

# Colorado Scientific Society

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

## May talk:

### ***Prelude to the May 16 field trip to the Victor Mine***

**Tim Brown, Victor Mine geologist, will give an evening lecture about the Cripple Creek mining district, using a real-time ArcGIS demonstration to describe how geologic data was used to reconstruct the ancient volcano where the mine is now located. Following the lecture, we will visit the Colorado School of Mines geology museum to look at ore specimens from the Cripple Creek district. (See abstract, p. 2)**

**NEW Location!!**  
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**Thursday, May 14, 2009**

**Colorado School of Mines—Department of Geology and Geological Sciences,  
Berthoud Hall, Room 241, Golden, CO**

**Social half-hour—6:30 p.m. Meeting time—7:00 p.m.**

## **LAST CHANCE:**

### **Sign-up for the 2008 Colorado Scientific Society Spring Field Trip to the Victor Mine and Front Range Geology. Saturday May 16, 2009**

Join us and be immersed in the innards of the ancient volcano at the Victor Mine outside of Cripple Creek, Colorado. Strange rocks and volcanic structures will be seen—phonolites, lamprophyres, and volcanic cooling columns. Looking at the high wall, tunnels of the old mine workings lend a respect for the immensity of the present operation.

Next the tour will go to the crusher building with its primary cone crusher and secondary crushers that prepare the ore for the leach heaps. The final stop is the Ed Hunter mill building where the solutions come from the leach pads into the charcoal filtering vats. From there the gold is poured... but no one but very trusted employees are allowed in that room!

We will make several stops as we drive down from Lakewood through the Pikes Peak Batholith, the Great Unconformity and the Cambro-Ordovician section, highly fractured and re-cemented sandstone dikes in the Sawatch Formation, and the Tertiary Divide gravel. The mine tour guides (Tim Brown and others) will meet us in Victor at 1:00 p.m. to give us a brief history of the town and mine and then we will head up to the mine for a 2.5-hour tour.

We will leave from the Cold Springs Park-and-Ride at the northwest corner of the Federal Center at 7:30 a.m. We will return to Cold Springs Park-and-Ride about 5:30 p.m. Bring your own sack lunch, beverages, cameras, and rain gear. Cost, including transportation (vans) will be \$20.00/person. Student grants from the Pillmore Fund are available to cover student expenses. Contact Lee Shropshire, 970-352-8778, leeshrop@comcast.net, to apply for a grant. Contact Cal Ruleman (cruleman@usgs.gov; (303) 236-7804) for questions or additional information about the field trip.

**Sign up now by contacting Cal Ruleman directly  
by phone at 303-236-7804 or send email to cruleman@usgs.gov**

**SIGN-UP DEADLINE IS MAY 9.**



Photo from [www.ccvgoldmining.com](http://www.ccvgoldmining.com)

## MAY ABSTRACT

### 3D Modeling and Visualization in the Cripple Creek Mining District

Timothy R. Brown

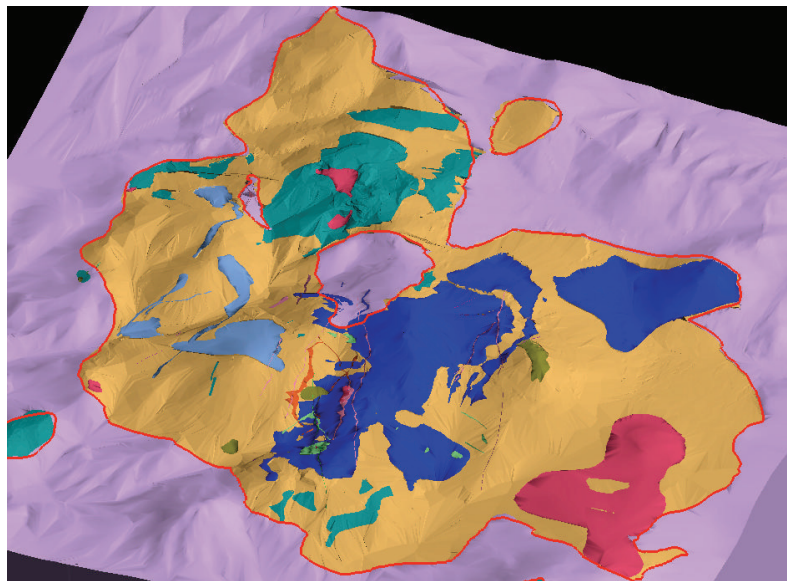
Cripple Creek and Victor Gold Mining Company

Nearly 24 million ounces of gold have been produced from the Cripple Creek Mining District since it was discovered in 1891. Over 3 million of those ounces were produced since 1995 from the current open-pit, heap leach operation that continues to produce around 300,000 ounces of gold each year. The recent mining began by producing 10 million ore tons each year, and in 2003, increased ore production to 20 million tons per year. This rate of production has presented significant challenges to the Exploration Department to replace this depletion.

