

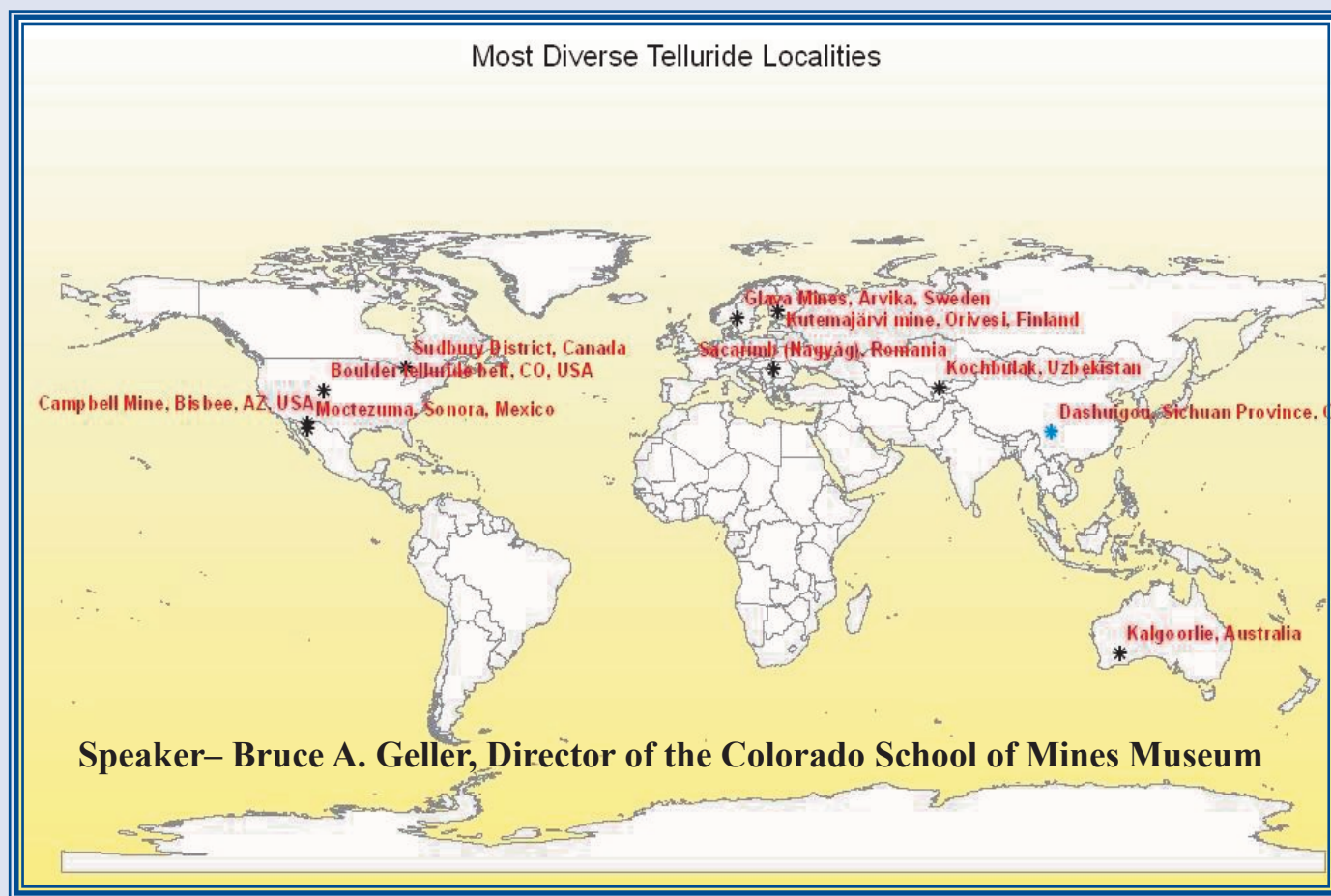


Colorado Scientific Society

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

THE NOVEMBER MONTHLY MEETING WILL FEATURE: 20 YEARS AFTER: A BRIEF UPDATE ON THE STUDY OF TELLURIDE MINERALS AND DEPOSITS

Most Diverse Telluride Localities



Speaker— Bruce A. Geller, Director of the Colorado School of Mines Museum

Thursday, November 20th, 2014

Location— Shepherd of the Hills Church,
11500 W. 20th Avenue (at Simms Street),
Lakewood, Colorado

Social Time — 6:30p.m. Lecture — 7:00p.m.



