



# Colorado Scientific Society

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

## ***Annual Meeting, Potluck Dinner, and President's Address***

***Wednesday, December 13, 2017, 5:30 p.m.***

**Arbor House, Maple Grove Park, 14600 W. 32<sup>nd</sup> Ave., Golden  
Social time & holiday potluck dinner, 5:30-7:00; Program at 7:00**

## ***DUST! Why Should You Care? (the answer is blowing in the wind) Marith Reheis, Scientist Emeritus, USGS***

***Annual President's Address, abstract:*** Windblown dust is carried all over the world, whether visible or not. Earth-derived dust today is most abundant in arid and semi-arid regions, and in the glacial past in glacio-fluvial areas. So why is dust important? Let me count some of the ways: *[continued next page]*



*[abstract, continued from page one]*

(1) agriculture, (2) ecosystems, (3) dust storms, (4) water supply, (5) human (and animal) health. Dust is the great equalizer of the Earth's surface, because it is the only component (along with other wind-borne materials like volcanic ash and anthropogenic pollutants) that circles the planet.

Dust can be rich in mineral nutrients such as potassium, phosphorus, magnesium, manganese, copper, zinc, boron, and molybdenum. Transported dust is either deposited as a blanket (loess) or added to soils. Loess forms the substrate for the richest crop-growing areas on the planet; dust added to soils contributes critical plant nutrients that may not be available in the parent material. For instance, we now know that dust from Africa provides most of the mineral nutrients external to that held in the biomass to the Amazon rain forest. Dust forms the vast majority of silt and clay-sized particles present in desert soils and dust from distant sources is present in nearly every soil on the planet. Dust is trapped and retained by the biological crust that binds surface sediment in drylands, and thus plays an important role in dryland ecosystems.

What dust brings, it can take away in the form of blinding dust storms with consequences for agriculture, human health, and water supply. The effects of the terrible dust storms of the Dust Bowl days on soil erosion and people are well known. Exposure to excessive amounts of dust can cause asthma and silicosis and can trigger heart attacks and strokes. Dust from some soil surfaces can carry the anthrax bacterium or fungal spores that cause valley fever (coccidiomycosis). And dust from some natural sources, such as desert playas and lakes dried up due to over-use of water, can contain high concentrations of toxic elements such as arsenic, antimony, tungsten, chromium, and lithium. Ongoing studies are showing that dust, when deposited on spring snowpack, decreases reflectivity. This causes snow to melt earlier and faster, and can sharply reduce water supply in late summer and fall.

\* \* \* \* \*

#### Short Biography—Marith Reheis

Marith graduated with a B.S. in Geology from the University of Georgia in 1972. “Desperate to escape from humidity and saprolite, I earned an M.S. from the University of Colorado studying the transport of debris by Arapaho Glacier. After a few years mapping coal in the Conservation Division of USGS, I returned to CU Boulder to study soil genesis under Pete Birkeland. From 1984 to retirement in 2013, I’ve resided in the evolving branches of Regional Geology -- Environmental Geology -- Climate -- Earth Surface Processes -- Geosciences and Environmental Change Science Center. Field areas included northwest Colorado, the Bighorn Basin, Great Basin and Mojave Deserts, and the eastern Colorado Plateau. In parallel, my career has evolved through bedrock and surficial mapping, soil studies, neotectonics, desert dust sampling and analysis, and paleoclimate research, to a state of mixing them all together.”



\* \* \* \* \*

***December 2017 President's Message, Marith Reheis, Scientist Emeritus, U.S. Geological Survey***

This will be my last message to you as CSS President, and somewhat to my surprise, I've enjoyed writing them! We have had an exciting and successful year, with about 25 new members and several well attended trips and special events. We sponsored two field trips: one to view new geologic mapping in South Park in June was led by Peter Barkmann and the second to the White River Plateau in August, led by members of the Denver Museum of Nature and Science, with focus on the paleontology and stratigraphy of Devonian rocks. We just hosted a Family Night at the Colorado School of Mines Geology Museum, welcoming several families with children who participated (along with us grownups) in a museum treasure hunt. And, perhaps most momentous, we participated in the March for Science in downtown Denver in April. Along with the March itself, we hosted a booth that had literally hundreds of visitors over several hours. Finally, in June we teamed with the Jeffco Innovator's Workshop and the Colorado Oil and Gas Association to cosponsor a talk by Robbie Gries on her newly published book "*Anomalies: Pioneering Women in Petroleum Geology 1917-2017*." Remarkably, her talk pushed back into the 1890's for the earliest participation by women in oil exploration!