Fortunately, exploration activities have successfully replaced reserves for several years. These efforts have been successful for several reasons, but one of the most important is the strong understanding of the district's ore controls, geology, mineralization and alteration that has been developed over the past several years. This understanding comes, in part, from the 3D modeling and visualization tools that are used on a daily basis.

Several years of work were invested by the Exploration Department to create the 3D model that is used today. Numerous data sets were compiled to create our model that included hundreds of historic maps, thousands of drill holes, and numerous scientific publications, geologic maps, theses and dissertations. The result is a robust, geologic model that is easily updated with new data and is available to our geologists and engineers.

The image below shows a perspective view of the geologic model that is approximately 4 miles north-south (towards top of image), 4.3 miles east-west, and 5,000 feet thick. The central portion of the image, outlined in red, shows rocks of the diatreme-intrusive complex that have erupted through and intruded into the Precambrian basement rocks that are shown in lavender. Drill holes, geophysical data, underground workings, block models, and air photos can all be displayed and used to generate and evaluate exploration targets.





On Thursday, April 9, CSS member Tom Sutton judged the Colorado State Science Fair at the Lory Student Center, Colorado State University, Fort Collins. The following CSS special awards were given:

### Senior Division (Grades 9–12)

**First Place, \$100, Zach Miller and Matt O’Keefe**—“Removal of Copper in an Aqueous Solution through the Application of Natural and Synthetic Zeolites.” Miller and O’Keefe made a fine study of removing copper from mine drainage for both environmental protection and economic recovery.

**Second Place, \$75, Alan Selzer**—“Carbon Sinks to Carbon Sources: A Soil Analysis of the Colorado Mountain Beetle Infestation.” Selzer did an impressive investigation of the eastward migration of the pine beetle infestation from the perspective of the relative abundances of organic compounds and CO<sub>2</sub> respiration rates in the soils.



### Junior Division (Grades 6–8)

**First Place, \$75, Taylor Volesky**—“Acid Rain Effects on Cave Formation.” Volesky studied the effects of the dissolution of limestone with water of varying pH values.

**Second Place, \$50, Danielle Riggs**—“Cooled Fast or Cooled Slow, How Big Will the Crystals Grow?” Danielle studied the effects of cooling rates of liquids on the size of the crystals formed.

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### COMING ATTRACTION:

## Colorado Scientific Society Family Day “Geology tour and BBQ/Potluck Picnic”

**Place:** Colorado School of Mines geology museum and student quad.

**Date:** Saturday, August 29

**Rain Date:** Saturday, September 12

CSS will provide the burgers/hot dogs/  
Boca burgers, condiments, utensils,  
refreshments, etc.

**YOU** bring your family, friends, neighbors, and favorite yummy potluck item to share with LOTS of people.

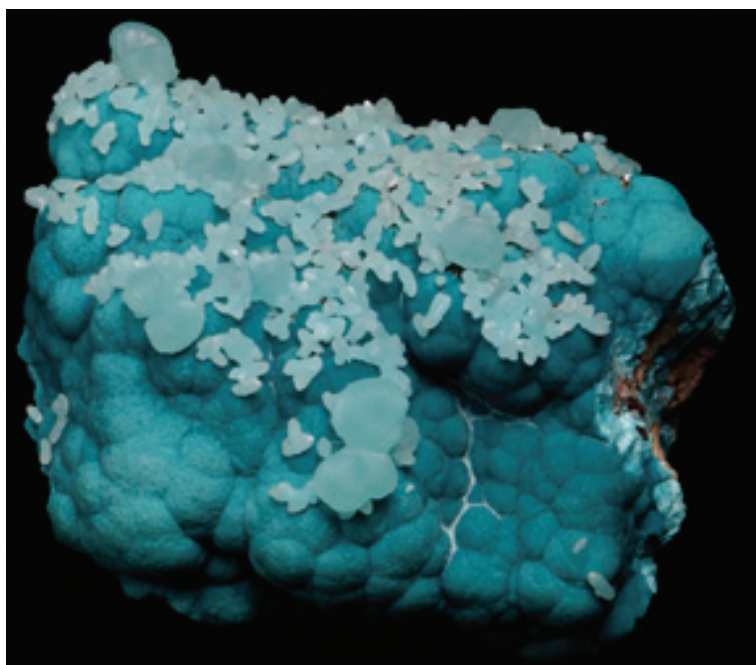
#### Schedule:

