



Colorado Scientific Society

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



New Horizon- Lower Dakota Coal Bed

**2013 Update of Wyoming
And Colorado Coal Industries,
Geology, and Coal Resources**

Chris Carroll - Thursday January 17, 2013 Social half-hour 6:30pm, Meeting time 7:00pm

Abstract

Tertiary and Cretaceous western US coal provides the nation with its most prolific coal mining regions. Wyoming leads the nation in producing low-sulfur Tertiary coal from its 17 world-class surface mines in the Powder River Basin. Wyoming produces 400 MT of coal annually, which is more than the next six coal-mining states combined. Colorado is ranked ninth, and has increased its production of Cretaceous coal by 10% in the past year. The economic value of coal production in the two states is about \$6 billion annually.

Wyoming produces coal mostly from the Paleocene Tongue River member of the Ft. Union Formation. Colorado coal is from the Cretaceous Mesaverde Group (Upper Williams Fork and Bowie members) and the coal-bearing part of the Dakota Sandstone on the western slope, and the Paleocene/Cretaceous Raton Formation near Trinidad. Paleocene coals of the Rocky Mountains and Northern Great Plains contain low sulfur and ash content, while the Cretaceous coals have low to moderately low sulfur and ash, marking these coals as the most important compliant coal resources in the US.

No Charge For Anyone!



Everyone is Welcome!

Bio for Chris Carroll:

Chris was with the Colorado Geological Survey (CGS) from 1989 to 2012. He has authored or co-authored nine geologic quadrangles maps in Colorado Springs, Durango, South Park, and Glenwood Springs, and mapped over 100 miles of the Fruitland Formation coal outcrop in the Colorado part of the San Juan Basin. He recently began work with the Wyoming State Geological Survey as their coal geologist. His main coal research interests include coal resource assessments and coal availability studies in the Somerset, Yampa, White River, Danforth Hills, and Trinidad coal fields. He has completed several publications on coal resources in Colorado, and is the author of the Historic Coal Mines of Colorado, the Colorado Coal Directory, and the Coal Resource Maps of Colorado. He is currently working with the USGS on a cooperative National Coal Resource Data System (NCRDS) coal program in the Greater Green River area of south-central Wyoming.

Mr. Carroll is a graduate of the University of California at Santa Barbara in geology with an emphasis in geophysics. Chris is the past-president of the Friends of Dinosaur Ridge, and past chair of the Geological Society of America's Coal Geology Division. Most importantly he is an expert whitewater rafter with over 10,000 miles of rivers in the western and southwestern US.



▶CSS President's Address.....2



▶Pleas and Thank Yous...3



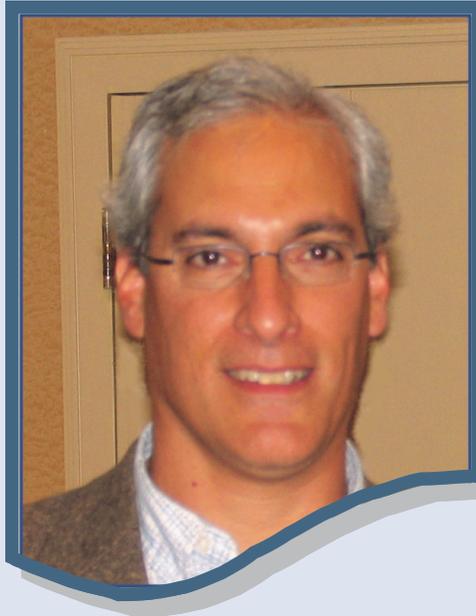
▶Calendar of Events....4, 5



▶Where is this rock?.....7

PRESIDENT'S MESSAGE BY MATT SARES

Happy New Year to all our members! This year, 2013, marks the 131st year of the Colorado Scientific Society. Through all these years the hallmark of the Society has been “to facilitate the interchange of scientific observations and ideas, and promote intercourse among the observers themselves,” as stated by Samuel F. Emmons during the founding meeting in December 1882. The new and continuing officers, councilors, and committee members for 2013 are working to continue that important function and proud tradition for today’s geological and broader scientific community.



CGS, the last several serving as Deputy Director. I moved to the Colorado Division of Water Resources in 2011 as the manager of the Hydrogeological Services Branch, which helps to administer the use of groundwater from the multiple basins and aquifers in our state.

