

# **Bulletin of the Mineralogical Society of Southern California**

Volume 90 Number 6 - June, 2017

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*The 945<sup>th</sup> meeting of the Mineralogical Society of Southern California*

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*With Knowledge Comes Appreciation*

**June 9<sup>th</sup>, 2017 at 7:30 P.M.**

**Pasadena City College  
Geology Department, E-Building, Room 220  
1570 E Colorado Blvd., Pasadena**

***Program:*** Critique of Cost-Risk Analysis and Frankenstein Spacecraft Designs  
Presented by Mohamed Elghefar

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**Remember:** If you change your email or street address, you must let the MSSC Editor and Membership Chair know or we cannot guarantee receipt of future Bulletins

**About the Program: Critique of Cost-Risk Analysis and Frankenstein Spacecraft Designs** Presented by Mohamed Elghefari from Reed Integration, Inc.

Our June program discusses the costs of space travel! Mr. Elghefari will explain the various methods used to estimate and compare the various options available for space travel and the “Frankenstein” designs for spacecraft that are offered for consideration.

In this presentation, we present an historical, data-driven probabilistic cost growth model for adjusting spacecraft cost Current Best Estimate (CBE), both for earth orbiting and deep space missions. The model is sensitive to when, in the mission development life cycle, the spacecraft cost CBE is generated. The model is based on historical spacecraft data obtained from the NASA CADRe database. This alternative cost-risk modeling approach encompasses the uncertainties of underlying design parameters of the spacecraft (i.e., mass and other cost drivers) without violating laws of physics or the axioms of the theory of probability. In addition, it promotes realism in estimating NASA project costs by providing traceable and defensible data-derived measures of cost risk reflecting NASA's historical cost estimating performance.

**Mohamed Elghefari** spent over fifteen years in the aerospace industry and has a wide range of expertise in the areas of space mission architecture and concept development, space radiation effects, and cost modeling and research. He performed independent technical assessments and cost evaluations of various NASA and Air Force programs. He was a systems engineer at the NASA Jet Propulsion Laboratory where he helped develop proposals for future planetary and deep space missions. Prior to that, he worked as a mission assurance engineer, where he assessed and tested the effects of space radiation on advanced microelectronic, power, and optoelectronic devices at different particle accelerators and radiation source facilities. Mohamed was the Principal Investigator for radiation effects assessment of Magneto-Resistive Random-Access Memory (MRAM) devices under the NASA Electronic Parts and Packaging (NEPP) program. Mr. Elghefari holds a Bachelor of Science degree in Physics from UCLA, a Master of Science degree in Astronautical Engineering from USC, and a Master's degree in Financial Engineering from the Anderson School of Management, UCLA.

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**From the Editor:**

Wow, 2017 is going so fast! It definitely feels like the older I get, the faster time flies! The MSSC Picnic is coming up fast (August) and so is time to elect our 2018 officers (November). It has been the same faces at the Board meetings for seven years. Now is the time for the rest of our membership do their share to keep MSSC healthy and active by stepping up to take on these positions. If you think you might be interested in a position, take the time to talk to the existing office older to see what is involved. Talking is easy and you might even find that you want to try one of the elected positions. Linda Elsnau

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**MEANDERINGS FROM THE PRESIDENT** by Ann Meister

The President of the United States has issued an Executive Order to review of the National Monuments larger than 100,000 acres that were created after 1996. Included in this list are Carrizo Plain, Mojave Trails, and the San Gabriel Mountains. The complete list is on the DOI website: <https://www.doi.gov/pressreleases/interior-department-releases-list-monuments-under-review-announces-first-ever-formal>. Comments may be submitted online until July 10, 2017 at <http://www.regulations.gov> by entering “DOI-2017-0002” in the Search bar and clicking “Search,” or by mail to Monument Review, MS-1530, U.S. Department of the Interior, 1849 C Street NW, Washington, DC 20240. Carrizo Plain is the site of Soda Lake where many of us have collected thenardite, bloedite, and mirabilite (if you are there on a very cold day and keep the specimen in the freezer after you collect it). The San Gabriel Mountains and the Mojave Desert have a large variety of mineral localities. Now’s your chance to comment and perhaps help change these areas back to land that is open for collecting.

