



Colorado Scientific Society

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

***February Meeting, Thursday, Feb. 15, 2018, 7:00 p.m.
Shepherd of the Hills Church, 11500 W. 20th Ave., Lakewood
Social time, 6:30; program at 7:00***

Two presentations:

“In the Footsteps of Darwin”

Rob Wesson

*Scientist Emeritus,
USGS, and Writer*



“How the 1859 gold rush put Colorado on the Map”

Wesley Brown

*Rocky Mountain Map Society,
Philip Lee Phillips Society,
and Alpine Rescue Team*



In the Footsteps of Darwin, Rob Wesson

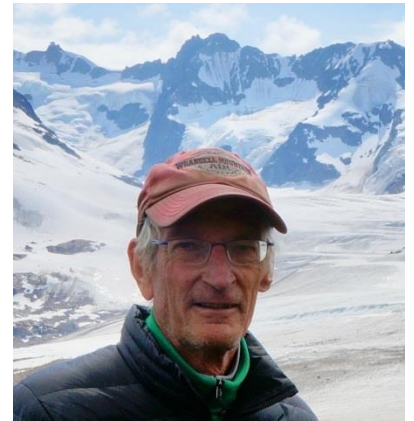


Everybody knows—or thinks they know—Charles Darwin, the father of evolution and the man who altered the way we view our place in the world. But what most people do not know is that Darwin was on board the HMS *Beagle* as a geologist—on a mission to examine the land, not flora and fauna. Or about Darwin’s seminal role in demonstrating and exploring the ups and down of the Earth’s crust. This is the story told in Rob Wesson’s book, *Darwin’s First Theory*, and that he will share with us.

Retracing Darwin’s footsteps in South America and beyond, Rob trekked across the Andes, cruised waters charted by the *Beagle*, hunted for fossils in Uruguay and Argentina, and explored sites of long vanished glaciers in Scotland and Wales. As he followed Darwin’s path—literally and intellectually—he experienced the land as Darwin did, engaged with his observations, and tackled the same questions Darwin had about our ever-changing Earth.

Upon his return from his five-year journey aboard the *Beagle*, after examining the effects of earthquakes, tsunamis, volcanic eruptions, and more, Darwin conceived his theory of subsidence and uplift,—his first theory. These concepts and attitudes—the vastness of time; the enormous cumulative impact of almost imperceptibly slow change; change as a constant feature of the environment—underlie Darwin’s subsequent discoveries in evolution. And this peculiar way of thinking remains vitally important today as we enter the human-dominated Anthropocene age.

As the New York Time Book Review wrote, Rob’s book “dares, thank goodness, to work some of the rare Darwinian territory that is actually underexplored. Tracing the young Darwin’s tracks ... Wesson relates how Darwin hatched his first, favorite, and most overlooked substantive theory, on the origins of coral reefs. In both method and vision—imagining forms changing slowly over time in response to changing conditions—this precocious, even audacious idea anticipated and possibly inspired the theory of evolution Darwin would publish two decades later.”



How the 1859 gold rush put Colorado on the map, Wesley Brown

In the spring of 1858, Colorado's Front Range area was uncharted and inhabited only by Native Americans. But by the close of 1859, 100,000 fortune seekers had thoroughly explored the Front Range, north of Pueblo to the Wyoming border. In their quest for gold, they left their footprints on the landscape, establishing dozens of settlements and blazing numerous trails. This slide show and lecture will teach you about Colorado’s gold rush and how this important chapter of history influenced Colorado maps of today.

Photo captions (p. 1 & 2): “Marco surveying on FitzRoy’s platform after 2010 earthquake” [I expect that in the talk, we’ll learn who Marco was]; “Denver confluence 1859 panorama”; “Rob showing his location on Darwin section across the Andes”; and “Rob at Iceberg Lake”.

Rob Wesson is an earth scientist who also loves stories. As a kid growing up in the Pacific Northwest, he became fascinated by mountains and glaciers. This interest led to a BS in earth science from MIT, and an MS and PhD in geophysics from Stanford University. His career in earthquake research with the U.S. Geological Survey (USGS) spans four decades, where he is currently a Scientist Emeritus. He has also written about science for a popular audience for the USGS and for *Scientific American*. In retirement, his research has turned

to Chile where he is collaborating with a team exploring large earthquakes, tsunamis, and associated tectonic questions. This work has been supported in part by grants from the National Science Foundation. When not traveling to South America or elsewhere, Rob divides his time between his home in Evergreen, Colorado, and the cabin he built near McCarthy, Alaska.

Rob first became interested in Darwin and his geology through reading *The Voyage of the Beagle* on a vacation trip to Patagonia. He became captivated by Darwin's prodigious powers of observation and his insatiable need to understand and explain. Whatever rock, fossil, landscape, rodent, bird, or beetle that he found, Darwin wanted to tell its story.