As with any non-profit organization, there are many places where we could use your talents. Please consider volunteering on one of our committees. Specifically we need chairpersons for our Outreach, Program, and Publicity committees. These positions can adapt to the time you have available. So even if your time is limited, please consider volunteering.

As the new president, there are some members who know me well, but many may not. Therefore, it is appropriate to give a short summary of my background and career. Born and raised in Toledo, Ohio, I came to Colorado in 1982 after receiving my B.S. in Geology from the University of Toledo. I was fortunate to find work with a start-up oil and gas geological consulting company in Boulder. We performed detailed, basin-wide stratigraphic studies creating maps and regional databases of producing formations. Upheaval in the petroleum industry led me to graduate school at the Colorado School of Mines leading to a graduate Professional Degree in Hydrogeology. I worked with the Colorado Geological Survey from 1991 to 2011, where most of my scientific investigations centered on the role of geology in groundwater and water quality issues. I had 20 fruitful and rewarding years at

This year, I’m asking each member to bring at least one coworker or friend to a CSS meeting – whether it is one of our monthly meetings, a field trip, the Emmons Lecture, or Student Night. This way they can experience our rich “interchange of scientific observations and ideas” and hopefully join in our endeavors.

Finally, this message would not be complete without expressing our sincerest appreciation and thanks to Pete Mordreski for his leadership and energy over the past year as President. Likewise, we thank Lisa Rukstales for her many years of selfless service as our newsletter /graphics chairperson. Our hats are off to both of you!

Did You Know....?

While we certainly have some big volcanoes here on Earth, the biggest known volcano in our solar system is actually on Mars. Its name is Olympus Mons and it measures a whopping 600km (373 miles) wide and 21km (13 miles) high.

- <http://www.sciencekids.co.nz/sciencefacts.html>
- <http://www.comicvine.com/forums/battles/7/can-your-team-escape-from-volcano-island/629706/>





From the Past President

As 2012 ends and a new year begins, I would particularly like to thank our newly elected President and President-Elect, Matt Sares and Scott Lundstrom respectively, for being willing to step up on short notice and agree to take charge of the Colorado Scientific Society for the coming year. To recap what I said in the December newsletter, my sincere appreciation goes to all the officers, councilors, and committee chairs who have, past and coming year, volunteered their time and efforts to the Sci Soc. I would like to give one more mention of extra thanks, to Lisa Rukstales for her fine work in preparing our newsletter throughout the past five years, and to Linda Barton, our new newsletter editor, for cheerfully stepping up to volunteer for this job at our December meeting.

My last thoughts for all:

- 1).Talk to a friend or colleague (or even better, to several!), tell them about the Sci Soc and encourage them to come to a meeting and to join.
- 2). Post a copy of the flier about our next meeting on a bulletin board where you work.
- 3). Remember to pay your dues for 2013, and consider making an extra donation toward one of our memorial funds or the endowment fund.
- 4). Finally, have a wonderful New Year, and I'll look forward to seeing you on January 17 and at our other coming meetings and, come spring and summer, our field trips!

Pete Modreski

It's Time to Pay Dues for 2013...

Membership dues for the coming year (2013) 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. If you are uncertain if you owe dues or of your member status, contact CSS Treasurer Don Sweetkind by phone at 303-236-1828 or by e-mail at dsweetkind@usgs.gov.

As you pay your dues, please consider making an additional contribution to one of our Memorial Funds, which support our student research grants program, or the Endowment Fund, which we use to defray operating costs. Any contributions made in calendar year 2012 (checks dated before 1 January 2013), will be credited toward the 2012 tax year.

Please remember that your entire contribution goes towards generating interest for the grants and that your contribution is 100% tax deductible because the Society is a non-profit Section 501 (c)(3) organization. Through interest income generated by our Memorial Funds, we have awarded over \$125,000 in research grant funding to more than 165 students. This year we also supported the participation of about a dozen students on our field trips through the Pillmore Fund. See next page for the 2012 Memorial Fund grant awardees and research topics.

PLEASE support our future scientists by generously supporting the *Colorado Scientific Society*. **Thank you!!**

Congratulations
to ***Beth Simmons, Ph.D.!***

The Arthur Lakes movie has been accepted into the Colorado Environmental Film Festival, a February event at the Mountaineering Center in Golden! I'll let you know the dates and times when I know more!



WANTED:



NEW CSS MEMBERS!

PLEASE INVITE A FRIEND OR NEIGHBOR TO OUR NEXT MEETING OR EVENT!