EVERYONE IS WELCOME



Abstract

Much research has been conducted on telluride deposits (those containing the element Te), applying new tools and insights, in the twenty years since the completion of my doctoral studies (Geller, 1993). Telluride has become a more sought-after commodity, since its application in modern photovoltaic (PV) cells, thermoelectric devices (in military and medical applications), certain memory chips, and guided missiles (George, 2013a). Twenty years ago, telluride was only employed in industrial applications, such as metal alloying, rubber vulcanization, and in glass/ceramic pigments, but continues to be used in these industries today (George, 2013b). It is likely that demand for telluride will grow, as technology advances, catalyzing better understanding of telluride mineral distribution, exploration for more telluride deposits, and improved methods of telluride extraction. All telluride produced until recently, came as a by-product from processing sulfide ores. Only one deposit in China has recently been mined specifically for its telluride.

Although telluride remains one of the rarest elements on earth, the IMA has approved 85 un-oxidized telluride minerals (those lacking O in their formulae). These are found in diverse geologic environments, generally in the trigonal crystal system. Despite similar chemical behavior with selenium, only about 9% of worldwide telluride deposits have any reported selenium species (Ralph, 2014). Literature reported correlations of tellurides with vanadium minerals are also over-exaggerated and run only at about 6% (Ibid). Nineteen elements have been found to bond with telluride in nature, the most common being bismuth, sulfur, and silver. There is no known natural Cd telluride phase. Ralph (2014) reports that the six most typically occurring tellurides on earth (referred to in this talk as ‘the big six’) in order of occurrences are: hessite, tetradymite, altaite, petzite, sylvanite, and calaverite, which strongly corroborates data presented in my dissertation, but not entirely in that order.

Tellurides have been reported on six continents. From data in Ralph (2014), many countries now report tellurides that did not in 1993. China has seen the largest increase in the number of telluride deposits. In 1993, the Boulder Telluride Belt (BTB) in Colorado had the largest diversity of telluride minerals in the geologic literature. Today, eight districts on four continents eclipse the BTB in this distinction (cover photo).

The countries with the most telluride occurrences as reported by Ralph (2014) are: the United States, China, Canada, and Russia, which correlates well with their overall land size. Colorado had the most telluride occurrences per square kilometer of any region in the U.S. in 1993 (Geller, 1993). Extrapolating from data presented by Ralph (2014), Colorado presently has the most telluride occurrences per square kilometer of any known region in the world, statistically.

In the future, more tellurides will be discovered, from more worldwide occurrences, from type localities and occurrences with extremely diverse telluride mineralogy, but they will remain rare, occur in trace amounts, and probably possess similarities to “typical” telluride chemistry (the predominance of Bi, S, Ag, Pb, Pd, Cu, Au, etc.). The ‘big six’ will continue to dominate world occurrences. This study corroborates the value of mineral databases in mineral research.

References:

Geller, Bruce Alan, 1993, Mineralogy and origin of telluride deposits in Boulder County, Colorado,

Univ. of Colorado at Boulder Ph.D. dissertation, 731p.

George, M.W., 2013a. “Mineral resource of the month, Tellurium.” Earth Magazine. March 2013, p.57.

George, M.W., 2013b, “Tellurium,” Mineral Commodity Summaries, U.S. Geological Survey, January 2013,

<http://minerals.usgs.gov/minerals/pubs/commodity/selenium/mcs-2013-tellu.pdf>.