**Geology and Paleontology in the News:** The 15km-wide asteroid that hit the Gulf of Mexico 66 million years ago impacted in the worst possible place. Had the asteroid struck a few moments earlier or later, it might have hit deep ocean instead of the shallow coastal waters underlain by gypsum beds ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) which injected

huge volumes of sulfur into the atmosphere, extending the “global winter” period that followed the immediate firestorm. ( <http://www.bbc.com/news/science-environment-39922998>) Poor dinosaurs...

## **OTHER (FREE) THINGS TO DO...**

The **Von Kármán Lecture** on June 1 and 2 is titled “The Golden Age of Exploration,” presented by Charles Elachi who was the JPL Director 2001-2016, now a professor at Caltech. Thursday is at the Von Kármán Auditorium at JPL and Friday is at the Vosloh Forum at PCC. Start time is 7 PM.

The **Watson Lectures** at Caltech will restart in October.

The **UCLA Meteorite Gallery** lecture is on Sunday, June 25 at 2:30 PM. The speaker is Dr. Frank Kyte, former manager of the UCLA electron microprobe. His topic is “Eltanin, the largest meteorite of which intact fragments are preserved.” The Meteorite Gallery in Geology room 3697 is open with a docent present every Sunday from 1 till 4. The lecture is in room 3656 near the Meteorite Gallery. (New location)

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## **A special letter from Ann Meister**

Dear MSSC members,

Well, it's that time of year when nominees for the coming year are diligently sought. Who would like to be in the leadership team of MSSC? In previous years, I've asked for volunteers and spoken with various individuals, but no one seems to be interested or has the time, or whatever, so the current crew has patiently continued. However, I'm now burning out. Others when they have hit this wall have left the Society. I don't plan to do that. But we do need to find a new President of the MSSC for 2018 as well as replacements for other officers who have willingly served longer than normal terms. I have been President of MSSC since January 2011 – now serving my seventh consecutive term and nine in total, having served two terms many years ago. Jim Kusely, our Treasurer, has also served for 7 years; others have held their offices for 5 and 6 years. As Past-President, I will remain on the Board to provide continuity, as Geoff Caplette, who served 3 years as President, has faithfully done. Who would like to volunteer? Please contact me or any current officer to discuss the various jobs and/or to volunteer to serve. It is when new or recycled talent cannot be found that a club starts exploring the group's dissolution as the Southern California Micro-Mineralogists did in 2005 when they merged with MSSC. I do not want to address a troublesome and discouraging agenda item at the Board meeting on June 4 – the procedure for dissolving the MSSC. Finding nominees is an agenda item.

Any member of MSSC is welcome to attend the Board meeting. But please RSVP to Bruce Carter or me. The meeting is at the home of Bruce Carter at 1:00 pm on Sunday, June 4. The address is 146 Highland Place, Monrovia. Nominations are made at the October and November meetings. The new officers are elected at the November meeting, and installed at the annual banquet in January. The term is one year, though by custom, officers usually serve two terms. The term of Directors is two years. The duties of the various offices are listed in the Bylaws and Operating Rules or discuss this with the current office holder.

The Society's first meeting was on June 23, 1931, 86 years ago. We are the oldest Society “west of the Mississippi” which was the landmark for things that happened in the uncivilized West. In 2004, we staged our last Mineral Show, which had been an annual event for 57 years. That ended because no one wanted the responsibility of Chairman. Will the MSSC now end because no one wants the position of President? Please friends, think seriously about what the Society means to you and what you would do for its continuation.

