Bulletin of the Mineralogical Society of Southern California

Volume 96 Number 1 –January, 2023

The 1,009th meeting of the Mineralogical Society of Southern California

With Knowledge Comes Appreciation

A ZOOM Meeting

January 13th, 2023 at 7:30 P.M.

Program: "Enhancement Secrets" Presented by Denise Nelson

In this Issue:

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: "Enhancement Secrets" Presented by Denise Nelson

Nature's ability to create beautiful gems and minerals has its limits, but men's creative minds and scientific discoveries are basically endless! We will explore the curious world of "Enhancements"! Some are easy to recognize and are obvious, some are ancient practices and some are totally dependent on modern technology and very difficult to identify. Even experts are now stressed, beyond their abilities, to find the answers in the ever-growing field of altering appearances and chemical processes. Discovering and disclosing the artificial improvements to the natural appearance of a gemstone is often controversial and problematic and can also be hazardous! The gem-trade enhancement practices are guided by regulations and rules, yet the various processes remain profitable and dazzling in the end!

Denise Nelson is a Graduate Gemologist (GIA), Appraiser, and occasional Gem hunter. She started her own business, Inner Circle, a Fine Jewelry and Appraisal provider, over 23 years ago in Maryland. Her travels to mines and trade-shows have taken her to many different Countries like Brazil, Thailand, Malaysia, Japan, China, Germany, France and Argentina. This combination of gemology and genealogy is a perfect topic for Denise Nelson, who has taught genealogy and spent many years researching and studying the history of gems and jewelry. An appraiser, consultant and owner of INNER CIRCLE Fine Jewelry and Appraisal Services, Nelson has revealed many interesting facts to her clients in her 30 years in the jewelry business. She's traveled to 38 countries to research historical jewelry, visit mining areas and buy gemstones, pearls and jewelry for her customers. Nelson also designs jewelry and is a wholesaler to a number of jewelry stores. She is a member of the National Association of Jewelry Appraisers (NAJA) and the Gemological Association of Great Britain.

How to Join our ZOOM Meetings by Rudy Lopez

MSSC members are automatically included in the invite list each month.

For non MSSC Members who want to join this meeting. You must respond to our Programs chair, Rudy Lopez at programs@mineralsocal.org no later than Thursday January 12, 2023. Please include "January ZOOM Meeting" in the subject line of your response. This response date will allow time for us to send you the information needed to participate in the ZOOM meeting and also will allow time to get everything organized.

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From the Editor: Linda Elsnau.

Well, Happy New Year to one and all! May 2023 be all you hope it will be. 2022 was an interesting year for MSSC. We had 12 months of interesting ZOOM meetings and can look forward to another year of programs that inform, educate and entertain MSSC Members

We have a new slate of officers and can anticipate how these new officers will improve our organization.

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Some Words From Our New President, Angela Guzman

The Mineralogy Society of Southern California (MSSC) was a pioneer in the field of groups dedicated to the study, education, collection and admiration of minerals. Nationwide, today there are many societies and clubs that have branched out to include rockhounds, lapidary creators, gem enthusiasts and, of course, collectors. Our history includes the fact that MSSC, which was established in 1931, spawned the California Federation of Mineralogical Societies (CFMS, founded 1936) and the American Federation of Mineralogical Societies (AFMS, founded 1947). We are proud to have led the way… Our meetings have gone from brick and mortar to on-line ZOOM conferencing in less than 92 years. Whew! Sure, we had a global pandemic, but to continue to meet and grow is fantastic by any standard.

Ah, what to say about minerals? In my mind's eye, they are mysterious and beautiful. It is no wonder people study, collect, trade, sell and showcase them; create wonderful jewelry with them and otherwise display those minerals they treasure. In addition, they are useful, especially in an array of today's technologies such as medicine, industrial (i.e., abrasives) and information technology, to name a few. Minerals are, and have been, a

lifeline to our existence. Today, some of those minerals and gems include synthetics. The more one knows about minerals, the wider one's scope of appreciation and understanding of them becomes.

For 2023, one of my goals is that MSSC maintain our focus on minerals. Education and outreach, especially directed at children, has been one of the keys to our growth. Let's keep doing what works! Our mineral program presenters attract people from all over the US and other countries. That is impressive! We'll need to cultivate others who have an interest in minerals, encourage their participation and see if they will take the plunge and jump in to see what our society is about. MSSC's Field Trip Program has successfully grown to become an occasional weekend destination that is fun and socially satisfying. Let's see if we can finally expand some of those trips to include more family involvement. Our challenge, if we are to survive as a society, is to develop strategies that stimulate the interest of young Earth Science students and attract those who attend colleges and universities, to join and partner with us to help keep our founders' dream alive. This requires MSSC programs and events be analyzed for possible improvements and/or additions.

As your president, I look to you to help me achieve these goals. We can do this together! So "…fasten your seat belts…", it's going to be a great ride! Look out 2023, here we come!