Wesley Brown has been a collector, student, and author of old maps for 40 years. He confines his map collecting to two areas (1) the earliest world maps up to the year 1540 and (2) the exploration and settlement of Colorado from the 16th through 20th centuries. A Denver resident, he co-founded the Rocky Mountain Map Society in 1990 and served as its President for its first seven years. He has served as the Co-Chairman of the Philip Lee Phillips Society (the national map and geography society of the Library of Congress). Wes has long been associated with the Denver Public Library, as one of its mayoral-appointed Commissioners where he served as President and where he is still active in acquisitions for the institutions important western map collection. He has published many papers on maps.

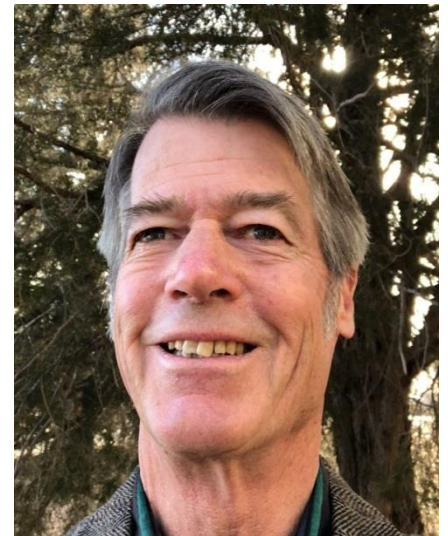
Wes first started using maps at age 16 as a mountain climber and has climbed about 400 different named peaks in Colorado. He is currently a Field Active Member of the Alpine Rescue Team.

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President's Message, February 2018

I hope many of you admired the super blue blood moon. My wife roused the dogs and me out of bed to see the predawn spectacle of a nearby full moon, the second of the month, mottled in orange by the shadow of the earth as it set over the Front Range.

Earlier in the new year my son and I wandered through the overstuffed Dubai Mall, past the multi-story shark tank and rode an elevator to a burnished perch on the Burj Khalifa, the world's tallest tower. I felt like the Ghost from Christmas Past in Scrooge's nightmare; my awe-struck slack open jaw needing a scarf around my head to keep it from gaping at the scene: Far below were architectural marvels, set amidst reflection pools and stately palms. Beyond spread the seven amalgamated Emirates... a population of 70% foreign workers mostly without spouses, sending remittances home. We could see the Dubai airport, busiest in the world and said to be a mere 5 hours flight from half the world's population...many of whom recognize Dubai to be earth's prime tourist attraction. We could see scores of man-made islands where the face of the planet is being changed at a scale easily visible from space. On the surface it appeared grand.



Yet looking between the lines, I could sense a rising tide of fear of missing out ("fomo") spreading across the world and lapping up against the lower floors of the tower.

Beyond city limits, drying palm trees, burned rubber on the wide new roads, and pens full of unemployed racing camels are signals of a changing life style. Young Emerati boys don't tend palm groves anymore, they drive fast cars rather than camels, and aspire to leaving high school and finding a government job; young Emerati girls strive to stay in college as long as they can before their marriage is arranged. The rest and majority of the population lives in fear of having their work permits revoked. Few dare cause disturbance and the place is safe.

In the Dubai Louvre a global audience squinted at the fig leaves covering the vitals of marble statues and at other gaudy treasures from the basement of the Louvre in Paris. What was the audience thinking? Should we want some of this stuff? Are we missing out on stuff? Do we have enough stuff? Does France have more stuff than we do? Should we buy more of Paris and rebuilt it here?

Can citizens the same age as Wikipedia marinated in social media withstand the siren song of stuff and the relentless bombardment of just-missed opportunities?

Our speakers last month (Dave Krause and Liz Johnson) each illustrated with deep conviction ways in which we can assist, support, and inspire young people who live in our research areas. We don't accomplish our science in a vacuum... we are bound together inextricably with all others and together we should make the world a better place. Our Society can play a role in this; watch for collaborations with other groups and participation in events this year as we strive to raise earth science awareness in our region.

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

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A Look at 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. Thanks to Beth Simmons for extracting this information and creating PDFs so we can all enjoy it. ---Chris Morrison, CSS website manager

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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 is planning to have a booth at the informational teach-in this day—we'll share more news about this as available.

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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, or see our facebook page, <https://www.facebook.com/groups/511533159044226/> .

Volcanoes, the Failures of the Gods, and the Collapses of Empires: The 6th Century CE

Friday-Saturday | February 9-10, 2017

Benson Earth Sciences Rm 180 | Free and Open to the Public

One of the two most severe and long cold periods of the past few thousand years began abruptly in 536 CE. The cold lasted for many years, and suppressed evaporation of water from oceans, therefore reducing precipitation resulting in droughts in many areas of the world. The cause evidently was immense volcanic eruptions. In this symposium, we will explore the controversy over which volcanoes were the instigators as well as the historical and religious consequences of the climate changes due to the eruptions.



