



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 Monthly Meeting

The Northern Rio Grande Rift
New Geological Studies in the Upper
Arkansas River Valley Region, Colorado

By: Karl S. Kellogg,
U. S. Geological Survey



Everyone is Welcome!

Thursday, February 21st (the 3rd.
Thursday of each month), 2013

Shepherd of the Hills

Presbyterian Church

11500 W. 20th. Avenue

(20th Ave. and Simms St.),

Lakewood, Colorado

6:30 p.m. Social half-hour, 7:00 p.m. Meeting

No Charge For Anyone!



*Also: What Can I Do To
Help The Colorado
Geological Survey?*

*By: Vince Matthews,
Colorado Geological
Survey*

Abstracts

The northern Rio Grande rift – new geological studies in the upper Arkansas River valley region, Colorado

A talk by Karl S. Kellogg, U.S. Geological Survey

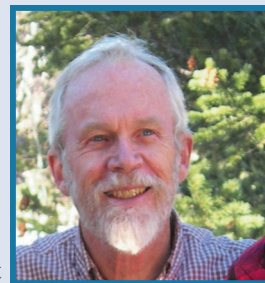
(with major contributions from Cal Ruleman, Ralph Shroba, Bob Bohannon, Wayne Premo, Mike Cosca, and Keenan Lee)

It has been 125 years since Samuel Emmons published his USGS monograph on the Leadville mining district. Since then, dozens of geologists have published papers and maps on the geology and ore deposits of the upper Arkansas River valley, between Leadville and Salida. The USGS is currently undertaking a fresh geological look at this major extensional feature, a northern expression of the Rio Grande rift, employing detailed mapping of more poorly understood areas and reinterpretation of many previously studied regions. Recently acquired LiDAR data and new isotopic dating has greatly facilitated this research. A 1:50,000-scale geologic map of the region, based, in part, on the new mapping, nears completion and extends into the Proterozoic metamorphic and intrusive rocks in the adjacent Sawatch and Mosquito Ranges. This talk will first present an overview of the geology of the upper Arkansas River Valley region, followed by a presentation of some of the new features and ideas we have developed.

The grabens that control the upper Arkansas River valley are filled with thick basin-fill deposits (mostly Dry Union Formation), which occupy two major sub-basins. Along the Arkansas River locally there are at least 5 major alluvial terraces, and an equivalent number of pediment surfaces that slope from the Sawatch Range on the west side of the valley, all documenting deep erosion since the end of the Tertiary. Numerous new U/Pb and $\text{Ar}^{40}/\text{Ar}^{39}$ isotopic ages better constrain the timing of both Proterozoic and Late Cretaceous to early Tertiary intrusive events. New detailed mapping, coupled with ^{10}Be cosmogenic surface-exposure ages, have revealed the timing and rates of late Pleistocene deglaciation. Many previously unrecognized Neogene and Quaternary faults, some with possible Holocene displacement, have been identified. As participant on a CSS fieldtrip observed this fall, glacial dams that impounded the Arkansas River at Clear Creek and Pine Creek failed at least 3 times during the middle and late Pleistocene, resulting in catastrophic floods and deposition of enormous boulders (some > 10 m long) downstream; at least two failures occurred during the late Pleistocene Pinedale glaciation.

Biography of Karl Kellogg

Karl received his B.A. degree from UC Berkeley in 1966, and Ph.D. in geology from CU Boulder in 1972. He feels like he almost lived his retirement early for several years, teaching for Outward Bound School, travelling, and working part time for the USGS on 3 expeditions to Antarctica (and once more with the New Zealand Antarctic Research Program), before settling down to teach geology for two years at Cal State University, Sonoma. He joined the USGS full time in 1980, first working on the Saudi Arabian program for 3 years. His USGS career has also involved working on the Volcanic Hazards Program and mapping in (1) the Idaho and Montana thrust and foreland provinces, (2) the Transverse Ranges of California, and (3) central Colorado. He is author or co-author on over 100 scientific publications (excluding abstracts), including 37 geological maps. He was president of the Colorado Scientific Society in 1997. His hobbies involve bicycling, river running, forest management on his family's tree farm, skiing, and photography.



Title: What Can I Do to Help the Colorado Geological Survey?

A talk by Vince Matthews, Colorado Geological Survey

Transfer of the Colorado Geological Survey from the Department of Natural Resources to the Colorado School of Mines is now formalized by Legislative Action. However, the conditions of that transfer were developed largely behind closed doors outside the legislative process, with minimal outside input. The DNR proposal has eliminated all state funding for groundwater, oil, gas, coal, minerals, geothermal, CO₂ sequestration, and ground water quality programs. There are substantial ramifications for the people of Colorado. However, there is some support in the Legislature for restoration of some programs, but strong constituent support will be necessary to accomplish this.