Ralph, J. (2014). Retrieved from <http://www.mindat.org/>





▶ CSS President's Message.....3



▶ Science News5



▶ Calendar of Events.....4

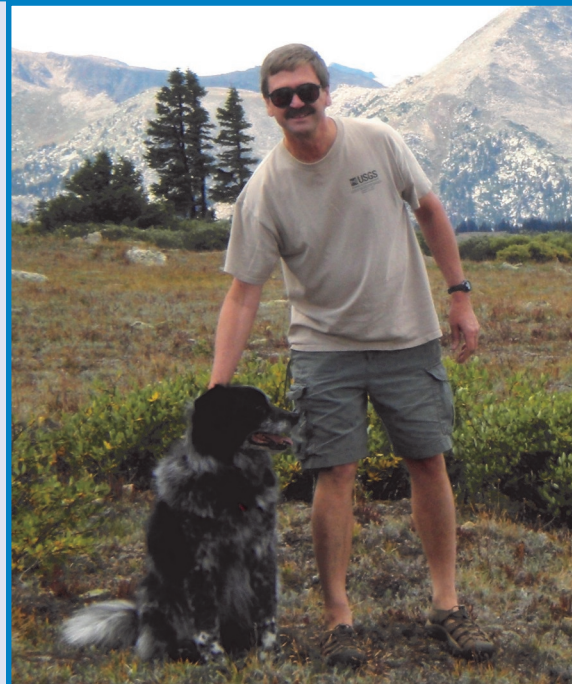


▶ Please and Thank You!.....6

CSS President's Message by Scott Lundstrom

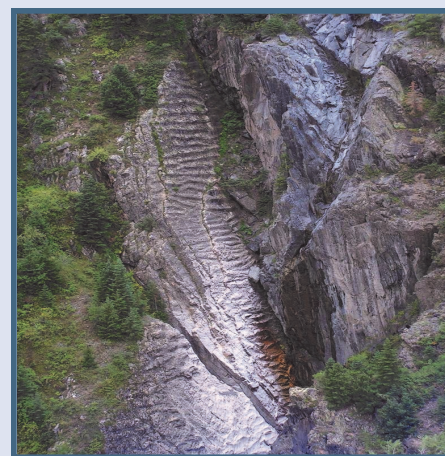
Once again, our annual Student Night in October was a good opportunity to see several excellent presentations covering various sectors of geoscience research by graduate students of Front Range Universities. This was the case for all 5 of our speakers at our October meeting at the wonderful setting of Benson Hall at the University of Colorado. Thus it was a challenge to settle on our winning presentation but in the end, it was Mario Guzman, of the Colorado School of Mines Department of Geology and Geological Engineering for his presentation on Geology of the North Amethyst Au-Ag epithermal deposit, Creede District, Colorado.

For our November meeting, we are fortunate to have Dr. Bruce Geller, Director of the Colorado School of Mines Geology Museum to provide his expertise and globally considered perspective on telluride minerals and deposits. Many of you who have visited the CSM Geology Museum have seen its world class mineral exhibits, and so understand what a great resource it is to our region. In addition to his work as chief curator, Bruce is a good friend and economic geologist who we are very glad to have as our colleague. I am looking forward to his talk and to seeing many of you there.



Where is this Rock? By Pete Modreski

October Picture- We had one completely correct response to October's rock picture, sent by **Elisa McGhee**, Assistant Professor, Aviation & Aerospace Science Dept., Metro State University of Denver. "I submit that the answer is the west wall of the gorge at The Bear Creek Falls Overlook in the Uncompagne Formation south of Ouray. The quartzite ripples and rigid surface were polished by a 3,000' thick glacier which extended 12 miles north to Ridgeway. It is dated at 1.5 billion years. We went to visit Ouray for my birthday in September and happened to visit the overlook. I also happened to get the book "The Western San Jan Mountains- Geology, Ecology and Human History" by Rob Blair, at the used book store in town. That is where I found my answer!" Right on, Elisa! Congratulations!



This month's picture- This time there are two kinds, human-shaped, not natural, and both seen at the same location. What are they, and where?

Calendar of Events- November 2014

Colorado Scientific Society's regular meetings are held the 3rd Thursday of the month at the Shepherd of the Hills Presbyterian Church, 11500 West 20th Ave., Lakewood, CO.
Unless otherwise advertised- Social time begins at 6:30 p.m. and talks start at 7:00 p.m.
For more information, contact Scott Lundstrom, 303-917-2849, pslundstrom@msn.com.

Upcoming CSS Meeting Presentations:

Thursday, November 20th, 7:00 p.m.