**Noon:** Bob Weimer’s CSM campus geology walk

**2:00:** BBQ

**4:00-ish:** Museum tours—separate tours for adults and kids

**RSVP when?:** To be announced in the August newsletter. Potluck sign-ups also in August.



## 2008 Contributions to Memorial & Endowment Funds

The Society thanks its members & friends who contributed to our Memorial and Endowment Funds during 2008. A total of \$5,062 was contributed as follows:

\$1463, Tweto Fund; \$365, Oriel Fund; \$215, Eckel Fund; \$60, Pierce Fund; \$480, Snyder Fund; \$1040, Pillmore Fund; \$1439, Endowment Fund.

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 \$125,000. 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).

In the table of contributors below, Memorial or Endowment Fund contributions shown with an asterisk indicates those contributing \$100 or more.

Frank J. Adler\*  
John Aleinikoff  
Donald Baker  
Theodore Ball  
Pete Birkeland  
Maeve A. Boland  
Lorraine Burgin  
Al Bush, In memory of Richard P. Fischer  
Parker Calkin  
Nancy Camp  
Ann C. Christiansen\*  
Mary-Margaret Coates  
James Cole  
James G. Crock  
Anthony J. Crone  
Claire Davidson  
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Warren C. Day  
Harald Drewes  
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Robert Fleming\*, In memory of Ben Leonard  
Val L. Freeman  
Celia Greenman\*  
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Arlene Pillmore\*  
Michael Poland  
F.G. Poole\*, In memory of Allen Heyl, Ben Leonard,  
and Wally Pratt  
Bethani Puzo  
John M. Rakowski  
Marith Reheis  
Rich Reynolds  
William Rogers  
Edward Ruppel  
Michael B. Sawyer  
Eric Scanniello  
Mark A. Scanniello  
Henry Schmoll  
Jim Shannon\*  
Richard. A. Sheppard  
Harry Siebert  
Betty Skipp\*  
Marjorie C. Smith, In memory of Irv Witkind  
Mark R. Stanton  
Donald Sweetkind  
Bradley S. Van Gosen  
Alan Wallace\*, In memory of Wally Pratt  
John E. Warne  
Joseph Weitz\*, In memory of Rube Ross  
Van S. Williams  
Paul L. WilliamsDana Willis  
Reinhard A. Wobus  
Robert A. Zielinski



## CSS Memorial Funds Distribution

*By Matt Morgan and Don Sweetkind*



Over the past 25 years, the Colorado Scientific Society has helped support the graduate research of 223 students, awarding a total of \$182,000 (an average of over \$800 per grant). This achievement is extraordinary for an organization of our size and, through member contributions, exemplifies the commitment of our members to promote high-quality research in the earth sciences. The five funds that award grants for student research are: the Tweto Fund for research in the Rocky Mountains; the Oriel Fund for research in the central and northern Rocky Mountains; the Eckel Fund for research in engineering geology; the Snyder Fund for research on Precambrian geology of the Rocky Mountains; and the Pierce Fund for research on the Heart Mountain fault and Quaternary geologic problems.

This year we received 43 applications for Memorial Fund grants and we were able to fund 16 of those applicants. The review panel, consisting of Jim Burnell (CGS), Cal Ruleman (USGS), Christine Turner (USGS), and Matt Morgan (CGS), had a difficult time deciding which were the “best” proposals because all were top-notch. They were a joy to read and some were quite inspiring!

Here are this year’s winners sorted by fund:



### **Eckel Fund**

Stephanie Mason (Univ. of New Mexico) - \$1000 - Paleomagnetism and structural analysis of the western margin of the Rio Grande Rift, San Luis Basin: Implication for the kinematic evolution of continental rift zones.

Karen Williams (Montana State Univ.) - \$650 - Stream channel organization: the relationship between patterns in channel form and unit stream power.

Holly Brunkal (Colorado School of Mines) - \$500 - Channel infilling rates and mechanisms for runoff-initiated debris flows following wildfire in the western U.S.

### **Oriel Fund**

Senthil Yuvaraj (Bowling Green State Univ.) - \$1200 - Reassessing the reservoir characteristics of the Pictured Cliffs Sandstone, San Juan Basin, Colorado and New Mexico, using architectural-element analysis.