Biography of Vince Matthews

Vince Matthews is a former State Geologist and Director of the Colorado Geological Survey. Vince received Bachelors and Masters degrees in Geology from the University of Georgia and a Ph.D. from the University of California, Santa Cruz. He held tenured positions at two universities and has taught geology at the University of California, University of Northern Colorado, Arizona State University, the Frank Lloyd Wright School of Architecture, and the University of Texas of the Permian Basin.

As an executive in the natural resources industry for Amoco, Lear, Union Pacific, and Penn Virginia, Matthews explored for oil & gas in virtually every basin in the U.S., including Alaska and the Gulf of Mexico. Vince is the author of more than 70 technical articles and abstracts and was senior editor of the multiple, award-winning publication, Messages in Stone: Colorado's Colorful Geology and the map, A Tourist Guide to Colorado Geology.





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CSS President's Message

- by Matt Sares



The roots of the Colorado Scientific Society are closely intertwined with the U.S. Geological Survey. The Society's birth in 1882 was due to the foresight and prompting of Samuel F. Emmons in the offices of the USGS. A majority of the officers and councilors of the Society have been USGS employees. The Colorado Geological Survey was re-established in 1969 and it wasn't long until its employees were also involved in CSS leadership and support roles. Since the 1970s scientists from these organizations have played an important role in the life of the CSS. Of course, the Society has had many distinguished leaders from every segment of the geological community over the years, but we do owe a debt of gratitude to volunteers associated with these two organizations for leadership in the Society and in the geological community at large.

In light of this history, it's important for us to know how we as members can respond when the vitality of these organizations is threatened. Government budgets have been under perennial pressure since the "Great Recession" began in 2008 and this will continue as the Nation and some states wrestle with yearly budget deficits and mounting long-term debt. During these times it is not surprising that budgets for the USGS or CGS are kept from growing or are even trimmed a few percent, difficult as that may be. But when large-scale cuts in funding are proposed to these agencies that perform scientific investigations in the public interest, it is time for the geological community to make its collective voice heard.

At this month's meeting Vince Matthews, the recently retired State Geologist of Colorado, will speak to us about the situation of the Colorado Geological Survey and its move to the Colorado School of Mines. Of utmost concern is the scheduled 50% reduction in CGS's base funding and the loss of several programs that provide key scientific information important to the health of Colorado's economy. Ironically, these cuts are planned at a time when State revenues are actually growing. Please attend this meeting to learn what has happened, what is yet to be decided, and how you can best make your voice heard.



Where is this rock?

By Pete Modreski



February's Where is This Rock: This should be an easy one; also located along a hiking trail--I'll bet many of you have seen it. Where (in Colorado) is this? Send your answer to the editor, Linda Barton lbarton1611@gmail.com.

Answer to the picture that appeared on page 7 of the January newsletter: The pegmatite dike is in Waterton Canyon, along the trail (the beginning of the Colorado Trail) and access road along the South Platte River that leads to the base of Strontia Springs Dam. The dam is about 6.5 miles up the canyon, and this pegmatite dike is about 3 or 3.5 miles from the trailhead, near the Marston Tunnel Diversion Dam. The dike is one of many such, found within the 1.7-Ga gneisses traditionally known as the Idaho Springs Formation. The Strontia Springs Dam, completed in 1983, is 243 feet high, and its reservoir is 1.7 miles long with a surface area of 98 acres.



Science News

When the Ice Melts, the Earth Spews Fire

Dec. 19, 2012 — It has long been known that volcanic activity can cause short-term variations in climate. Now, researchers at the GEOMAR Helmholtz Centre for Ocean Research Kiel (Germany), together with colleagues from Harvard University (Cambridge, Massachusetts, USA) have found evidence that the reverse process also occurs: Climate affects volcanic activity.

Their study is now online in the international journal *Geology*.

In 1991, it was a disaster for the villages nearby the erupting Philippine volcano Pinatubo. But the effects were felt even as far away as Europe. The volcano threw up many tons of ash and other particles into the atmosphere causing less sunlight than usual to reach Earth's surface. For the first few years after the eruption, global temperatures dropped by half a degree. In general, volcanic eruptions can have a strong short-term impact on climate. Conversely, the idea that climate may also affect volcanic eruptions on a global scale and over long periods of time is completely new. Researchers at GEOMAR Helmholtz Centre for Ocean Research Kiel (Germany) and Harvard University in Massachusetts (USA) have now found strong evidence for this relationship from major volcanic eruptions around the Pacific Ocean over the past 1 million years. They have presented their results in the latest issue of the international journal "Geology."