Colorado Scientific Society Monthly Meeting/Lecture- "Twenty Years After: A Brief Update on the Study of Telluride Minerals and Deposits."
Speaker- Bruce A. Geller, Director of the Colorado School of Mines Geology Museum.

Free admission. Public welcome!

OTHER EVENTS:

Fri-Sun., Nov. 14-16, "**Denver Mineral Dealers 2014 Gem and Mineral Show**" at the Jefferson County Fairgrounds, Location- Exhibit Building, Golden, CO. No admission charge. Opening/Closing Hours: 10-5 Friday, 10-6 Sat., 11-4 Sunday.

Sat., Nov. 15, 10 a.m.- 4 p.m., Exhibit Opening & Family Day, "**Steps in Stone: Walking Through Time.**" Location- University of Colorado Museum of Natural History, CU campus, Boulder.

"A new exhibition that features real fossil tracks and trackways from the University of Colorado Museum of Natural History collections. Interactive exhibits invite children and adults alike to explore how animals, from insects to dinosaurs, moved across the earth, how their tracks became fossils, and how we study tracks to learn more about ancient landscapes and animals. The exhibit features never before exhibited trackway fossils from the collection of paleontologist Martin Lockley, recently retired from the University of Colorado-Denver. To celebrate this opening, the museum is hosting a free family day with multiple hands-on stations for children of all ages (and grown-ups, too!) to learn about fossil tracks and see the new exhibition. See- "Children's Museum, City of Boulder Open Space and Mountain Parks, and Dinosaur Ridge for activities and information on other places where we can explore fossil tracks in our Colorado backyard."

Sat., Nov. 15, 12:00- 4:00 p.m., **Silent Auction**, gems, minerals, etc., sponsored by the **Littleton Gem and Mineral Club**. Location- Columbine Hills Church, 9700 Old Coal Mine Ave., Littleton, CO 80123. Free refreshments! All are welcome!

Mon., Nov. 17, 3:00 p.m., Denver Museum of Nature and Science, Seminar Series, VIP Room, "**Reconstructing Ancient Colorado with Geologically Accurate Animations.**" Speakers- James Adson, Joseph Rogers, Eric Lobato, and Paul Weimer (UC-Boulder). For information about this research see- <http://igp.colorado.edu/>.

Wed., Nov. 19, 4:00 p.m., CU Boulder Geological Sciences Colloquium, "Tracking the Oxidation State of Earth's Mantle Through Time." Speaker- Dustin Trail, University of Rochester; Benson Earth Sciences Building Auditorium (room 180). Refreshments will be served at 3:30 on the 3rd floor.

Thur., Nov. 20, 7:00 p.m., Colorado Scientific Society meeting, Shepherd of the Hills Church, Lakewood.

Sat.-Sun., Nov. 22-23, 9 a.m.- 4 p.m., "**Garage Sale**" at the Colorado School of Mines Geology Museum, 13th and Maple Streets, Golden. Rocks, minerals, fossils, books, maps, USGS folios, etc. "Prices vary by item or box. Most prices will drop during the event." For more information call: **303-273-3815**.

Wed., Dec. 3, 4:00 p.m., CU Boulder Geological Sciences Colloquium, "**Mastodons and Mountain Climates: Final results from the Snowmastodon Project.**" Speaker- Ian Miller, DMNS. Location- Benson Earth Sciences Building Auditorium (room 180). Refreshments will be served at 3:30 on the 3rd floor.

Fri.-Sat.-Sun., Dec. 12-14, **Flatirons Gem and Mineral Show**, sponsored by the Flatirons Gem and Mineral Club, Boulder. Location- Boulder County Fairgrounds, Exhibit Building, 9595 Nelson Rd. (Nelson & Hover), Longmont, CO. For more info see- <http://bcn.boulder.co.us/community/fmc/fmcshow.htm>

Wed., Dec. 17, 3:00 p.m., DMNS Seminar Series, VIP Room, "**On the Trail of Colorado's Newest, Oldest Sedimentary Rock Formation: Eluded at Every Turn by the Tava Sandstone.**" Speaker-Christine Siddoway (Colorado College). For background information on speaker see- <http://sites.coloradocollege.edu/csiddoway/>.