Colorado Scientific Society

Visit our Website:
<http://www.coloscisoc.org>



Calendar of Events- January

- ◆ FYI, **Volunteers Welcome!** – to be judges at several **Denver Public Schools Science Fairs**. Help is needed in the mornings, approx. 8:45 a.m. – noon.. Coming science fairs will be on **Jan. 15, 17, and Feb. 7**
- ◆ Saturday, **Jan. 26** will be the **DPS District Science Fair**, held at the Denver Zoo, If you are willing to help at any of these, please contact Debbie Turner, CRI, Debbie_turner@dpsk12.org or call **720-424-2300**. Ask your friends and colleagues to help too!
- ◆ **Thurs., Jan. 17**, at the monthly meeting of the **Colorado Scientific Society**, a talk by Chris Carroll, Coal Geologist, Wyoming Geological Survey (formerly with the Colorado Geological Survey). Social time, 6:30-7:00 p.m., speaker, 7:00 p.m.). At Shepherd of the Hills Presbyterian Church, 11500 W. 20th Ave., Lakewood; all are welcome to attend. For more info see <http://www.coloscisoc.org/>.
- ◆ **Tuesday, January 15, CO-AIPG January Luncheon**
Golden Corral Buffet & Grill, 3677 South Santa Fe Drive, Sheridan, CO 80110 (Southwest side at Santa Fe Dr. & Hampden Ave.) Lunch starts at 11:30 AM, Speaker 12:30 PM
"Geothermal Energy - An Opportunity for Distributed Power Generation and Energy Savings in Colorado" Paul Morgan, Colorado Geological Survey
Price: Buffet lunch (approx. \$10) must be purchased for entry to the Golden Corral. A additional voluntary tip of \$1/ person is requested for the wait staff in the meeting room. Free parking.
For more info: Contact Jim Burnell, jim.burnell@state.co.us.
- ◆ **Four Corners Geological Society January Meeting**
TITLE: Diagenetic Evolution of Porosity in Carbonates during Burial
SPEAKER: Dr. Art Saller, AAPG Distinguished Lecturer
DATE/TIME: **Thurs., Jan. 24, 2013**: Social Hour-5:30 PM, Dinner-6:00 PM, Speaker-7:00 PM
LOCATION: Colorado Room (at back of Ballroom in Student Union Building), Fort Lewis College, Durango, CO
COST: \$20 per person w/dinner (Students Free); \$2 per person for talk only
RSVP by Jan. 18 to: Gary Gianniny, gianniny_g@fortlewis.edu, (970) 247-7254
- ◆ **Denver Gold Group's January Networking Luncheon**
WHEN: **Wednesday, January 23, 2013**
11:30 AM - 1:00 PM
WHERE: Four Seasons Hotel, 1111 Fourteenth Street, Denver, Colorado 80202 RSVP by Tuesday, January 22, 2013
COST: Registration Fee: \$40. For registration, go to <https://www.cvent.com/events/2013-january-denver-luncheon/registration-559d5cdb7e274f1f9941a00eba183de1.aspx?i=30741cbd-1456-4814-8a52-98deda5471b8>
- ◆ **DENVER MINING CLUB LTD.**
Local Chapter of the INTERNATIONAL ORDER OF RAGGED ASS MINERS, Establ. 1891
Golden Corral Buffet & Grill
3677 South Santa Fe Drive, Sheridan (Southwest side at Santa Fe Dr. & Hampden Ave.) Purchase of buffet lunch required.
Every Monday, except when noted 11:30 a.m. - 1:00 p.m. (+/-)
VISITORS ALWAYS WELCOME!
January 7--Dave Wright, Historian, Leadville, Colo. Mining History of Clear Creek (near Granite, Colo.). Video presentation.
January 14--John Googins, Applications Engineer, Aggregate & Mining Consultants LLC. The Banana Screen.
January 21--No Meeting. MLK Birthday Holiday.
January 28--Phillip Martinez, Vista Mining Adventures. Fine Gold Recovery in a Commercial Mining Operation.
- ◆ Please email (pmodreski@usgs.gov) for a complete list of all USGS seminars scheduled through May 28.