Thank you, Ann Meister, President

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## **MINUTES of the June 12, 2017 MSSC Meeting**

On Friday, May 12, 2017, the Membership meeting of the Mineralogical Society of Southern California (MSSC) was called to order at 7:35 p.m. by President Ann Meister who welcomed all to the 944th Membership Meeting. There were no guests present.

President Meister called for any corrections or additions and seeing none, made a call to entertain a motion to approve the Minutes of the April 2017 Membership Meeting Minutes as published in the May 2017 MSSC *Bulletin*. The Motion was made by Laura Davis, seconded by B.J. Ledyard to accept as published. Ann asked for discussion and seeing none, called for the vote. **The vote was taken and the Motion passed by unanimous vote.**

### **Regular Business**

- Deadline to submit items for the *Bulletin* is the 22nd of each month;
- If you have not received your e-mailed Bulletin by the 2nd of the month, please let Editor Linda Elsnau know; (snail mail takes longer!)
- Dues were due in January, see Cheryl Lopez, Membership Chair, to pay or join;
- If you haven't received your Membership Roster, please contact Cheryl, as well;
- Sometimes there are conflicts with graduation events at Pasadena City College, but our June 9, 2017 meeting does not conflict with their graduation on the 16th. See you at our next Membership meeting here at PCC on June 9, 2017;
- Next **BOARD meeting** will be **June 4th** at Carter residence. Agenda items include: (a) Discussion about the Annual Picnic to be held on August 6th at the Carter residence, (b) Volunteers for officer positions for our next election and (c) other agenda items. Everyone is welcome to come to the Board meeting. Contact Ann so she knows how many/who will attend and Board members let her know if there are other agenda items;
- Thanks to Rudy Lopez for his article in the May 2017 *Bulletin* on his mini field trip (Oro Grande).

### **Announcements**

#### **Shows:**

- The combined CFMS/AFMS Show will be held in Ventura June 9-11 at the Fairgrounds. CFMS Director Jo Anna Ritchey will attend for MSSC;
- Glendora 's Show will be June 3-4;
- West Coast Gem and Mineral Show is May 19-21 in Santa Ana;

#### **Other:**

- Wilson Lecture Series at Cal Tech will resume in the Fall 2017;
- The von Kármán Lecture Series for June will be "*The Golden Age of Exploration*" presented by Charles Elachi, Professor, Cal Tech JPL Director (2001-2016) on June 1 at JPL and June 2 at Vosloh Forum at PCC. The lectures begin at 7p.m. [Secretary Note: The July 2017 the lecture will be "*Five Years of Exploring Gale Crater with the Curiosity Mars Rover*" to be presented July 13 and 14. Reservations are not required but recommended due to limited seating;
- UCLA's Meteorite Gallery: On May 14, 2017, "*The Great American Eclipse of 2017*" is to be presented by Professor Kevin McKeegan. August 21st will be total eclipse of the Sun. [Sec. Note: Please visit the Gallery website for future presentations [www.meteorites.ucla.edu/gallery](http://www.meteorites.ucla.edu/gallery)];
- Marek Chorazewicz announced the NCMA Annual Micromount Symposium to be held the first weekend in June (June 2 - June 4) in El Dorado, CA. Contact Marek or Bob Housley for additional information.

### **Show and Tell**

- Jerry Wendt brought a specimen he purchased in Mexico that may have Calcite;
- Angie Guzman brought in a specimen she collected at Oro Grande on the impromptu field trip with Cheryl and Rudy Lopez. The barite is from "Gus' Quarry" where there is also pyrite, quartz and dendrites.

### **Programs Chair**

- Rudy Lopez reports on the "Science in The Park" held at Irvine Park on April 29th. It was windy, but Angie, Leslie and I (Rudy) gave about 400 rock samples to the kids. We are invited back next year! While

there, we took advantage of a little networking and President of the American Opal Society (one of the other booths there) has agreed to speak at one of our meetings;

- Sample rock and/or mineral donations are always welcome. Rudy will pick up, if need be.
- October is another event that MSSC will be participating in. It will be in Buena Park, put on by the same people that hosted "Science in The Park" and we will do cabbings demonstrations. You are more than welcome to help, hand out rock samples to the kids and have a great time! Let Rudy know at the next meeting.