The basic evidence for the discovery came from the work of the Collaborative Research Centre "Fluids and Volatiles in Subduction Zones (SFB 574). For more than ten years the project has been extensively exploring volcanoes of Central America. "Among others pieces of evidence, we have observations of ash layers in the seabed and have reconstructed the history of volcanic eruptions for the past 460,000 years," says GEOMAR volcanologist Dr Stefan Kutterolf, who has been with SFB 574 since its founding. Particular patterns started to appear. "There were periods when we found significantly more large eruptions than in others" says Kutterolf, the lead author of the *Geology* article. After comparing these patterns with the climate history, there was an amazing match. The periods of high volcanic activity followed fast, global temperature increases and associated rapid ice melting.

To expand the scope of the discoveries, Dr Kutterolf and his colleagues studied other cores from the entire Pacific region. These cores had been collected as part of the International Integrated Ocean Drilling Program (IODP) and its predecessor programmes. They record more than a million years of Earth's history. "In fact, we found the same pattern from these cores as in Central America" says geophysicist Dr Marion Jegen from GEOMAR, who also participated in the recent study. Together with colleagues at Harvard University, the geologists and geophysicists searched for a possible explanation. They found it with the help of geological computer models. "In times of global warming, the glaciers are melting on the continents relatively quickly. At the same time the sea level rises. The weight on the continents decreases, while the weight on the oceanic tectonic plates increases. Thus, the stress changes within in the Earth to open more routes for ascending magma" says Dr Jegen.

The rate of global cooling at the end of the warm phases is much slower, so there are less dramatic stress changes during these times. "If you follow the natural climate cycles, we are currently at the end of a really warm phase. Therefore, things are volcanically quieter now. The impact from human-made warming is still unclear based on our current understanding" says Dr Kutterolf. The next step is to investigate shorter-term historical variations to better understand implications for the present day.

The above story is reprinted from materials provided by Helmholtz Centre for Ocean Research Kiel (GEOMAR). 19.12.2012

Reference:

Kutterolf, S., M. Jegen, J. X. Mitrovica, T. Kwasnitschka, A. Freundt, P. J. Huybers (2012): A detection of Milankovitch frequencies in global volcanic activity. *Geology*, G33419.1, <http://dx.doi.org/10.1130/G33419.1>



Calendar of Events- February

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 Matt Sares, tel. 303-717-3983, matt.sares@state.co.us

- ◆ **USGS Rocky Mountain Area Seminar Series** is held once every two weeks, 10:30-11:30 a.m. alternate Tuesday mornings in the Building 25 Lecture Hall, Denver Federal Center, Lakewood CO. Public is welcome. Park in the lot east of Bldg. 25 and use entrance E-14. For more information, contact Pete Modreski, tel. [303-202-4766](tel:303-202-4766), pmodreski@usgs.gov
- ◆ **Desk and DERRICK**— Monthly Meetings are held the first Tuesday of each month at the Crown Plaza. Our next meeting is **February 8th** at the Crowne Plaza – downtown 1450 Glenarm Place, Denver, CO 80202 \$30 for members \$35 for guests. Please RSVP to: marketing@mail.rmoj.com. Speaker will be Ginny Brannon Assistant Director for Water and Energy, Colorado Department of Natural Resources. Her presentation topic will be on "Oil & Gas Development in Colorado: Regulatory & Policy Landscape."
- ◆ **Colorado School of Mines Museum**- Book Sale (and Garage Sale) **February 18-22nd**, 9 A.M. to 4 P.M. CSM Museum 1310 Maple Street, Golden Colorado. Hundreds of books, journals, professional and hobbyist magazines, USGS folios, maps, some specimens, equipment, etc. Prices individually marked and drop by as much as 50% each day! For more information, call: [303-273-3815](tel:303-273-3815).
- ◆ **Also at Colorado School of Mines, Arthur Lakes Library**- Annual Book Sale, February 18-22, 1400 Illinois St., Golden. 9 a.m. to 4 p.m. daily. Day 1 prices are \$10 for hardcovers, \$5 for softcovers, and \$2 for maps; prices for remaining inventory are reduced each day. An onsite sealed-bid Silent Auction for more valuable items will be held on Monday, Feb. 18, 10 am to 12 noon. For more info and an advance list of silent auction items see: http://library.mines.edu/LB_Book_Sale
- ◆ **The Denver Geophysical Society & The Rocky Mountain Association of Geologists**
19th Annual 3D Seismic Symposium: Making Sound Decisions, **March 05, 2013**, at the Sheraton Downtown Denver Hotel .
For information visit: www.3dseismicsymposium.com
Registration, Sponsorship, and Vendor Booths are now available through February 19th!
Please note that registration, sponsorship and booth purchase will be administered on the DGS website at www.denvergeo.org
Keynote Speaker:: Thomas Jorden, Chairman, CEO & President of Cimarex Energy
Kickoff Speaker: Mark Zoback, Professor of Geophysics at Stanford University, Reservoir Geomechanics Applied to Stimulation of Shale Gas, Tight Gas, Tight Oil Reservoirs
- ◆ **Tucson Gem and Mineral Society** - Tucson Gem & Mineral Show **February 14-17** The largest gem and mineral show in the United States.
- ◆ **Denver Museum of Nature and Science**—Mammoths & Mastodons: Titans of the Ice Age Opens **February 15** Life-size models, fossil tusks and skulls, touchable teeth, spear points, cave paintings, interactive displays, and monumental video installations bring the Ice Age back to life..
- ◆ **Denver Gem & Mineral Guild** —Gem and Mineral Show **February 22-24** Jefferson County Fairgrounds, Exhibits Building. Free admission and parking. 10-6 Fri. and Sat., 10-5 Sun.
- ◆ **Western Interior Paleontological Society (WIPS) Symposium – March 16-17**
"Ice Worlds and Their Fossils. "Discover how glacial climates & life interact to shape evolution and the biosphere". Green Center, Colorado School of Mines campus, Golden, CO. For more information:
http://www.westernpaleo.org/symposiums/pages_2013/2013.php. Click on "Speakers" for program info. Registration is \$85; student registration, \$30; single-day registration is also available.