Thank You, Angie

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It's Time to Renew your MSSC Membership!

Don't miss out on the monthly bulletins, Zoom Meetings, or upcoming Field trips.
Send your dues to:

MSSC
13781 Alderwood Lane #22J
Seal Beach, CA 90740-3993
Or
Use PayPal

$30.00 INDIVIDUAL
$40.00 Family
$35.00 additional for USPS Delivered Bulletin

If your information has changed since last year (email, address, phone) please complete a new Memberships form with new information.
Any Questions, please contact Carolyn at treasurer@mineralsocal.org

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MINUTES of the December 9, 2022 ZOOM Meeting

Call to Order (Dr. Rossman, President):
President Dr. George Rossman, Ph.D. called the meeting to order at 7:33 p.m. It was MSSC's **1,008th** Membership Meeting and our 31st via ZOOM conferencing.

Message from the President (Dr. George Rossman):
There is no change in the number of approved mineral species. We're still at 5,863 at the last update in November 2022. However, late last Tuesday, there was notification that a new mineral was approved. Chi Ma of Caltech has discovered Olsenite, $KFe_4(PO_4)_3$. This is from the El Ali meteorite and is named after Edward J Olsen, curator at the Field Museum of Natural History in Chicago. By the way, the 15-ton meteorite was found by prospectors searching for opal two years ago in Somalia. Tony Kampf announced that Olsen was on his dissertation committee.

Dr Rossman also asked if there were any guests. John Martin indicated he was a first-time attendee. However, due to technical difficulties, John could not be heard. Dr. Rossman welcomed Mr. Martin and said he was glad to have him on board.

Business – Minutes:
Dr. Rossman asked for corrections or additions to the November Minutes posted in the December 2022 Bulletin. There were none. He asked for a show of hands to approve the Minutes as written. The approval was unanimous. He asked for any objections and seeing none declared the Minutes approved.

Announcements and Reports
Marek Chorazewicz – (a) Field trip Dec 3rd had a good turnout. People collected beautiful blades of hematite. Some of the dark blue small crystals were really gemmy, there was micro apatite, our member (Gregor) found small grains of purple corundum and there were nice pink crystals. Everyone found something and everyone left happy; (b) Another field trip is in the planning stages for mid-January 2023. Check the website and the Bulletin for updates.

Programs –(Cheryl Lopez for Rudy)
January's presenter will be Denise Nelson. Her program topic is TBD.

Treasurer's Report (Carolyn Seitz)
Report is through end of November at this time. Carolyn notes that we have gone two years without a banquet, picnic and Micromount conference, all of which help the society to raise money. Think everyone is looking forward to the PMC in January but, we don't know if we'll have another banquet, or picnic for that matter – all due to uncertainty of our general health, as there are too many diseases going around. That said, it is the end of the year and dues renewals are starting to trickle in so that will help boost our bank account.

Secretary (Angie Guzman)
Angie made the following three announcements/reports:

(a) Installation of officers for 2023 will held during the next Membership Meeting scheduled on January 13, 2023 and administered by Past President, Ann Meister. The newly elected officers are:

President and CFMS Director: Angie Guzman	Directors
Vice President: Cheryl Lopez	Simona Cianciulli
Treasurer: Carolyn Seitz	David Lesperance
Secretary: Leslie Ogg	Pat Stevens

(b) Angie spoke about maintaining MSSC's focus in the coming year; citing MSSC's beginnings in 1931: "…dissemination of general knowledge of the mineralogical and related Earth Sciences, through the study of minerals, specimens…" It is my hope to continue along that path as those who came before me, she said. MSSC will continue to have talks, presentations, field trips, education outreach and other events that will be relative to mineralogy, crystallography, micro mounts and the like. I hope you will join with me.

(c) Last thing, Mojave Trails National Monument (MTNM) was created in 2016 by a presidential act by Barak Obama. Obama made several National Monuments including the San Gabriel Mountains. What this means to us is that you can't take anything out of a National Monument, not a grain of dirt. There is a subcommittee, a group of individuals and the BLM, that have been working on trying to restore "rock hounding" – which includes collecting, mineral collecting. A subcommittee is meeting this weekend in Laughlin, NV and our member, Gregor Losson who is also a board member of So Cal Friends of Mineralogy. Gregor is the gem and mineral representative, our go-to-guy. Short notice, but if you have any public comment you wish to make let me know and I will make sure Gregor gets the information. If you have any questions or comments, please contact me after tonight's meeting.

Comments and discussion on this topic included:

Dr Rossman: This is very important because we stand to lose a huge number of important collecting localities that have been with us for decades. If no action is taken and the bill goes through without modification, well, we need to make sure the voice of the mineral collecting community is heard. And the same for the science

system. We are also concerned about the closure that makes it a huge miasma of paperwork of trying to get permission to go back in and collect things – even for science, if these bills should pass unmodified;

Angie Guzman: One last thing, the final report will be submitted and voted on in 2024, so we have a little bitty window to act – about a year, maybe 1-1/2 years;

Tony Kampf: (was asked if the NH Museum involved with action regarding legislation) Not that he's heard of other departments. But, from his own perspective, he says, he's done work at and with minerals from localities there. There are localities in Utah where collecting had been done but they're all gated up now – no access.