## **Program**

***The Formation of Meteorite Minerals*** presented by Alan Rubin, Ph.D., a pioneering cosmo-chemist at the University of California, Los Angeles (UCLA). Researchers have identified a new mineral in the oldest solar system solids from primitive meteorites. The isometric crystal is named rubinite after Dr. Alan Rubin, tonight's guest speaker. Rubinite was officially approved by the IMA, International Mineralogical Association, March 2017. Congratulations, Dr. Rubin!

Dr. Rubin began by making a few announcements: (a) the Solar Eclipse on August 21st, if you get a chance to see it, do so, (b) publicity poster and information cards are up front, (c) tonight's talk will be repeated at the Ventura show in June, (d) "Article in Press" handout shows formulas for most minerals.

Rubin explains there are a wide range of oxidation states and names a wide variety of minerals found in meteorites. He tells us chondrites are the most abundant stony meteorites and are among the first to have formed in the solar nebula. There are about 435 known meteorite minerals, many of which have, within the last 20 years, been noticed/identified due to advancements in technology.

Chondrites contain chondrules. Chondrules are submillimeter-size crystalline and/or glassy quasi igneous spheroidal or ellipsoidal inclusions found in chondritic meteorites. They constitute up to 70 volume percent of the meteorite. The sample Dr. Rubin showed is literally chock full of chondrules. These are some of the oldest solids formed in the solar system, they are 4.856 billion years old and are modestly abundant. Their shape and size are formed by surface tension, some are molten and some are not.

Other components in chondrites include refractories. CAI's, calcium aluminum inclusions, for example, are rare outside of CI, carbonaceous inclusion chondrites. They all have the same concentration of oxygen indicating that they all formed in the same area of the solar system around the same time.

*Allende* fell in Mexico in 1969 contains calcium-aluminum-rich-inclusions. There are abundant chondrules and a smattering of CAI's in this meteorite (slide photo). It has a fine grain matrix, up to 60% of the "rock". Another element to chondrites is AOI's, amoeboid olivine inclusion which are almost exclusively found in CI, carbonaceous chondrites. AOI's are irregularly shaped, have olivine, diopside and spinel.

Here's an important thing to know. The composition of CI, carbonaceous intrusion, is one of the most primitive. Look at it this way, if you could squeeze out all the helium and hydrogen from the sun the mass would still be 6,300 times that of the earth but, it would have the same composition of carbonaceous chondrite. The remaining elements would be the same proportional elements contained in the sun, the planets, the moons, the comets, the asteroids, all of it. The only difference is the sun was quantitatively able to acquire hydrogen and helium from the solar nebula. Jupiter is so big because of the hydrogen and helium it has, as well.

Chondrites undergo thermal metamorphism(heat), aqueous alteration (water) and/or shock metamorphism (impacts).

Thermal Metamorphism describes the petrologic scheme. Chondrites are categorized into types. There are 6% of type 3. This type is slow to metamorphose, they are metallic, not modified due to melting or differentiation and contain olivine and pyroxene. They are said to be unequilibrated. Next chondrites are type 4 at 12%, type 5 at 33% and type 6 at 49%. These types, 4, 5 and 6, are altered by thermal metamorphism. They have recrystallized (type 4), begun to be indistinct and integrate with matrix (type 5) and new metamorphic minerals form, such as feldspars (type 6). Seventy-four percent of ordinary chondrites are observed falling.



Aqueous Alteration by phyllosilicates or ice, that is, water with carbon dioxide, forms nickel rich sulfide, nickel rich iron and carbides. Types 1 and 2 are aqueous alteration, not hot enough for thermal metamorphosis but the matrix is hydrated in some fashion.

Shock Effect shows metal, sulfides and shocked olivine trails on the meteorite (slide sample). Mosaic design exhibits a high degree of shock.