More Events

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)

Florissant Scientific Society- Sunday, February 17th. 12-3:30 P.M. Dr. Lon Abbott, Geology Professor at CU-Boulder and co-author of "Geology Underfoot Along Colorado's Front Range," will talk about his latest production (which will be available at the meeting for \$24.00). Bring money for book and bring food for lunch! CU-Boulder Campus, Benson Science Center Conference Room. It is about a block's walk from the nearest parking lot; handicapped parking is adjacent to the building.

For a map: <http://www.colorado.edu/campusmap/map.html?n=218&w=220>

For more information, contact Beth Simmons, cloverknoll@comcast.net.

CO-AIPG February Luncheon, Tuesday, February 19, 2013

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

"Niobrara Tight Oil in Colorado: Recent Production and Development Trends"

Speaker: Chris Eisinger, Colorado Geological Survey

Price: Buffet lunch (approx. \$10) must be purchased for entry to the Golden Corral. An additional voluntary tip of \$1/person is requested for the wait staff in the meeting room. Free parking.

More info: Contact Tom Cavanaugh, tom.cavanaugh@amec.com or 303-293-6002, by February 15.

Denver Mining Club February Schedule:

Golden Corral Buffet & Grill 3677 South Santa Fe Drive, Sheridan, CO 80110
(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!

February 4. Gary L. Rowe, Jr., Regional NAWQA Program Officer, Central Region, USGS. Tales of a Former Volcanologist.

February 11.—Richard A. Sowers, Executive Director, Western Museum of Mining & Industry. Update on the Western Museum of Mining & Industry.

February 18.—No Meeting. Presidents' Day Holiday.

February 25.—Open meeting: no scheduled speaker. Enjoy lunch with friends.

2013 SME Annual Meeting & Exhibit and CMA 115th National Western Mining Conference

"Mining: It's About the People" **Feb. 24-27, 2013**

Colorado Convention Center, Denver, CO.

For more information call SME Meetings Dept. 303-948-4200 or see the web site: www.smenet.org.

University of Colorado Benson Earth Sciences Colloquium Schedule:

Lectures held in lecture hall (380), Wednesdays 4pm. Refreshments are served at 3:30 on the 3rd floor.

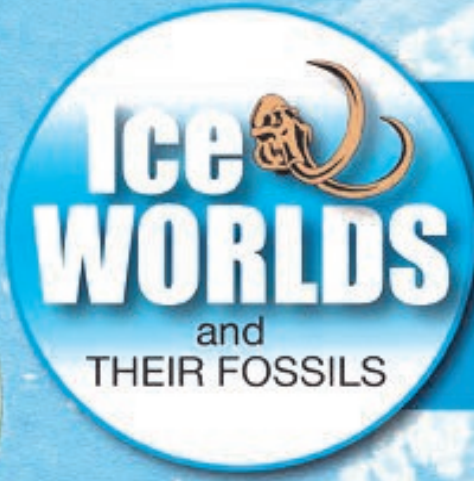
Schedule posted at: <http://www.colorado.edu/geolsci/colloquium.htm>

February 6. Mark Cloos, University of Texas. "Collisional Delamination in New Guinea."