More Events

PTTC Short Courses

Basic Well Log Interpretation Monday-Wednesday, **January 28-30**, 8:30 am - 5 pm, **Colorado School of Mines**, Ben Parker Student Center Ballroom DE Fee: \$650, includes food at breaks, class notes, and PDH certificate Instructor: Dr. Dan Krygowski, The Discovery Group, Denver, CO Limit: 60 persons

Petrophysics of Unconventional Reservoirs Thursday Friday, **January 31-February 1**, 8:30 AM-5:00 PM **Colorado School of Mines**, Ben Parker Student Center Ballroom C Fee: \$450, includes food at breaks, class notes, and PDH certificate Instructors: Robert Cluff, The Discovery Group, Inc.; Michael Holmes, Digital Formation, Inc. Limit: 40 persons Class

Descriptions and Register Online: www.pttcrockies.org

For more information, contact Mary Carr, 303.273.3107, mcarr@mines.edu

USGS Rocky Mountain Area Seminar Series. Seminar begins at 10:30 a.m., Building 25, Lecture Hall, Denver Federal Center, Lakewood CO. For more information contact Pete Modreski - 303-202-4766 . E-mail - pmodreski@usgs.gov

January 8. Geoff Plumlee, USGS, Denver. "Linking geology and health to help understand a deadly outbreak of childhood lead poisoning from artisanal gold mining, northwest Nigeria."

January 15. Andy Manning (USGS Denver). "Potential links between climate change and water quality degradation in a mineralized watershed."

Enter the Federal Center via the main gate (Gate 1) on Kipling St., and go north to the large parking lot (with overhead solar photovoltaic panels) east of Building 25; enter Bldg. 25 via the Security station at entrance E-14, near the center of the building.

Thurs., Jan. 10, 7:30 p.m. in the VIP Room, Denver Museum of Nature and Science, at the bimonthly meeting of Friends of Mineralogy, Colorado Chapter, Dr. Joseph R. Smyth, CU-Boulder, will give a talk on **X-ray Diffraction and X-ray Crystallography** . All are welcome to attend. Dr. Smyth is a noted expert on X-ray crystallography and on the nature of minerals in the earth's deep interior.

RMAG 2013-- AAPG Distinguished Lecturer Series

Speaker: Art Saller, AAPG Distinguished Lecturer

Topic: Diagenetic Evolution of Porosity in Carbonates during Burial

Wednesday **January 16, 2013**

Location: Denver Marriott City Center 1701 California, Denver, Colorado 80202

Check in: 4:30 pm; Talk: 5:00 pm

Pre-registered Member Price: \$45 Walk-in Member Price: \$65

Pre-Registered Non-Member \$65 Walk-in Non-Member: \$85

ONLINE REGISTRATION CLOSES 5 pm on THURSDAY, JANUARY 10, 2013

Light appetizers and cash bar will be provided.

To Register, visit www.rmag.org

NGWA Short Courses

Short courses being offered by the National Ground Water Association in Denver in February 2013:

Feb 4 Hydrogeology Fundamentals and Refresher (#320); 0.75 CEUs (See <http://www.ngwa.org/Events-Education/shortcourses/Pages/320feb13.aspx> for more information)

Feb. 5 Effective Technical Writing: Principles and Strategies (#203); 0.75 CEUs (See <http://www.ngwa.org/Events-Education/shortcourses/Pages/203feb13.aspx> for more information)

Feb. 6-7 Fundamentals of Groundwater Geochemistry (#235); 1.45 CEUs (See <http://www.ngwa.org/Events-Education/shortcourses/235/Pages/235feb13.aspx> for more information)

Feb. 6-8 Low-Cost Remediation Strategies for Contaminated Soil and Groundwater (#142); 2.1 CEUs (See <http://www.ngwa.org/Events-Education/shortcourses/142/Pages/142feb13.aspx> for more information)

Mountains Are Only Minor Contributors to Erosion and Climate Regulation

Jan. 7, 2013 — Though churning smokestacks, cud-chewing cows and gasoline-burning vehicles are contributing constantly to greenhouse gas emissions, there are also many processes that do the reverse, pulling molecules like carbon dioxide out of the atmosphere. One of these is chemical weathering, which occurs when rock turns into soil. Carbon dioxide molecules and rain combine to dissolve rock, and the weathering products, including sediment, eventually make their way through waterways to the ocean where some become trapped on the ocean bottom and in coral reefs and seashells.