*Annealed* means cooled slowly. Some chondrites are shocked then annealed. The slide sample showed evidence of how the shock evidence remains. Meanwhile, when melting occurs, metal liquid (dense, so it sinks) and silicate liquid (rises) form - they don't mix, so the result is *differentiation*, like the meteorite Vesta that has an iron core (check this out on YouTube). *Achondrites* do not contain, chondrules. They are igneous rock from molten magma.

As of today, there are about 300 meteorites from the Moon and about 400 meteorites from Mars and most are large differentiated objects. How do you know the meteorites are from Mars since we haven't been to Mars? Johnson Space Center analyzed meteorites they thought were from Mars by measuring trapped atmosphere bubbles they found and compared the bubbles in the Martian atmosphere as measured by Viking spacecraft in 1976. There was a 1:1 correspondence match. *[Sec. Note: I'm sure it was a lot more detailed and specific than the simple explanation given during this presentation.]* Dr. Rubin did go on to explain the mineral content, petrology and other evidence to prove the meteorites in question are indeed from Mars.

He continued his presentation by telling us about ratios of iridium vs. nickel, cosmic ray exposures, cooling rates, mineral absorption and reflection, orbits, fragments and the Itokawa Asteroid.

The formation of minerals in meteorites is by single mechanism, for example ringwoodite is a high-pressure shock metamorphism of olivine. On the other hand, olivine can be formed by a myriad of processes, some of which are listed below.

Dr. Rubin has put together a list of processes by which minerals could form: (1) pre-solar grains {*graphite, carbides, aluminum oxides, silicates and glass*} (2) condensation of solar nebula {*some regions hot enough to evaporate then cool to form titanium oxide, carbides, sphalerite, etc.*}, (3) crystallization in CAI and AOI melts, {*complicated oxides, chlorides, olivine, etc.*}, (4) crystallization in chondrule melts {*olivine, oxides, corundum, glass, etc.*}, (5) exsolution during cooling of CAI, (6) exsolution during cooling of chondrules and opaque and (7) annealing of amorphous material, (8) thermal metamorphism and exsolution, (9) aqueous alteration, hydrothermal alteration, (10) shock metamorphism, (11) condensation within impact plumes, (12) crystallization from melts in differentiated or non-differentiated bodies, (13) condensation from late-stage vapors in differentiated bodies, (14) exsolution inversion, (15) solar heating near perihelion, (16) atmospheric passage and (17) terrestrial weathering. *[Sec. Note: Minerals formed include quartz, chromite, copper, cobalt, silicate, basalt, magnetite and many others.]*

Lively Q & A followed which included: Keep in mind that asteroids do not have an atmosphere, micro-meteorites burn up in Earth's atmosphere, general public make meteor-wrongs (miss-identify their rock), "Meteor Men", Union Carbide's "green meteorite", many new minerals from meteorites are studied and properties are analyzed, plus other great comments and questions.

Thank you, Dr. Rubin, for an interesting and informative presentation.

**Prize:** Won by Angie Guzman.

**Adjourn:** The meeting was adjourned at 8:55p.m. Refreshments and discussions followed adjournment.

Respectfully submitted, Angie Guzman, Secretary (*Apologies in advance for any omissions or misspellings.*)

*[Secretary's Note: Come to the next meeting to get full benefit and hear these amazing presentations for yourself. Our next meeting will be Friday, June 9, 2017 at 7:30 p.m. at the PCC Geology Building*

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## List of Upcoming MSSC Events : Mark your Calender!