CSS continued to support and encourage earth science students with Student Night presentations and awards in September. Our Foundation awarded \$11,000 in grant money for field and laboratory work to twelve highly qualified applicants (out of 28 total) from 10 colleges and universities, including 7 PhD, 4 MS, and one BS candidates. And in April, CSS members Chuck Weisenberg and Tom Sutton judged the 2017 Colorado Science and Engineering Fair at CSU and awarded several hundred dollars to four students, two each at the junior and senior levels, for Excellence in Geology. We should be proud of our nurturing of these future scientists. Very little of these activities would be successful without the hard work and enthusiasm of many people, and especially the officers, councilors, and committee chairs who volunteer their talents. Lisa Fisher, Pete Modreski, and Don Sweetkind continue to handle the record keeping, publicity, and finances. Bruce Geller and Jim Reed provided needed input and great humor to the council on many issues and concerns. Chris Morrison continues to maintain and update the website. Melissa Foster not only organized the Student Night presentations but also, along with Peter Barkmann, completely overhauled the Memorial Fund application forms while Peter guided the grant process. Linda Barton-Cronoble set a very high standard for refreshments at every meeting, including the occasional free keg of beer donated by Golden City Brewery! We hope to see you at the annual meeting and potluck, to be held again this year at the Arbor House on West 32<sup>nd</sup> Street in Golden, December 13.

--- Marith

Last Spring the CSS took part in the March for Science in downtown Denver. That organization has now announced a Vote For Science initiative to try to bridge the gap between advocating for science and civic engagement. If you are interested in getting more information on this initiative and ways to educate your community and your representatives on why science and science policy matter, please go to this website:

[https://actionnetwork.org/forms/vote-for-science?source=direct\\_link&](https://actionnetwork.org/forms/vote-for-science?source=direct_link&)

\* \* \* \* \*

***The agenda of our Dec. 13 Annual Meeting*** will include:

**Announcement of the recipient of the Past President's Best Paper of 2017 award.**

**Election of officers for 2018.** Nominees include Tom Casadevall (President-elect), Lisa Fisher (continuing in office as Secretary), Don Sweetkind (continuing in office as Treasurer), and Councilor nominees to be announced. Bob Raynolds, as 2017 President-elect, will assume office as President for 2018. **The "passing of the gavel"** [made of Aspen silver and presented to the Society in 1907] to the new President will take place.

# Colorado Scientific Society financial statement 2017

**SUMMARY:** The budget table below shows a nearly balanced budget for 2017; we are probably running a slight surplus because there are a few dues checks that have been sitting on the Treasurer's desk that have not yet been deposited! Our favorable budget situation is a result of: (a) increasing member dues to \$25; (b) a good response in regular members paying their dues on time; and (3) the one-time boost of dues payments for three lifetime memberships.

Not itemized in the revenue/expense lists below are CSS activities that are approximately revenue-neutral, including field trips and the Past-President's dinner. Also not shown is the pass-through of interest income from our Memorial Funds which is awarded as student grants.

---Don Sweetkind, CSS Treasurer

## Revenue

Dues: 108 regular (3 lifetime), 11 Corresponding, 3 Student, 36 honorary	\$2,825
2016 accrued interest, Endowment Fund	\$1,201
<b>Total revenue</b>	<b>\$4,026</b>

## Annual Expenses

Meeting space (2 Arbor House, 6 church, 1 AMC - Emmons)	\$1,175
Emmons Honorarium	\$1,000
Corporate Insurance (covers liability at meetings field trips)	\$760
Website (Hosting, \$100)	\$100
Student night awards (\$250 and 5x\$50)	\$500
Science Fair awards (\$100, \$75, \$75 and \$50)	\$300
Best Paper award (engraving on plaque and mug)	\$100
Newsletter expenses (stamps)	\$89
Post office box rental	\$40
State reporting fee	\$25
Misc expense (refreshments)	\$90
<b>Total Annual Expenses</b>	<b>\$4,179</b>

\* \* \* \* \*

## Memorial Fund Summary for 2017 ---Peter Barkmann, CSS Past President

There is no doubt that one of Colorado Scientific Society's most important functions is providing assistance to the next generation of scientists by awarding grants through its Memorial Funds Grant Program. The Society maintains six funds that are supported by gifts from members and friends. The six funds are the Ogden Tweto Fund, the Steven Oriel Fund, the Edwin Eckel Fund, the Bill Pierce Fund, and the George Snyder Fund. Each fund targets specific geoscience disciplines. Total income ranges from about \$8,000 to \$11,000 that is awarded to senior undergraduates and graduate students through a competitive application process. The principle balances remain untouched assuring continuation of the program.