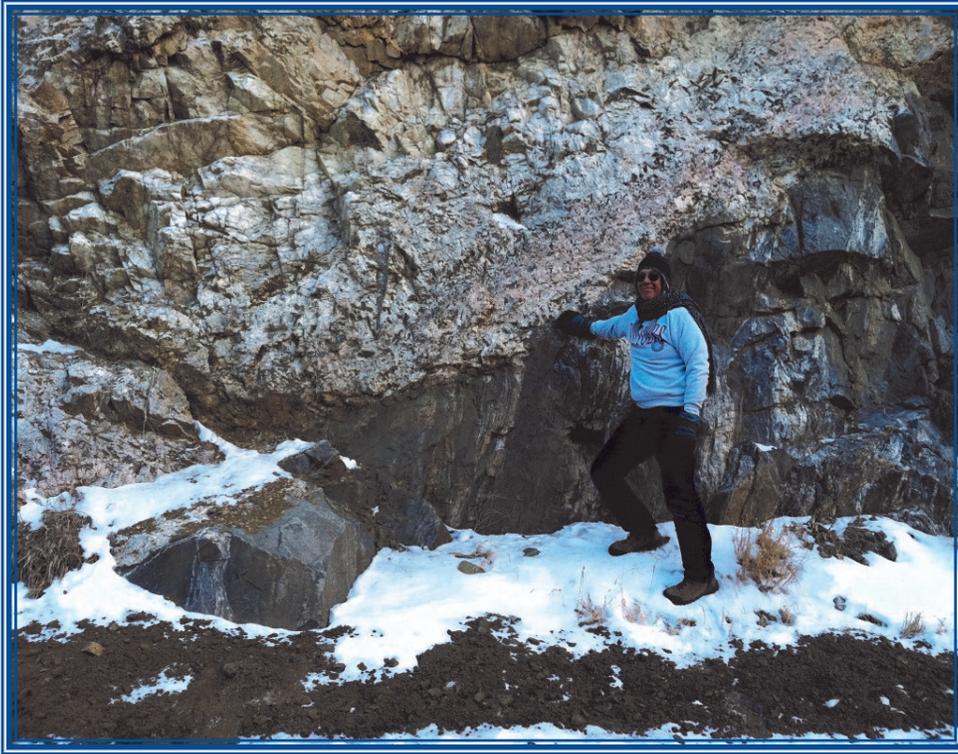
For years, geologists believed that mountains, due to their steep slopes and high rates of erosion, were large contributors to this "carbon draw down" effect. But a new study led by the University of Pennsylvania's Jane Willenbring suggests that mountains do not play a significant role in this activity, turning a geological paradigm on its head. Willenbring, an assistant professor in the Department of Earth and Environmental Science, led the research, working with Alexandru Codilean of the GFZ German Research Center for Geosciences and Brandon McElroy of the University of Wyoming. "High mountains have been the go-to field area for people interested in studying how much sediment goes into the ocean and how tectonics perturbs global climate," Willenbring said. "But what we found was that mountains contribute only a small amount of the total sediment produced on Earth. This finding, published in the journal *Geology*, directly challenges previous studies, which suggested that small mountain rivers contributed most of the sediment to the world's oceans. What these other scientists neglected to account for, according to Willenbring, was that even the steepest, most erosion- and weathering-prone slopes take up only a tiny fraction of Earth's surface. So while these steep protrusions have very high rates of carbon absorption per unit area, they are far outstripped by the much more abundant expanses of gently sloping land. "These small mountain streams are packing a big punch for their size," Willenbring said. "But even though they have a lot of erosion going on, the amount of the Earth covered by mountain ranges is too small to produce the amount of sediment that less steeply sloped areas produce." The previous studies lacked access to a new investigative technique that was developed relatively recently. The method involves an examination of cosmogenic nuclides, which are rare forms of chemical elements produced only when supernovas explode, sending high-energy radiation to Earth and breaking up other atoms. Counting these chemical isotopes allows researchers to determine how long sediment has remained in a particular watershed over long time periods. In contrast, techniques used previously, which involve physically measuring sediment flow in rivers and streams, only capture a snapshot of sediment erosion and deposition rates over a short time frame. The researchers analyzed published data on cosmogenic nuclide concentrations from around the world to determine the levels of sediment flux over a time frame of thousands to hundreds of thousands of years. They also gathered topographical data to determine the slopes of the surrounding areas. They then extrapolated these rates of sediment deposition to the whole Earth's surface. "What the cosmogenic nuclides tell us is that chemical weathering still happens in these low sloping areas," Willenbring said. Other scientists had believed these gently rolling or flat areas, such as floodplains, to be "trappers" of sediment, but the research team's analysis demonstrated that, despite being areas of net deposition, they are in fact still drawing large amounts of carbon dioxide from the atmosphere. Given these findings, geologists interested in understanding the contribution of erosion to climate fluctuations may want to spend less time on mountaintops and more time in big, lower-lying rivers like the Mississippi and the Amazon, Willenbring said. "We're going to need to start studying 'boring' rivers if we're going to understand carbon and sediment cycling."