Event	Date	Comments / Scheduled Program (if known)
<b>Meeting Dates:</b>	July, 2017	Webers, Mary Pat & Dick - Canadian Amethyst
	September, 2017	Dr. Rossman - Quartz crystals
	October 2017	Larry Hoskinson & Leslie Neff- Opals Part 2
	November 2017	Chuck Howser - Flight
<b>Annual MSSC Picnic</b>	August, 2017	Theme to be announced
<b>Board Meeting</b>	June 4, 2017	Board Meeting at Bruce Carter's house

*Note: Dates and programs shown above are subject to change. Check your bulletins to confirm final information each month.*

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### Donations Needed: by Rudy Lopez

MSSC is being asked to attend events as an exhibitor. We have exhibited at the Natural History Museum for three years, The Cooper Center & OC Parks this year and have been asked by other organizations to attend their functions.

Currently, we have been very lucky to have had donations from club members that have made it possible to give every kid we meet at these events a rock. But we will need a lot more. We have provided over 3600 bags of rocks or minerals to kids so far. Each year at the Natural History events our counts have gone up by 300 bags or more.

Donations of minerals or rock will help provide mineral bags for our events to give to the kids. Donations will also help provide silent auction items that will bring money to MSSC to fund these events if needed. We have silent auctions at our annual meeting and Micromount Conference every year, and last year had a silent auction at our annual picnic.

If you have something you want to donate for any of our events you can e-mail: Rudy Lopez: [programs@mineralsocal.org](mailto:programs@mineralsocal.org). I will also pick up if needed. Remember these are items we can bag or sell at any of our events. Rocks or minerals don't have to be bagged. If you have identification labels, just put it in with your donation and Rudy will make sure the label gets in with that bagged rock or mineral.

We will be glad to send a thank you for your donation for your taxes if needed.

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### Prehistoric, OC. By: Rudy Lopez

MSSC have been invited by Jeannine Pederson of the Cooper Center to participate at:

The Cooper Center & OC Parks - Prehistoric OC  
 Saturday, October 14, 2017, from 10am to 3pm at  
 Ralph B Clark Regional Park, 800 Rosecrans Ave, Buena Park California.

We have accepted and will give a demonstration on cutting slabs for cabbing and a cabbing demonstration. Angie Guzman will provide the cabbing demonstration. I will cut slabs, talk about cabbing and assist with the cabbing if needed. We will have an outside location and have room for anyone else that wants to give a demonstration of their choice. We can use help with the giveaway table. We will also need minerals or rocks to bag and give the kids at this event.

Please feel free to step up and help with this event any way you can. Contact Rudy Lopez and let him know you how you would like to help. Contact him at the next meeting or send an e-mail: [programs@mineralsocal.org](mailto:programs@mineralsocal.org)

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## Science in the Park By: Rudy Lopez

Saturday, April 29th MSSC was part of the Science in the Park, that took place at Irvine Regional Park. MSSC was invited to participate by The Cooper Center and OC Parks.



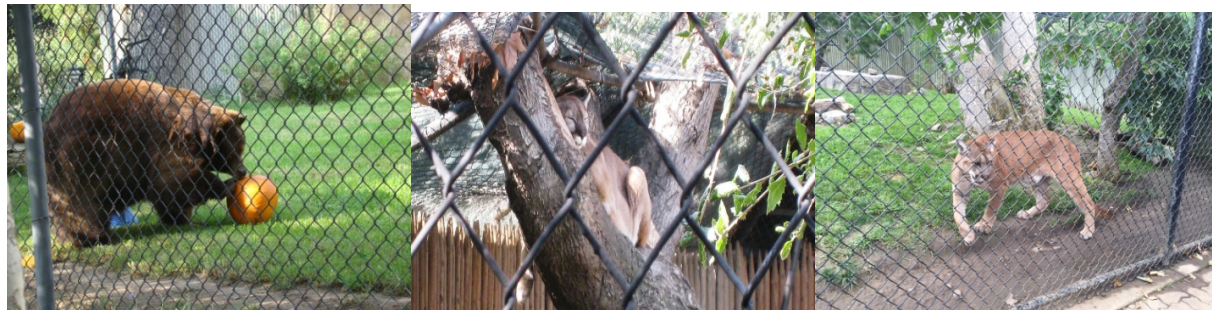
Irvine Regional Park is an Outdoor Educational Center, with something for everyone. A Wilderness area that includes waterfalls, nature hikes and beautiful views.



