scout Day** at Dinosaur Ridge, Morrison, CO. See [www.dinoridge.org](http://www.dinoridge.org) for full information.

**Sun., May 20**, 12 noon to 4 p.m., **Friends of Mineralogy, Colorado Chapter, Silent Auction**, at Clements Community Center, 1580 Yarrow St., Lakewood. All are welcome.

**Fri.-Sat.-Sun., June 1-3, Pikes Peak Gem & Mineral Show**, sponsored by the Colorado Springs Mineralogical Society; at the Norris-Penrose Event Center [new location], 1045 Lower Gold Camp Road #3, Colorado Springs.

**Sun., June 17**, will be the date of the once-yearly **Geology Train** on the Cumbres & Toltec Scenic Railroad, Antonito, CO. See their website, <http://cumbrestoltec.com/>.

*For more lecture series during the year see:*

**Colorado Café Scientifique in Denver**, monthly lectures on science topics held either at Blake Street Station or Brooklyn's, Denver; open to the public, no charge other than refreshments you may choose to purchase; see <http://cafescicolorado.org/>.

**Colorado Scientific Society** (3<sup>rd</sup> Thursday, 7 p.m.), see <http://coloscisoc.org/>. Meets at Shepherd of the Hills Church, 11500 W. 20th Ave., Lakewood CO, except when noted.

**CU Geological Science Colloquium** (Wednesdays, 4 p.m.) see <http://www.colorado.edu/geologicalsciences/colloquium>

**CSU Dept. of Geoscience Seminars** (Fridays, 4 p.m.), see <https://warnercnr.colostate.edu/geosciences/geosciences-seminar-series/>

**Van Tuyl Lecture Series, Colorado School of Mines**, (Thursdays, 4 p.m.): <https://geology.mines.edu/events-calendar/lectures/>

**Denver Mining Club** (Mondays, 11:30), see <http://www.denverminingclub.org/>.

**Denver Region Exploration Geologists Society** (DREGS; 1<sup>st</sup> Monday, 7 p.m.), <http://www.dregs.org/index.html>

**Florissant Scientific Society** (FSS); meets monthly in various Front Range locations for a lecture or field trip; meeting locations vary, normally on Sundays at noon; all interested persons are welcome to attend the meetings and trips; see <http://www.fss-co.org/> for details and schedules.

**Rocky Mountain Map Society** (RMMS; Denver Public Library, Gates Room, 3<sup>rd</sup> Tuesday, 5:30 p.m.), <http://rmmaps.org/>

**Western Interior Paleontology Society** (WIPS; Denver Museum of Nature & Science, 2<sup>nd</sup> Monday, 7 p.m.), <http://westernpaleo.org/>. Meetings are held either in the Ricketson Auditorium or the Planetarium at the Denver Museum of Nature & Science, unless otherwise noted

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***March - Where is this Rock?*** Our mystery rock feature resumes after a month's break. Who can tell us where this nice pile of (is it boulders or bedrock?—you tell us) is? Send your answer to the editor, Pete Modreski, [pmodreski@usgs.gov](mailto:pmodreski@usgs.gov).



### **CSS Officers for 2018**

President..... Bob Raynolds, bob.raynolds@dmns.org  
President Elect..... Tom Casadevall, tcasadev@gmail.com  
Past President..... Marith Reheis, 303-277-1843, marith16@gmail.com  
Secretary..... Lisa Fisher, 303-215-0480, lisa.fisher@alumni.mines.edu  
Treasurer..... Don Sweetkind, 303-236-1828, dsweetkind@usgs.gov

### **Councilors**

2016-2018: Linda Barton Cronoble, lbarton1611@gmail.com, 720-338-1237  
2016-2018: Melissa Foster, melissa.ann.foster@gmail.com, 707-498-2484  
2017-2019: Jim Reed, jim@rockware.com  
2017-2019: Chris Morrison, chris-morrison@comcast.net  
2018-2020: Pete Modreski, pmodreski@aol.com, 720-205-2553  
2018-2020: Matt Rhoades, rhoadesgeo1@gmail.com

### **Committee Chairpersons**

Database Manager: Paul Morgan, 303-384-2648, morgan@mines.edu  
Field Trip Chair: Cal Ruleman, 303-236-7804, cruleman@usgs.gov  
GSA Meeting Co-chairs, Lisa Fisher & Libby Prueher  
History Chair: Beth Simmons, cloverknoll@comcast.net  
Hospitality Chair: Mary-Margaret Coates, geotechedit@gmail.com  
Membership Chair: Bob Raynolds, bob.raynolds@dmns.org  
Newsletter & Publicity: Pete Modreski, 303-202-4766, pmodreski@aol.com or pmodreski@usgs.gov  
Outreach: Joe Mestichelli, joseph.mestichelli@gmail.com  
Past Presidents' Best Paper Award, Marith Reheis, 303-277-1843, marith16@gmail.com  
State Science Fair: Chuck Weisenberg, 303-238-8806, cweisnbrg@msn.com  
Student Programs Chair: Melissa Foster, melissa.ann.foster@gmail.com, 707-498-2484  
Student Research Grants Chair: Marith Reheis, 303-277-1843, marith16@gmail.com  
Webmaster: Chris Morrison, chris-morrison@comcast.net

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***Newly appointed to the CSS Council*** is Matthew Rhoades. Matt is the former State Geologist of New Mexico and has held numerous positions in industry. In our next newsletter, we'll feature a biography of Matt as well as of Tom Casadevall, our CSS President-Elect.

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***CSS outreach to public non-science groups*** (repeating this from an earlier newsletter... please contact us if you would like to be on our list of volunteer speakers!)

As a follow-up to our participation in the March for Science, we'd like to compile a list of members who would be willing to give an occasional lecture or presentation to non-science audiences. Groups such as neighborhood organizations, churches, social groups (Elks, Rotary, etc.) sometimes ask for speakers and it would be wonderful to have a list of knowledgeable people on whom to call. We'd like to post willing speakers and their topics on our website, so that visitors to the site could see what topics might be easily available. If you'd like to participate, please email your name and topic to Pete Modreski, pmodreski@usgs.gov, or Joe Mestichelli, joseph.mestichelli@gmail.com.

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CSS had two ***excellent*** presentations at our February meeting, by Rob Wesson and Wes Brown. We'll say a bit more about them in our April newsletter.