University of Pennsylvania (2013, January 7). Mountains are only minor contributors to erosion and climate regulation. *ScienceDaily*.

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

Where is this rock?



Can you guess where this photo was taken? As a follow-up to Pete Modreski's "Colorado Pegmatites" talk at the December meeting, here is Pete with a pegmatite dike. The dark-appearing crystals in the dike are muscovite. Let's say this was taken, on January 1, somewhere in or near the Denver metro area.

Answer in the February Newsletter--We'll see who can come closest.

Send your guess to: CSS Newsletter Editor -Linda Barton....lbarton1611@gmail.com



New Debate – Did Volcanos Kill the Dinosaurs?

At the annual meeting of the American Geophysical Union held in San Francisco during the week of December 3rd, 2012, researchers from Princeton University presented a theory that poisonous gases released by volcanos may have killed off the dinosaurs about 65 million years ago rather than the popular asteroid (i.e., Alvarez) hypothesis. According to Gerta Keller, a geologist at Princeton University, tens of thousands of years of lava flow from the Deccan Traps, a volcanic region near Mumbai in present-day India, may have spewed poisonous levels of sulfur and carbon dioxide into the atmosphere resulting in global warming and ocean acidification. To read more, please see the following link: <http://news.yahoo.com/volcanoes-not-meteorite-killed-dinosaurs-scientist-argues-170148456.html>

2013 CSS Elected Positions

*The following elected positions were filled during
the **Annual Business Meeting and Potluck
Dinner** on December 13, 2012.*

President:.....Matt Sares CGS, 303-866-3581 x8290, matt.sares@state.co.us
President Elect:.....Scott Lundstrom 303-917-2849, pslundstrom@msn.com
Treasurer:.....Don Sweetkind 303-236-1828,
Secretary:.....Lisa Fisher 303-215-0480, lisa.fisher@escalantemines.com
Newsletter Editor.....Linda Barton 720-338-6201, lbarton1611@gmail.com

We are seeking a new **Treasurer** to start 2014. We would like to identify a candidate soon, so that he/she can spend this year learning the ropes from **Don Sweetkind** for a smoother transition. We will be happy to explain the duties and responsibilities with prospective candidates.

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

- ◆ **Outreach Chair**
- ◆ **Program Chair**
- ◆ **Database Manager**
- ◆ **Publicity Chair**
- ◆ **Pillmore Fund Student Awards 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

2011-13: Ben Harrison, 303-417-9633, benjh@earthlink.net
2012-14: Paul Morgan, CGS, 303-866-2611, paul.morgan@state.co.us
2012-14: Rebecca Flowers, CU Boulder, 303-492-5135, rebecca.flowers@colorado.edu
2013-15: Elizabeth Pesce, pesce.e@gmail.com
2013-15: Marieke Dechesne
2011-13: Celia Greenman

COMMITTEE CHAIRPERSONS

Best Paper Award: Lisa Fisher, Escalante Mines, Inc., 303-215-0480, lisa.fisher@escalantemines.com
Field Trips: Cal Ruleman, USGS, 303-236-7804, cruleman@usgs.gov
Graphics: Lisa Rukstales, USGS, 303-236-5547, lrukstales@usgs.gov
History: Beth Simmons, cloverknoll@comcast.net
Hospitality: Ben Harrison, 303-417-9633, benjh@earthlink.net
Membership/Mentor: Mitchell Reese, 575-317-4864, mreese83@gmail.com; Liz Pesce, epesce@mines.edu
Memorial Funds: Lisa Fisher, Escalante Mines, Inc., 303-215-0480, lisa.fisher@escalantemines.com
Science Fair: Chuck Weisenberg, 303-238-8806, cweisnbrg@msn.com
Webmaster: Table Mountain Web Design, 303-278-2701, bwarden@tablemntn.com CSS



Colorado Scientific Society

Application and Membership Update Date _____ Dues and Funds Contributions

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): _____

<p>Please make your checks payable to the: <i>Colorado Scientific Society</i></p> <p>Send this form & your check to: Colorado Scientific Society P.O. Box 150495 Lakewood, CO 80215-0495</p>	<p>Or register and pay on-line using PayPal at: http://www.coloscisoc.org/membership/duespaypal.htm</p>
---	---