Water features are throughout the park. Areas to pedal a water bike, fish or just to relax by the lake and watch ducks swim around



Take a train ride around the park, go for a ride through the park on a horse or paddle your way around.



Take in the Zoo and watch the bears have fun, tired mountain lion and a restless mountain lion roaming around. Irvine Regional Park has a lot to see every day.

But, once a year OC Parks puts on a Science in the Park event and this year we were invited to participate. Angie Guzman, Leslie Ogg, and Rudy Lopez represented MSSC at this event. We were given a great location facing the parking lot, the zoo and the sun. We were supposed to have two canopies set up to keep us out of the sun, but the night before was the big wind storms. At my house in Pasadena we had big trees down due to the



storm and at Irvine Park they had bad winds. They tried to put up the canopies but they flew away. So, we were in the sun all day getting tanned.



We had plenty of mineral bags for the kids to choose from. I took three boxes with about 800 bags for this event and we handed out over 400 bags. I found buckets of tumbled rocks as I was cleaning out my storage area. The minerals were from Wiley's Well, California which were Chalcedony and Agate. The others were from an area above Quartzite, Arizona which was an assortment of Jasper. I have more rocks that I will be tumbling soon. I have 20 & 40 pound tumblers and if you have rocks I can tumble for our events, please let me know.

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**Ride Share Listing**

**Can You Provide A Ride?**  
**Would You Like Company On The Drive To Meetings?**

We have heard from several of our members that they would like to ride-share with someone to the meetings. We will list the names, general location and either a phone number or an email address of anyone who would like to connect for a ride-share. If you would like to catch a ride or would like company for the trip, let me know at [msscbulletin@earthlink.net](mailto:msscbulletin@earthlink.net) and I'll put the information in this section of the bulletin. After that, any final arrangements made are up to you. Also, If you make a connection that works for you, let me know so that I can remove your information from the bulletin. The Editor

Looking for	Who	Where	Contact at
A ride	Richard Stamberg	North Orange County, near Cal State Fullerton	
A ride	Catherine Govaller	San Bernardino, CA	

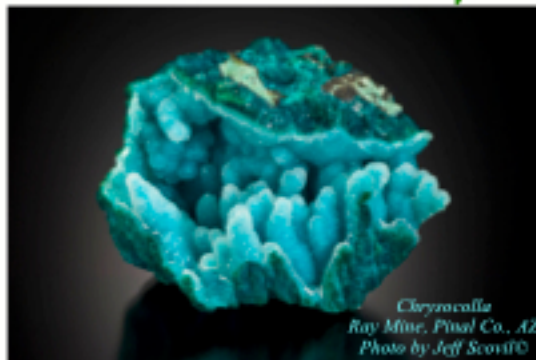
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MSSC Advertisement Policy:			
Mineral-related ads are allowable in the MSSC bulletin. Below is the price per month			
	Business Card	\$5.00	
	1/3 page	\$10.00	
	1/2 page	\$20.00	
	Full Page	\$35.00	
In addition, any advertiser who purchases 12 months of space in advance will receive a discount of 12 months for the price of 10 months. The copy for the ads should be mailed to the editor at <a href="mailto:bulletin@mineralsocal.org">bulletin@mineralsocal.org</a> and the payment should be sent to the <b>MSSC Treasurer 1855 Idlewood Road, Glendale, CA 91202</b>			

# WEST COAST GEM & MINERAL SHOW

## November 10-12, 2017

Minerals ♦ Fossils  
Gemstones ♦ Jewelry  
Meteorites ♦ Beads  
Decorator Items  
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Chrysocolla  
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### Calendar of Events:

Only local area shows are listed here. Other CFMS Club shows can be found at: <http://www.cfmsinc.org/>