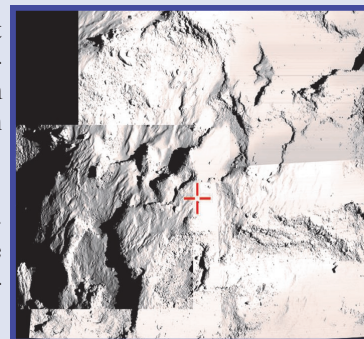


Science News: Philae Lander Reveals Stunning, Unsettling View of Comet

DARMSTADT, GERMANY — Philae may be in a tough spot, literally. After touching down on comet 67P/Churyumov-Gerasimenko, the Rosetta mission's robot has been beaming back striking but somewhat unsettling views of the comet.

Instead of being entirely in open space, the lander is flanked by what looks like a cliff. “We are not sure how far we are from the cliff, but we are in its shadow permanently, which may be a problem,” Jean-Pierre Bibring of the Université Paris Sud in Orsay, France, said at a media briefing on November 13. The lander is also not sitting perfectly on all three legs. It is almost vertical, with two feet on the ground and one in open space, Bibring said.

Being in the cliff's shadow means that the lander's solar panels get less sunlight than mission scientists had anticipated. The data suggest that the lander gets only 1.5 hours of sunlight a day where it has landed, rather than the six to seven hours it would have gotten if it had landed exactly on target, which it did — at first.



On the first touchdown, Philae hit the bull's-eye. But the lander didn't stop there. It bounced twice, touching down three times. In between the first and second touchdown, the lander shot a kilometer up into space and caught almost two hours of air time before it hit 67P again, then sprang another 20 meters in the air. The second bounce lasted 7 minutes. Together the bounces transported Philae from the original target site, Agilkia, to somewhere on the other side of the huge crater on comet 67P's head. The team has not yet pinpointed Philae's exact location.

The bouncing has left mission scientists scratching their heads about exactly what happened after the first landing. If Philae's harpoons had fired and its foot screws had bitten into 67P's surface, the lander wouldn't be in this awkward position. But the bounce does have a positive spin. The acrobatics provide a major piece of information that scientists currently lack in the characterization of comets: a comet's surface gravity, said planetary scientist Tony Farnham of the University of Maryland. The team cannot yet determine the exact surface gravity of 67P, Bibring said, but added that there was a good mix of fine powder and harder, rocklike material. Philae is collecting data that will soon provide more insight into this geology and the surface gravity of the comet.

The main concern right now, Bibring said, is trying to stabilize Philae so it can use all of its instruments to explore the comet. With Philae sitting on only two unanchored legs, using mechanical instruments like the drill SD2 could push or pull on the lander and send it back into space for another little hop or two — not something the team wants to risk. However, Bibring said the team is considering working very carefully with some of the mechanical instruments, like MUPUS, to try to jiggle Philae onto all three of its feet.

Philae has only 60 hours of battery power, and with the precarious position of the solar panels, the scientists are trying to cram in as much science as they can as quickly as possible. Decisions will be made soon about when to use the drill and other instruments that could affect Philae's physical position. These instruments are the ones that will directly sample 67P's surface, a critical element of the mission, Bibring said.

There's a chance that after the batteries run out, Philae could go into a safe mode and come to life again in a few months when the seasons change and the solar panels can get more sunlight. But that's a lot of speculation, said Philae project manager Stephan Ulamec of the German Aerospace Center in Cologne.

Bibring was adamant that despite the less than perfect conditions in which Philae now finds itself, the focus should remain on the here and now, with the fact that the team landed a robot on a comet, it's alive and it has the ability to study 67P, however limited the time and capacity may be.

If Philae doesn't execute its full mission, a piece of the puzzle is lost, but not the whole thing, Farnham said.

Citations- [European Space Agency: Rosetta mission](#)



Pleas and Thank Yous

It's Time to Pay Dues for 2015...