In 2016 the Society continued this time honored tradition with a generous total of \$11,000 available for distribution as listed in the following table.

- Tweto \$3,100
- Oriel \$2,050
- Eckel \$1,550
- Pierce \$1,100
- Snyder \$3,200

Twenty eight students submitted applications totaling \$33,090 in requests. Needless to say the selection process was very competitive. There were many excellent submittals covering a wide variety of topics. Applications came in from 16 institutions from across the country with University of Buffalo winning the furthest reach. Colorado institutions were well represented and included five applicants from Colorado School of Mines, four from Colorado State University, one from Fort Lewis College, and one from University of Colorado.

The Memorial Research Funds Committee consisted of Peter Barkmann, Society Past President and committee chair; Marith Reheis, Society President; Melissa Foster, Councilor; and Karl Kellogg, Society member and Past President. The following received grant awards:

**Mike Zawaski**, PhD candidate at University of Colorado: *Stromatolites as chemical and isotopic probes of paleo-environmental conditions across the Permian-Triassic extinction*. Awarded from the Snyder Fund.

**Avriel Schweinsberg**, PhD candidate at University of Buffalo: *What caused the onset of alpine glacier retreat following the Last Glacial Maximum?: A high-resolution deglaciation chronology in the Rocky Mountains, U.S.A.* Awarded from the Tweto Fund.

**Johanna Eidmann**, MS candidate at Colorado State University: *Understanding Post-Flood Channel Adjustments and Reservoir Sedimentation*. Awarded from the Eckel Fund.

**Joseph Milligan**, PhD candidate at Baylor University: *CO<sub>2</sub> reconstruction of the early Paleocene from the San Juan Basin, New Mexico*. Awarded from the Tweto and Snyder Funds.

**Lee Alford**, MS candidate at Colorado School of Mines: *Evolution of Au-bearing quartz-pyrite veins and their association to base metal mineralization in Central City, CO*. Awarded from the Tweto and Eckel Funds.

**Erin Lathrop**, MS candidate at Utah State University: *Capturing changes in the Mesoproterozoic carbon cycle: C-isotope stratigraphy of the ~1254 Ma Bass Formation, Grand Canyon Supergroup, AZ*. Awarded from the Snyder Fund.

**Harriet Cornachione**, PhD candidate at Utah State University: *Chronostratigraphy of dune fields in southern Utah: Implications for Holocene drought patterns of the southwestern Colorado Plateau*. Awarded from the Pierce Fund.

**Charles Mogan**, MS candidate at Northern Arizona University: *Paleoecological and Fire History from Crater Lake, Colorado*. Awarded from the Tweto Fund.

**Paige Wilson**, PhD candidate at University of Washington: *Environmental Change and Plant Response Across the Cretaceous-Paleogene (K/Pg) Boundary: A Study in the Hell Creek Area of Montana*. Awarded from the Oriel Fund.

**Emily Perry**, PhD candidate at Colorado School of Mines: *REE partitioning between fluid-calcite as tracer for metal transport and mineralization processes in alkaline and carbonatitic igneous rocks of New Mexico, USA*. Awarded from the Tweto, Oriel, and Pierce Funds.

**Jacob Thacker**, PhD candidate at University of New Mexico: *Regional tectonic analysis of Laramide orogenesis using field studies, apatite fission track, and (U-Th)/He fission track, and (U-Th)/He*. Awarded from the Oriel Fund.

**Jacob Milton**, Undergraduate at Illinois State University: *Detrital zircon geochronology of the Permian Abo Formation, Sacramento Mountains, New Mexico*. Awarded from the Snyder Fund.

Congratulations to all those awarded grants and commendations for jobs well done for all who submitted but did not get picked this year. Keep up the great work!