#### JUNE, 2016

##### June 2 - 4: LA HABRA, CA

North Orange County Gem & Mineral Society  
La Habra Community Center  
101 W. La Habra Blvd.  
Hours: Fri 5 - 8; Sat & Sun 10 - 5  
Website: [www.nocgms.com](http://www.nocgms.com)

##### June 3 - 4: ESCONDIDO, CA

Palomar Gem & Mineral Club  
California Center for the Arts  
340 N. Escondido Blvd.  
Hours: Sat 10 - 5; Sun 10 - 4  
Website: [www.palomargem.org](http://www.palomargem.org)

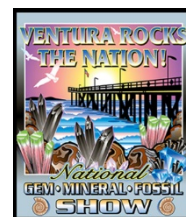
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##### June 3 - 4, 2017: GLENDORA, CA

Glendora Gems  
Goddard Middle School  
859 E. Sierra Madre Avenue  
Hours: Sat 10 - 5; Sun 10 - 4

##### VENTURA ROCKS THE NATION!

2017 CFMS-AFMS Show & Convention  
Hosted by Ventura County Gem & Mineral Society  
Ventura County Fairgrounds  
10 West Harbor Boulevard  
Hours: Fri & Sat 10 - 5; Sun 10 - 4  
Website: [2017CFMS-AFMSShow.com](http://2017CFMS-AFMSShow.com)



#### JULY

##### July 8 - 9: CULVER CITY, CA

Culver City Rock & Mineral Club  
Veterans Memorial Auditorium  
4117 Overland Blvd  
Hours: Sat 10 - 6; Sun 10 - 5  
Website: [www.culvercityrocks.org](http://www.culvercityrocks.org)

#### AUGUST

##### August 4 - 6: NIPOMO, CA

Orcutt Mineral Society  
Nipomo High School  
525 Thompson Avenue  
Hours: Fri-Sat 10-5, Sun 10-4  
Website: [www.omsinc.org](http://www.omsinc.org)

##### June 9, 10 & 11, 2017: VENTURA, CA



## 2017 MSSC Officers:

<b>OFFICERS</b>		
President	Ann Meister	<a href="mailto:president@mineralsocal.org">president@mineralsocal.org</a>
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### About the Mineralogical Society of Southern California

Organized in 1931, the Mineralogical Society of Southern California, Inc. is the oldest mineralogical society in the western United States. The MSSC is a member of the California Federation of Mineralogical Societies, and is dedicated to the dissemination of general knowledge of the mineralogical and related earth sciences through the study of mineral specimens. The MSSC is a scientific non-profit organization that actively supports the geology department at Pasadena City College, Pasadena, California. Support is also given to the Los Angeles and San Bernardino County Museums of Natural History. The Bulletin of the Mineralogical Society of Southern California is the official publication of the Mineralogical Society of Southern California, Inc.

The MSSC meetings are usually held the second Friday of each month, January, February and August excepted, at 7:30 p.m. in Building E, Room 220, Pasadena City College, 1570 E Colorado Boulevard, Pasadena, California. The annual Installation Banquet is held in January, and the annual Picnic and Swap Meeting is held in August. Due to PCC holidays, meetings may vary. Check the Society website for details.

The Society also sponsors the annual Pacific Micro mount Symposium held at the San Bernardino County Natural History Museum during the last weekend of January.

Annual Membership dues for the MSSC are \$20.00 for an individual membership, \$30.00 for a family membership. Bulletins are delivered by email, there is an additional annual \$20.00 fee if you prefer paper bulletins mailed to your address. The Society's contact information:

**Mineralogical Society of Southern California**

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**Website:** [www.mineralsocal.org](http://www.mineralsocal.org) **The Mineralogical Society of California, Inc.**

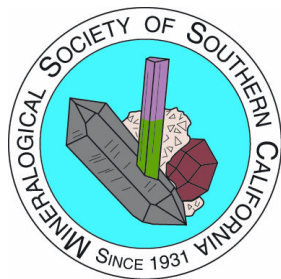
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*To:*



**With Knowledge Comes  
Appreciation**

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