'The Great Day of His Wrath', John Martin, 1851

Keynote Address, Friday 7PM:

Clive Oppenheimer: Volcanic Eruptions and People's Vulnerabilities and Resiliencies

Saturday Speakers, 8:15AM - 5:00PM:

Payson Sheets: Introduction, nature of stress, impacts, and controversies

Tom Casadevall: Huge Explosive Eruptions: Their nature and effects.

Kees Noreen: Timing and impact of El Chichon's mid-6th century eruption

Robert Dull: The magnitude 7 eruption of Ilopango: Environmental impacts on the Classic Period Maya and the world

Kyle Harper: The Ice Age Cometh: The 536 Event as a Turning Point in Roman History

John Hadon: On 536 CE and the Rise of Islam

Terry Kleeman: Ash fell from a cloudless sky: Chinese Records of the 536 CE Event

Event Details: <https://goo.gl/sycMyW>



Center for the Study of Origins
UNIVERSITY OF COLORADO BOULDER



Center for the Study of Origins

Calendar of Coming Events

Tues., Feb. 6, 10:30 a.m., USGS Rocky Mountain Science Seminar, Building 25 Lecture Hall, Denver Federal Center, “**Volcanic crisis at Agung Volcano, Indonesia: the role of VDAP/USGS**”, by Heather Wright, USGS Cascades Volcano Observatory.

Thurs., Feb. 8, 4:00 p.m., Van Tuyl Lecture at Colorado School of Mines, “**Petroleum Systems Analysis in the Alpine Foreland Basin**”, by Reinhard Sachsenhofer, Montan Universitat Leoben, Berthoud Hall, room 241.

Fri.-Sat., Feb. 9-10, Volcanoes, the Failures of the Gods, and the Collapses of Empires: The 6th Century CE. A symposium at CU-Boulder, Benson Earth Sciences Building, Room 180. Free and open to the public. For event details and an RSVP for free registration, see <https://goo.gl/sycMyW> .

Sat., Feb. 10, 4:00 p.m., “**Finding Darwin**” with Michon Scott -- science writer, web designer, and proprietor of strangescience.net -- at the Secular Hub's Darwin Day event, at the Secular Hub, 3100 Downing St. #C, Denver. The event is free and open to the public. See <https://www.secularhub.org/>. " 'You care for nothing but shooting, dogs, and rat-catching, and you will be a disgrace to yourself and all your family,' Charles Darwin's dad once told him. Darwin failed to become a doctor, but he succeeded in changing how we see life on Earth. Darwin developed the theory central to understanding biology, all the while trying to live down the reputation of his quirky, libertine grandfather. Michon Scott will share her experiences as she traced the presence of Charles Darwin on some of the Galapagos Islands and in England, and will also talk about evolution, Charles Darwin's life, and his grandfather Erasmus Darwin."-- Glenn Branch, Deputy Director, National Center for Science Education (NCSE).

Tues., Feb. 13, 5:30 p.m., at the monthly meeting of the Rocky Mountain Map Society, “**The 100 Most Revolutionary Discoveries in the Field of Geography**”, by Dr. Joseph Kerski, Environmental Systems Research Institute (Esri). Denver Public Library, 5th Floor, Gates Room ; free and open to the public.

Tues., Feb. 13, 7:00 p.m., Kick-off presentation in a new Speakers' Bureau Lecture Series at the Western Museum of Mining & Industry, Colorado Springs: WMMI's former curator, Larry Frank Jr. will discuss his book, **Colorado's Great Depression Gold Rush: The Oliver Twist Tunnel**. Doors open at 6:00 p.m., lecture 7:00 - 8:00 p.m.; \$5 admission, WMMI museum members admitted free. Please RSVP by calling 719-488-0880 or emailing rsvp@wmmi.org.

Thurs., Feb. 15, 4:00 p.m., Van Tuyl Lecture at Colorado School of Mines, “**Landscape Evolution of the Rocky Mountain Cordillera: New Insights from Integrated Geologic Datasets**”, by Theresa Schwartz, Research Square; Berthoud Hall, room 241.

Thurs., Feb. 15, 7:00 p.m., Colorado Scientific Society meeting, “**In the Footsteps of Darwin**” by Rob Wesson, and “**How the 1859 gold rush put Colorado on the Map**” by Wesley Brown.

Fri., Feb. 16, 1:30 p.m., Denver Museum of Nature & Science Earth Sciences Colloquium, “**Modeling growth rates in trilobites**”, by Melanie Hopkins, American Museum of Natural History. VIP Room, DMNS.