Membership dues for the coming year (2015) are now being accepted. You will find a dues payment form in this newsletter or on the CSS Web site: www.coloscisoc.org/membership/dues.html

Dues payments are \$20 for regular members; \$10 for corresponding members (outside the Colorado Front Range area), and \$5 for students. You may pay your dues by mailing a check to the CSS, or pay with a credit card using PayPal on the CSS website.

CSS Treasurer Don Sweetkind will send out an email to all members with information on their dues paid status. If you are uncertain if you owe dues or of your member status, or if you have not received a receipt for a past contribution, contact CSS Treasurer Don Sweetkind by phone at 303-236-1828 or by e-mail at dsweetkind@usgs.gov.

Refreshments at Meetings Again!

Colorado Scientific Society member **Jack Krajewski** has volunteered to bring refreshments to our monthly meetings!!!
A BIG THANK YOU to Jack!



The Colorado School of Mines (CSM) Geology Museum is having a combined used book sale/garage sale November 22+23. The hours are 9-4 on Saturday and 9-4 on Sunday. Most prices will decrease throughout the event. **The sale will be in the Museum building in the room across the hall from our entrance.**

Our staff and volunteers have sorted through at least one thousand books, rocks, maps, and U.S.G.S. folios. In short, there's a wide range of publications and specimens for rock hobbyists at many levels.

The Museum address is 1310 Maple Street in Golden and our phone number is 303-273-3815. We accept cash, checks, and credit cards. Members of the "Friends of the CSM Geology Museum" receive a 20% discount on all their purchases.

Parking on campus lots and streets on weekends is totally free.

New Publication:

Is there Dakota Sandstone in Utah or Colorado?

An interesting and provocative new publication: **"Where the Sea Meets the Land: The Unresolved Dakota Problem in Utah"**, by Ken Carpenter, 2014, in MacLean, J.S., Biek, R.F., and Huntoon, J.E., editors, *Geology of Utah's Far South: Utah Geological Association Publication 43*, pp. 356-372.

Ken Carpenter, formerly with the Denver Museum of Nature and Science, is now at the Prehistoric Museum, Utah State University Eastern, Price, UT, Director and Curator of Paleontology and Associate Vice Chancellor. In this paper, Ken presents arguments that the sandstones deposited along the western margin of the Cretaceous Interior Seaway are not the same as those formed at the eastern margin, and should not be considered part of the same Formation or Group as the type Dakota Sandstone of eastern Nebraska and western Iowa. The sources of the clastic sediments of the "Western Provenance" sandstones (lower Mesozoic and Paleozoic sedimentary rocks) differ from those of the "Eastern Provenance" (Precambrian crystalline and Paleozoic rocks). Many of the western sandstones have been given their own Formation names over the years—Naturita, Romeroville, Mesa Rica, Pajarito, Lytle, South Platte—but others, in Utah, are still referred to as "Dakota"; Ken thinks that this is lithologically and genetically incorrect. His very readable paper contains a good account of the history of this situation, with maps showing the development of understanding and interpretation of these "strata at the base of the Cretaceous marine rocks". Worth reading! ---

Pete Modreski, USGS

CSS Student Night Results



Student Night Participants– left to right: Mario Guzman , Linda Glickstein, Kevin McCoy, Amy Kenwell, and Ethan Faber

The Colorado Scientific Society expresses its appreciation for the excellent talks presented by all five of our 2014 Student Night Competition speakers and those who acted as judges. All participants received a cash award from the Society, with a First Place award being given to the one judged to have given the best presentation.

Mario Guzman, M.S. candidate, Department of Geology and Geological Engineering, Colorado School of Mines:
Geology of the North Amethyst Au-Ag Epithermal Deposit, Creede District, Colorado
BEST STUDENT PAPER AWARD WINNER

Kevin McCoy, Ph. D. candidate, Department of Geology and Geological Engineering, Colorado School of Mines:
Comparison of Economic Risk from Post-Wildfire Debris Flows at Three Sites in the Western United States

Linda Glickstein, B.S. candidate, Department of Earth Sciences, University of Northern Colorado:
Changes in Morphology In and Around the North St. Vrain River Due to the September, 2013 Flood

Amy M. Kenwell, M.S. candidate, Department of Geology and Geological Engineering, Colorado School of Mines:
Using Geochemical Indicators to Distinguish High Biogeochemical Activity in Sediments