\* \* \* \* \*

## **CSS is looking for a new person to serve on our Hospitality Committee!**

Linda Barton Cronoble, who has voluntarily taken charge of coordinating refreshments at meetings for the past several years, is “retiring” from that job for CSS. Thank you very much, Linda, for doing this job for us, and providing great refreshments at all our meetings! We need a new volunteer(s) to replace her, beginning in January/ The two tasks listed below can be combined under one chairperson, or can be done by two separate committee chairs/volunteers:

### **Refreshments:**

- Attend all meetings or arrange substitute
- Purchase food items
- Arrive 30 minutes before ‘social half hour’
- Set up refreshments, usually items such as cookies, snack items, fruit, soda, hot drinks – but can use own imagination or ideas
- Have a donations jar, this usually provides enough funds to purchase items for the next meeting.
- Clean up after meeting

### **Greeting:**

- *Make people feel welcome!*
- Set out sign-in book, name tags, membership forms, other CSS information, any other brochures or information deemed applicable; possibly set up mugs/glasses/logo items to ‘sell’
- Greet members as they arrive, steer them to the book and name tags, and any information or logo items (if any)
- Especially greet new people, encourage them to join, answer questions, introduce them to other members
- Encourage people to volunteer (can have a list of ‘needs’ or ideas)
- Come up with ideas for encouraging attendance, such as door prizes (solicit door prize gifts from local merchants, local corporations, geology related corporations or merchants, authors, etc.)

\* \* \* \* \*

## ***CSS Awards Presented at 2017 Colorado Science & Engineering Fair***

On April 6, 2017, CSS members Chuck Weisenberg and Tom Sutton judged the 2017 Colorado Science and Engineering Fair at CSU and selected the following awards for Excellence in Geology:



## Colorado Scientific Society, Excellence in Geology Awards

Junior Division 2<sup>nd</sup> place \$50

**Josef Perko**, 7th grade Walt Clark Middle School Loveland

**Effects of Dry Ice Sublimation on Mars Geology, Part 2**

Junior Division 1<sup>st</sup> Place \$75

**Kody Donnelson**, 6th grade Fleming Middle School Fleming

**Marble, Marble, Everywhere and What an Acid Rain Drop Will Do**

Senior Division 2nd place \$75

**Wyatt Wienen**, 11th grade Trinidad High School Trinidad

**Effect of Milankovitch Cyclicity on Prehistoric Marine Life of the Late Cretaceous Middle Cenomanian**

Senior Division 1<sup>st</sup> Place \$100

**Jenna Salvat**, 10th grade Coronado High School Colorado Springs

**Characterization of the Pyroelectric and Piezoelectric Effect Exhibited by Alpha-Crystalline Silicon Dioxide: Potential Application as a Micro-Thermovoltic Transducer**

Thanks to Don Sweetkind for preparing the checks for the awards. A certificate with the CSS logo is awarded as well. Judging at the State Science Fair is a unique and rewarding experience. It only takes one afternoon and a drive to Ft. Collins and back. If you are interested in helping to judge for these awards presented by our society, contact Chuck Weisenberg at 303-238-8806.

A complete list of the 2017 awards is at: [http://www.csef.colostate.edu/2017\\_Press\\_Release.pdf](http://www.csef.colostate.edu/2017_Press_Release.pdf) .

\* \* \* \* \*

### ***Corporate Sponsorship of the Colorado Scientific Society (we'll repeat this from last***

***month!)***Corporate sponsorship helps the Society continue to provide earth science-related talks, field trips, and other events to a broad cross-section of Front Range geologists and interested people. Please accept an invitation from the Colorado Scientific Society to become a corporate sponsor, enabling us to continue and expand our programs.

**Cost:** The annual rate for corporate sponsorship is \$200. Alternatively, sponsors may wish to support a specific event, such as underwrite the cash prizes at our annual Student Night competition, our awards to students at the Colorado State Science Fair, or support a field trip.

**Benefits of sponsorship:** All sponsors receive public acknowledgment for their support, including your company logo, name, and web address displayed in the CSS monthly newsletter and on our web page.

**How to donate:** The Colorado Scientific Society is a 501(c)(3) exempt organization, and contributions to it are tax deductible as charitable gifts and contributions. To donate and become a corporate sponsor, contact our Treasurer: Don Sweetkind, CSS Treasurer, email [dsweetkind@usgs.gov](mailto:dsweetkind@usgs.gov) .

\* \* \* \* \*

***CSS outreach to public non-science groups (repeating this too... 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](mailto:pmodreski@usgs.gov).