Christopher Cassle (Colorado State Univ.) - \$1000 - Detailed sedimentological and stratigraphic analyses of black shale successions within the Permian Phosphoria Formation of Idaho and Wyoming, USA.

David Nicklaus (Miami Univ.) - \$1000 - Depositional origin of the Jurassic-Cretaceous Buckhorn Conglomerate, Colorado and Utah.

Cody Routson (Univ. of Arizona) - \$500 - Paleoclimate Reconstruction for the San Juan Mountains, Colorado.

### **Pierce Fund**

Jill Onken (Univ. of Arizona) - \$1000 - Late Holocene alluvial cycles, landscape change, and climatic controls in the Carrizo Wash watershed of west-central New Mexico.

Jennifer Manion (Washington State Univ.) - \$750 - The older hydrothermal system in Yellowstone National Park.

Skye Cooley (Utah State Univ.) - \$480 - Co-evolution of Pleistocene Bear River and Pluvial Lake Bonneville.

### **Snyder Fund**

Matthew Zimmerer (New Mexico Inst. of Mining and Technology) - \$1000 - Constraining the relationship between the volcanic and plutonic record using the geochronology of eroded calderas of the Southern Rocky Mountain Volcanic Field.

Joshua Keeley (Idaho State Univ.) - \$1000 - Geochemistry of Neoproterozoic volcanic rocks and granitic clasts from the Pocatello Formation and formation of Perry Canyon in southeastern Idaho and northern Utah: Implications for Rodinian rifting.

### **Tweto Fund**

Carley Freer (Univ. of Houston) - \$1000 - Investigation of the deformation history of reactivated asymmetric anticlines in the Southern Rocky Mountains using field-based structural analysis and mechanical modeling.

Nicolas Young (Univ. of Buffalo – SUNY) - \$1000 - <sup>10</sup>Be chronology of late Pleistocene outburst floods and ice extent in the Upper Arkansas River Valley, Colorado.

Laura Hamlin (Univ. of Wyoming) - \$1000 - Determining the controls on extensional fracturing in the Wyoming Foreland using integrated kinematic analysis.

Warren Roe (Montana State Univ.) - \$500 - Tertiary paleogeography and sedimentology of the Big Hole basin, southwestern Montana.



Univ. of Colo. Museum of Natl. History Henderson Bldg., 15th & Broadway (next to the UMC), Boulder, 303-492-6892, <http://cumuseum.colorado.edu>

Join us for a variety of fun and educational Saturday family events...

**June 6, 10:00am–12:00pm:** Spring Flowers Parent-Child Workshop. Explore ways to preserve the beauty of flowers by pressing, pounding and drying. Make your own flower press to take home. All ages, with a parent. Reservations/fee required\*.

\*Workshops with a fee cost \$8 per person; \$5 if a museum member at the Family Membership level. All supplies will be provided. Advance payment/registration required: please call 303-492-1666. See our online calendar at: <http://cumuseum.colorado.edu/Calendar/>

## MINERALOGY & MICROSCOPY OF ORE DEPOSITS

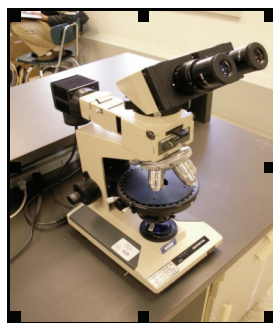
**A Short Course at the Colorado School of Mines  
June 22–26, 2009**

### Schedule/Course Fee

Class will meet each day from 9 to 5. The general schedule will include 30 minutes of illustrated lectures alternating with 60 minutes of microscope work.

Course fee is \$995.

Contact: Dr. Lufkin, 303-997-7365;  
[lufk3@comcast.net](mailto:lufk3@comcast.net); [www.johnlufkin.com](http://www.johnlufkin.com)



## Dinosaur Discovery Day—Volunteers needed!

As we did last summer, the Colorado Scientific Society will be providing volunteer workers at Dinosaur Ridge for Dinosaur Discovery Day on Saturday, August 8th. Dinosaur Discovery Days are an opportunity for the public to view the tracks, bones, and other spectacular examples of geology and paleontology along Dinosaur Ridge with volunteer guides.

Volunteers are needed from 10:00 a.m. to 2:30 p.m. During that time, guides will give demonstrations and answer questions at many of the interpretive stops along the Ridge.