Ethan J. Faber, M.S. candidate, Department of Geology and Geological Engineering, Colorado School of Mines:
A Landslide Risk Evaluation and Reduction Matrix for Lower Income Communities in Guatemala City



**Please note: our December meeting will be on the evening of Thursday, Dec. 18 and will include our annual Business meeting, President's address, and Holiday Potluck!
(More details will be in the next newsletter)**



2014 CSS Elected Positions

President:.....Scott Lundstrom, 303-917-2849, pslundstrom@msn.com
President Elect:.....Paul Morgan, 303-866-2611, paul.morgan@state.co.us
Treasurer:.....Don Sweetkind , 303-236-1828, dsweetkind@usgs.gov,
Secretary:.....Lisa Fisher, 303-215-0480, lisa.fisher@escalantemines.com
Past President.....Matt Sares, 303-866-3581 x8290, matt.sares@state.co.us

We are still seeking volunteers or nominations to fill several vacant posts. They are:

- ◆ Outreach Chair
- ◆ Publicity Chair
- ◆ Hospitality Chair
- ◆ Program Chair



We will also gladly accept volunteers to serve on any and all of our standing committees. If you have any questions regarding the duties of these positions, please call your favorite officer, councilor, or chair.

Please consider volunteering—many hands make lighter work and we would love to have a larger pool of ideas and contacts!

COUNCILORS

2013–2015: Marieke Dechesne, mdechesne@usgs.gov
2013–2015: Liz Pesce, pesce.e@gmail.com
2014–2016: Celia Greenman, celia.greenman@earthlink.net
2014–2016: Peter Barkmann, barkmann@mines.edu
2012–2014: Rebecca Flowers, rebecca.flowers@colorado.edu
2012–2014: Pete Modreski, pmodreski@aol.com

COMMITTEE CHAIRPERSONS

Best Paper Award: Matt Sares, 303-866-3581 x8290, matt.sares@state.co.us
Database Manager: Paul Morgan, 303-866-2611, paul.morgan@state.co.us
Field Trips: Cal Ruleman, 303-236-7804, cruleman@usgs.gov
History: Beth Simmons, cloverknoll@comcast.net
Hospitality: Open
Membership/Mentor: Liz Pesce, epesce@mines.edu
Memorial Funds: Matt Sares, 303-866-3581 x8290, matt.sares@state.co.us
Newsletter Editor: Linda Barton Cronoble, 720-338-1237, lbarton1611@gmail.com
Outreach: Open
Program: Open
Publicity: Open
State Science Fair: Chuck Weisenberg, 303-238-8806, cweisnrg@msn.com
Webmaster: Barb Warden, 303-278-2701, bwarden@tablemtn.com

Colorado Scientific Society
P.O. Box 150495
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Colorado Scientific Society

Application and Membership Update Dues and Funds Contributions

Date _____

New Member _____

Renewing Member _____

(email address)

(Telephone)

(Last Name)

(First Name)

(Initial)

(Address)

The success of most Society activities depends on volunteer help. Please circle any activities for which you can provide assistance. We will pass your name on to the appropriate Committee Chairperson.

Field Trips

History

Outreach

Fund Raising

Newsletter

Program/Talks

Annual Dues (January – December)

Regular Members \$20 _____

Corresponding Members \$10 _____

Student Members \$5 _____

Memorial Funds: These funds support research grants to graduate students in the Earth Sciences throughout the nation. *Please note if contribution is made in the memory of an individual.*

Ogden Tweto Memorial Fund _____

Steven Oriel Memorial Fund _____

Edwin Eckel Memorial Fund _____

Bill Pierce-Heart Mountain Fund _____

George Snyder Memorial Fund _____

Chuck Pillmore Memorial Fund _____

Endowment Fund:

This fund is used to support the Society's monthly meetings and newsletter, field trips, family night, annual Emmons Lecture, invited speaker honorarium, and special activities. _____

TOTAL CONTRIBUTIONS (DUES AND FUNDS): _____

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Colorado Scientific Society

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<http://www.coloscisoc.org/membership/duespaypal.htm>