\* \* \* \* \*

**IT'S NOT TOO EARLY** to renew your membership in the **Colorado Scientific Society** for 2018. Dues are \$25 for regular members, **\$20 if dues renewals are paid before Jan. 31 of each year**, \$10 for corresponding members (outside the Colorado Front Range area) and only \$5 for students. A Lifetime Membership is now available, for \$395.00. Mail a check to the CSS or pay with a credit card using PayPal on the CSS website. Please contact CSS Treasurer Don Sweetkind at 303-236-1828 or [dsweetkind@usgs.gov](mailto:dsweetkind@usgs.gov) if you are uncertain of your dues or membership status. You'll find a membership form on our website at <http://coloscisoc.org/membership-payment/>. Please remember that when you make your dues payment, you might like to include an extra contribution to support one of our **six Memorial Funds** that go toward student research grants, or the Society's Endowment Fund. You'll find all the categories listed on the membership form.

**Colorado Scientific Society, P.O. Box 150495, Lakewood CO 80215-0495** <http://www.coloscisoc.org>

*Did we mention that there's a \$5 discount if you pay your dues before January 31?*

\* \* \* \* \*

**For more news & information about the Society**, always check our website, [www.coloscisoc.org](http://www.coloscisoc.org), or search for us, Colorado Scientific Society, and "like" us on Facebook. Anyone can view our facebook page, whether you have an account or not, at <https://www.facebook.com/groups/511533159044226/>.

Our meetings are normally held on the third Thursday of the month at Shepherd of the Hills Church, 11500 W. 20th Ave., Lakewood. All are always welcome. Social time 6:30, meeting begins at 7. See [www.coloscisoc.org](http://www.coloscisoc.org) for more info. Our next meeting will be on Thursday, January 18, 2018.

\* \* \* \* \*

### ***November's "Where is this rock?"***



We just received one response to last month's "Where is this rock". Cal Ruleman wrote, about the photo of the cross-bedded sandstone, "could be Dawson or Dakota". In fact, it is from the lower part of the Dakota Group (Lytle Formation) along Alameda Parkway on Dinosaur Ridge.

I don't think anyone commented on the other photo (shown here at left), but it is from North Table Mountain,

showing the unusual ridges of lava that outcrop around the highest point on the mountain, appearing as dike-like features, between which is lava with a very pronounced horizontal, tabular jointing. I'll add a few more photos of some curious textures in this lava in our next issue, so I'll defer another "Where is this rock" until January. Till then--Merry Christmas! --- Pete Modreski, editor



## Calendar of Coming Events

**Happy Holidays!** Most or all of the university and museum lecture series have finished for the year now, and will resume in January. For links to their 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; 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, 1<sup>st</sup> Monday, 7 p.m.), <http://westernpaleo.org/>.

## CSS Officers for 2017

President.....	Marith Reheis, 303-277-1843, marith16@gmail.com
President Elect.....	Bob Raynolds, bob.raynolds@dmns.org
Past President.....	Peter Barkmann, 303-384-2642, barkmann@mines.edu
Secretary.....	Lisa Fisher, 303-215-0480, lisa.fisher@alumni.mines.edu
Treasurer.....	Don Sweetkind, 303-236-1828, dsweetkind@usgs.gov

### Councilors

2015-2017: Bruce Geller, bgeller@mines.edu, 303-273-3823  
2015-2017 Pete Modreski, pmodreski@usgs.gov, 303-202-4766  
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

### 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: Linda Barton Cronoble, 720-338-1237, lbarton1611@gmail.com  
Membership Chair: Bob Raynolds, bob.raynolds@dmns.org  
Newsletter Editor: Pete Modreski, 303-202-4766, pmodreski@aol.com or pmodreski@usgs.gov  
Outreach Chair: open  
Past Presidents' Best Paper Award, Peter Barkmann, 303-384-2642, barkmann@mines.edu  
Publicity Chair: open  
State Science Fair: Chuck Weisenberg, 303-238-8806, cweisnberg@msn.com  
Student Programs Chair: Melissa Foster, Melissa Foster, melissa.ann.foster@gmail.com, 707-498-2484  
Student Research Grants Chair: Peter Barkmann, 303-384-2642, barkmann@mines.edu  
Webmasters: Chris Morrison, chris-morrison@comcast.net, and Barb Warden, bwarden@tablemntn.com