Those interested in volunteering should contact Beth Simmons at [cloverknoll@comcast.net](mailto:cloverknoll@comcast.net)

**Saturday, May 9, a second “Earth Day” nature hike on Green Mountain**, led by geologist Pete Modreski and others. Sponsored by the Green Mtn. Civic Association, but open to everyone. For an easy 2-hour hike, meet at 9 a.m. at the cul-de-sac at the end of W. Exposition Dr., 5 blocks west of S. Alkire St., Lakewood. For more information, please contact Pete at [pmodeski@usgs.gov](mailto:pmodeski@usgs.gov) or 303-202-4766.



**The Colorado Chapter of the Friends of Mineralogy** will hold its annual silent auction of mineral hobby items on **May 16** at the Clements Community Center, 1580 Yarrow (near Colfax and Wadsworth), Lakewood, Colorado, 1:00 to 3:00 P.M. This auction features reasonably priced minerals, faceted stones, books, and mining paraphernalia for the general public. There will be a special verbal auction at 2:00 P.M. of museum quality specimens donated by special dealers.

**Admission is free.** All interested sellers and buyers are invited to phone Larry Havens at 303-757-6577 for more details.



## Earth Science Meetings and Talks

*Newsletter items must be received by the 25th of each month.*



**Colorado Scientific Society's** regular meetings are held the 3rd Thursday of the month at the Colorado School of Mines Geology Building in Golden (unless otherwise advertised). Social time begins at 6:30 p.m. and talks start at 7:00 p.m. For more information, contact Don Sweetkind, at 303-236-1828, [dsweetkind@usgs.gov](mailto:dsweetkind@usgs.gov)

**Café Scientifique** Wynkoop Brewery, evening science talks at 6:30. Free, except for beer. <http://www.cafescolorado.org>

**Colorado Bar Association, Natural Resources And Energy Law Section Monthly Luncheon May 8, 2009**—In conjunction with the 150th anniversary of the Pikes Peak Gold Rush, Stanley Dempsey will be speaking on Colorado's Mining District laws. 12:00 Noon Lunch, Denver Petroleum Club at the Denver Athletic Club, 1325 Glenarm Place, Denver. Parking available in the Club's parking garage for \$5.00. Cost of the luncheon is \$25.00 (Seniors over 62, \$21.00, and students and law clerks, \$10). The first 5 students who RSVP and show up in person, will be admitted free of charge, as guests of the Section. SPACE IS LIMITED Reservations must be received no later than Noon on Wednesday, May 6, 2009. To RSVP, call the Colorado Bar Association reservation line at (303) 860-1115 x727, or register by sending an e-mail to: [lunches@cobar.org](mailto:lunches@cobar.org). Please specify if you prefer a vegetarian lunch. If you call our reservation line, please spell your name and specify the name of the program you wish to attend. All cancellations or no-shows after Noon on Wednesday, May 6, 2009 will be charged the cost of the luncheon.

**Colorado School of Mines, Van Tuyl Lectures** Thursdays from 4–5 p.m. in Berthoud Hall room 241. <http://www.mines.edu/academic/geology>

**Colorado State University, Dept of Geosciences**, Rm 320 Warner College of Natural Resources Bldg., Mondays, 4:00 p.m. 970-491-5661. <http://welcome.warnercnr.colostate.edu/geo-training/index.php>

**Desk & Derrick, Industry Awareness Luncheon May 12th**—*Sarah Andrews – Literary agent, geologist, and mystery writer. Sarah is also a Geology lecturer at Sonoma State University. Many of her novels take place in the Rocky Mtns. region of the United States.* Meetings are held on the second Tuesday of each month at 11:30 a.m. at the Denver Petroleum Club, 1325 Glenarm Place. For reservations please contact Sandra Thompson, [Sandra.Thompson@anadarko.com](mailto:Sandra.Thompson@anadarko.com)

**Denver Mining Club, Ltd. May 11**—Allan J. Breitenbach, Principal Geotechnical Engineer, Vector Engineering Inc.: "Current Practice in Tailings Disposal and Dam Construction in the 21st Century." **May 18**—Bruce Geller, Director, CSM Geology Museum: "Update on the Prospectors and Developers Association of Canada (PDAC) Convention, 2009." Meetings held at: Country Buffet, 8100 West Crestline Ave, SE corner at Wadsworth, Littleton. Purchase of buffet lunch required. Every Monday, except when noted. 11:30 a.m. - 1:00 p.m. (+/-). VISITORS ALWAYS WELCOME! <http://www.denverminingclub.org>