February 13. Axel Schmitt, UCLA. "Young Earth Zircons from the New World".

February 20. Andres Meglioli, Mountain Pass Environmental. "Rock Glaciers - a scientific curiosity or a threat to mineral development in the Andes?"

February 27. Phil Wannamaker, University of Utah. "Stewing the lithosphere: Views of magmatic/ hydrothermal processes in subduction and extensional domains from electrical resistivity."



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Green Center, Colorado School of Mines, Golden

Pleas and Thank Yous

IF YOU HAVE NOT YET PAID YOUR DUES FOR 2013...

Membership dues for this 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. **Thank you!!**



2012 CONTRIBUTIONS TO MEMORIAL & ENDOWMENT FUNDS

The Society thanks its members & friends who contributed to our Memorial and Endowment Funds during 2012. A total of \$10,121 was contributed.

The Society awards the interest generated by the Tweto, Oriel, Eckel, Pierce, and Snyder Memorial Funds as student research grants. The Society uses the interest generated by the Pillmore Fund to subsidize student participation on field trips. The Endowment Fund is used to cover Society expenses.

Since the Memorial Fund Program started in 1984, the Society has awarded student research grants in Earth Sciences with an aggregate value of over \$140,000. Please remember that your entire contribution goes towards generating interest for the grants and that your contribution is 100% tax deductible (the Society is a non-profit Section 501 (c)(3) organization).

Receipts for 2012 contributions are still being sent out. If you need a receipt immediately for tax purposes, contact CSS Treasurer Don Sweetkind by phone at 303-236-1828 or by e-mail at dsweetkind@usgs.gov

In the table of contributors below, Memorial or Endowment Fund contributions in the memory of others are shown in brackets; an asterisk indicates those contributing \$100 or more. Keeping our member records and contributions up-to-date is a big job, so please forgive us and let us know if your name is not on this list.

Adler*, Frank J	Koontz, Wendell	Pitman, Janet
Ball, Theodore T.	A. Lamarre, Robert	Poole*, F.G. [Philip T. Hayes and Richard K. Hose]
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Bottjer*, Richard	Laux, J. Peter	Reheis, Marith
Camp, Nancy Ann	Lidke, David J.	Robertson, Jaques
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Crone, Anthony J.	Majewski, David J.	Ruppel, Edward
Davidson, Jerry	Mark*, Anson	Sattler, Luke
Davis*, Robert	McCallum*, Malcolm	Sawyer, Michael B.
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Greenman*, Celia	Noe, David	Willis, Dana
Kinkel, Robert A.	Orkild, Paul P.	Wobus, Reinhard A.
Kleinkopf, Dean	Peyton*, Sara Lynn	Zielinski, Robert

2013 CSS Elected Positions

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President Elect:..... Scott Lundstrom, 303-917-2849, pslundstrom@msn.com
Treasurer:.....Don Sweetkind , 303-236-1828, dsweetkind@usgs.gov,
Secretary:.....Lisa Fisher, 303-215-0480, lisa.fisher@escalantemines.com
Past President.....Pete Modreski, 720-205-2553, pmodreski@aol.com.

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

- ◆ **Outreach Chair**
- ◆ **Program Chair**
- ◆ **Publicity Chair**

Volunteer Opportunity

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
2011–2013: Celia Greenman, celia.greenman@earthlink.net
2011–2013: Ben Harrison, 303–417–9633, benjh@earthlink.net
2012–2014: Paul Morgan, 303–866–2611, paul.morgan@state.co.us
2012–2014: Rebecca Flowers, 303–492–5135, rebecca.flowers@colorado.edu

COMMITTEE CHAIRPERSONS

Best Paper Award: Pete Modreski, 720-205-2553, pmodreski@aol.com
Database Manager: Emily Taylor, 303–236–8253, emtaylor@usgs.gov
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Memorial Funds: Pete Modreski, 720-205-2553, pmodreski@aol.com
Newsletter Editor: Linda Barton, 720-338-6201, 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
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WANTED:

**NEW CSS
MEMBERS!**

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





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

Send this form & your check to:

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P.O. Box 150495

Lakewood, CO 80215-0495

Or register and pay on-line using PayPal at:

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