Tues., Feb. 20, 10:30 a.m., USGS Rocky Mountain Science Seminar, Building 25 Lecture Hall, Denver Federal Center, “**Oxygen isotope fractionation in the CaCO₃-DIC-H₂O system**”, by Jim Watkins, Univ. of Oregon.

Fri-Sat-Sun, Feb. 23-25, Denver Gem and Mineral Guild, **Jewelry, Gem, and Mineral Show**. Jefferson County Fairgrounds, Exhibits Building, 15200 W. 6th Ave. Golden CO; 10-6 Fri. & Sat., 10-5 Sun.; free parking and admission

Thurs., Mar. 1, 4:00 p.m., Van Tuyl Lecture at Colorado School of Mines, “**Record of sediment transport from the Himalayan-sourced Ganges-Brahmaputra Rivers to the deep-sea Bengal fan: 18 Myr of fan deposition from detrital zircons**”, by Mike Blum, Department of Geology, University of Kansas; Berthoud Hall, room 241.

Thurs., Mar. 1, 7:00 p.m., First Thursday lecture series of the Friends of the Colorado School of Mines Geology Museum, **The Boulder County Tungsten District and its History**, by Ed Raines, Collections Manager, CSM Museum. Location TBA.

Tues., Mar. 6, 10:30 a.m., USGS Rocky Mountain Science Seminar, Building 25 Lecture Hall, Denver Federal Center, **“Replacement, metasomatism dynamics, and the blind spot of geochemists”**, by Enrique Merino, Indiana Univ.

Thurs., Mar. 8, 4:00 p.m., Van Tuyl Lecture at Colorado School of Mines, **“Meeting the challenges of the world’s growing dependence on groundwater”**, by Bill Alley, United States Geological Survey & National Groundwater Association; Berthoud Hall, room 241.

Thurs., Mar. 8, 7:30 p.m. Friends of Mineralogy, Colorado Chapter, bimonthly meeting, at Lakewood Event Center, 7864 W. Jewell Ave. **“Mineral Species and Occurrences of the Swiss Alpine Clefs”**, by Brent Lockhart, of Houston, TX. Alpine-cleft minerals occur in open fissures within tectonically deformed igneous or metamorphic host rocks, in the Alps as well as many other mountain belts worldwide. They are noted for quartz (smoky and “rock crystal”), adularia, fluorite, titanite, anatase, hematite, magnetite, chlorite, axinite, and many other minerals.

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. Please RSVP by calling 719-488-0880 or emailing rsvp@wmmi.org.

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.

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, Golden CO.

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.)

Thur., Mar. 15, 7:00 p.m. March Colorado Scientific Society meeting. **Earthquakes and the public**, by David Wald, USGS, plus a 2nd speaker and talk, TBA.

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 Brassler, 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 Instit./Stanford.

Fri.-Sat.-Sun., April 13-15, Colorado Mineral & Fossil Spring Show, Crowne Plaza Hotel DIA, 15500 E 40th 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/>.

Thur., Apr. 18, 7:00 p.m., April 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.

Wed., Apr. 25 [tentative date], **Robert Hazen**, of the Carnegie Institution of Washington, will give a talk at CSM on **Mineral Evolution and Mineral Ecology**. Details will be available later.

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.

Tues., May 8 (*tentative date, to be confirmed*), annual Emmons Lecture sponsored by the Colorado Scientific Society, **Climate and biology, perspectives from the Paleocene/Eocene transition in the Bighorn Basin; implications for today**, by Will Clyde, University of New Hampshire.

Thurs., May 10, 7:30 p.m., Friends of Mineralogy, Colorado Chapter, bimonthly meeting, at Lakewood Event Center, 7864 W. Jewell Ave.: **Five Days on Xuebaoding Mountain, Sichuan Province, China: minerals and geology**”, by Markus Raschke. Xuebaoding is a mining area in central China, seldom visited by westerners, that has produced many fine specimens of orange scheelite (often on a matrix of muscovite crystals), beryl (aquamarine and goshenite), cassiterite, and numerous other minerals. Markus is a Professor in the Physics and Chemistry Departments at the University of Colorado, Boulder.

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/>.

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; 1st 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, 3rd Tuesday, 5:30 p.m.), <http://rmmaps.org/>

Western Interior Paleontology Society (WIPS; Denver Museum of Nature & Science, 1st Monday, 7 p.m.), <http://westernpaleo.org/>.

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We’ll give **Where is this Rock?** “a rest” for this month; please look for a geo-rock-quiz back in March.

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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
2016-2020: (position not yet filled)

Committee Chairpersons

Database Manager: Paul Morgan, 303-384-2648, morgan@mines.edu
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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
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Webmaster: Chris Morrison, chris-morrison@comcast.net

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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 .