**Denver Museum of Nature and Science May 6**—Michael Collier, aerial photographer: "Stones from the Sky." 7:00 p.m. Ricketson Auditorium; use Ricketson Evening Entrance. \$15 member, \$18 nonmember (lecture and dessert only) Book sale + signing. **May 21**—Jim Steinberg, Colorado photographer, and Susan J. Tweit, Colorado author: "Colorado Scenic Byways: Taking the Other Road." 7:00 p.m. Ricketson Auditorium; use Ricketson Evening Entrance. \$12 member, \$15 nonmember, Book sale + signing. For reservation information and a listing of more lectures and special programs go to: <http://www.dmns.org/main/en/General/Education/AdultProgram/Lectures>

**Denver Region Exploration Geologists' Society (DREGS)** meets in the Mutual Consolidated Water Building, 12700 West 27th Avenue, Lakewood. Social 6:30–7:00 p.m. Presentation at 7:00 p.m. Meetings are normally scheduled for the first Monday of each month. For information contact Jim Piper, (303) 932-0137, or the website <http://www.dregs.org>

**Denver Well Logging Society (DWLS)** meets on the third Tuesday of each month, Sept. through May. Lunch and a technical talk at the Wynkoop Brewery (Mercantile Rm.) begins at 11:20 a.m., 18th and Wynkoop Sts. in Denver. Call Noga Gardiner at 303-831-1515 by prior Thursday for reservations. <http://dwls.spwla.org>

**DIPS (Denver Intl. Petroleum Society) May 8**—Gary Stewart, Melange International, LLC, and Robert Coskey: "PEAK OIL? So what in the world is going on?" Regular meetings held 2nd Friday of the month at Wynkoop Brewing Company, 1634 18th Street, Denver. Gather at 11:30 am; Lunch served at Noon; Presentation at 12:30. Lunch price: \$15 for members, \$18 for non-members, \$3 talk only. Please e-mail Bob Zilinski, at [rezilin@aol.com](mailto:rezilin@aol.com) or call him at 303-885-0615 to make reservations before Wednesday, noon, May 5, 2009.

**Colorado Scientific Society**  
**P.O. Box 150495**  
**Lakewood, CO 80215-0495**

**<http://www.coloscisoc.org>**



## **OFFICERS**

President:	Don Sweetkind, USGS, 303-236-1828, <a href="mailto:dsweetkind@usgs.gov">dsweetkind@usgs.gov</a>	2006–2009: Scott Minor, 303–236–0303, <a href="mailto:sminor@usgs.gov">sminor@usgs.gov</a>
President-Elect:	Scott Minor, USGS, 303-236-0303, <a href="mailto:sminor@usgs.gov">sminor@usgs.gov</a>	2007–2010: Jeremy McCreary 303–744–0907 <a href="mailto:jeremy@cliffshade.com">jeremy@cliffshade.com</a>
Treasurer:	Don Sweetkind, USGS, 303-236-1828, <a href="mailto:dsweetkind@usgs.gov">dsweetkind@usgs.gov</a>	2008–2011: Lee Shropshire, UNC, 970–352–8778, <a href="mailto:leeshrop@comcast.net">leeshrop@comcast.net</a>
Secretary:	Lisa Fisher, CSM, 303-478-9427 (c), <a href="mailto:lfisher@mines.edu">lfisher@mines.edu</a>	2009–2012: Jim Burnell, CGS, 303–866–2611, <a href="mailto:jim.burnell@state.co.us">jim.burnell@state.co.us</a>
Past President:	Matt Morgan, CGS, 303-866-2066 <a href="mailto:matt.morgan@state.co.us">matt.morgan@state.co.us</a>	

## **COUNCILORS**

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Best Paper Award:	Don Sweetkind, USGS, 303–236–1828, <a href="mailto:dsweetkind@usgs.gov">dsweetkind@usgs.gov</a>
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Pillmore Fund:	Lee Shropshire, UNC, 970–352–8778, <a href="mailto:leeshrop@comcast.net">leeshrop@comcast.net</a>
Program:	Emmett Evanoff, 303-444-2644, <a href="mailto:emmettevanoff@earthlink.net">emmettevanoff@earthlink.net</a> , Libby Prueher, Christine Turner
Publicity:	Emily Taylor, 303–236–5050, <a href="mailto:emtaylor@usgs.gov">emtaylor@usgs.gov</a>
Science Fair:	Chuck Weisenberg, 303–238–8806, <a href="mailto:cweisnbrg@msn.com">cweisnbrg@msn.com</a>
Webmaster:	



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