Mike Cox: Quick comment, I attended one of the scoping meetings with the BLM and a point that was made was the type of localities that are within these monuments is very important to the BLM. Response was - will still allow collecting but by *special permit*. The special permit procedures require university affiliation and if you talk to the top university affiliated mineralogists in the world, they will tell you they don't go to these sites, they get their material from amateurs. So, when you look at all these locations, they are all going to become lost [to collecting], they'll no longer be accessible to science. Basically, they said they don't really have any control over the roads process, they're just there to account for the sites but other people are going to decide about the roads, if they are going to close or not, it was frustrating.

Dr Rossman: Again, it is very important we get our voice heard because ultimately if we don't do anything, we know what the answer is going to be.

[Secy Note: Contact Angie Guzman if you have any questions or comments]

Pacific Micromount Conference (Wilkins, Housley)
Dr Rossman reported that Al Wilkins said there are 3 speakers already chosen and that the registration announcements for the PMC on January 27, 28, 2023 in Fallbrook have gone out. According to Al, there will be a historically large amount of giveaway materials which will make it an attractive conference in Fallbrook. There was a question about the field trip. Marek said the field trip will be Jan 29 with meet up in Barstow.

Other Announcements:
Mike Cox announced that he attended the virtual talk of Carnegie Institute, Dr Robert Hays, available on YouTube. It was interesting and worth the watch.

Program
Cheryl Lopez, Vice President, introduced Dr. George Rossman who is speaking about diamonds. Dr. Rossman was kind enough to fill in for a scheduled speaker who was unable to make it. George is professor at California Institute of Technology, Division of Geological and Planetary Science. He is renowned for his expertise in identifying color in gems and minerals. Over his career, he has been honored with many prestigious medals and awards as recognition of his accomplishments in the sciences. Dr. Rossman is a member of MSSC and his term as President expires at the end of this year. We are proud and, it is fitting for us, to have Dr. Rossman as our speaker tonight.

Dr. Rossman starts by saying diamonds are known to the world as a gem, but there is a lot of interesting mineralogy and science behind diamonds. Diamonds, he says, are nowadays, by and large, dug out of holes in the ground, very large holes. There is a very large, abandoned diamond mine, a huge hole in the earth (photo), in Kimberly, South Africa. It was one of the first major mines from which diamonds were obtained in significant quantities. Today, mines like the Karowe Diamond Mine in Botswana (photo), are actively mining diamonds for the commercial market. Even in North America, the Diavik mine in Canada (photo), located in a watery area, needs to be dammed up to keep the water out, and, in winter it freezes over. You may have seen Ice Road Truckers on PBS that show how truckers bring supplies up to the mines. These mines and others have produced very spectacular materials.

For example, in the gem world, the Diavik has produced beautiful golden yellow gems. It is the premier piece of the Diavik Midnight Sun ring (photo). The Argyle Mine, a company of Rio Tinto Group, in Australia had produced wonderful pink diamonds. The Argyle ceased mining in Nov. 2020. The Argyle pink diamonds

embellish the Diavik Midnight Sun ring framing the yellow diamond. The Diavik mines 3,500 pounds of diamond each year!

Diamonds have intrigued people and have been known in society for hundreds, if not thousands, of years. People, for a long time, value diamonds whether in royalty or other people that view them as interesting materials.

So, let's take a look at the history of attempts to synthesize diamonds. It began as far back as 1797 when Smithson Tennant, a chemist who discovered osmium and iridium and showed that diamonds are carbon. He fused the diamond in sodium nitrate ($NaNO_3$) to convert the diamond to carbon dioxide (CO_2) gas. That convinced the world that diamonds (density of 3.51) were made out of carbon. People learned that graphite (density 2.25) is also pure carbon.

Some concluded that since graphite density is less than diamond, all you have to do is squeeze the graphite together and you'd get a diamond. Dr. Rossman displays a slide showing the structure of diamond and one of graphite. The diamond structure is 3-dimensional tetrahedral arrangement, whereas graphite is a layered structure with sheets of carbon bonded. In order to make diamond from graphite, you'd have to completely break the bonding structure and completely rearrange it.

1880 in Scotland, James B Hannay, made a pressure vessel from an iron pipe. He put lithium metal, bone oil and paraffin in the tube and heated it red hot. Ah ha, he claims to have produced diamonds, of which 9 samples were sent to the British Museum – part of their permanent collection. But wait, in 1890, Henri Moissan, who first isolated fluorine, melted Fe and C in a crucible in an electric furnace and plunged the crucible into cold water. The idea was the iron would freeze at the edge of the crucible, expanded against the liquid thereby creating pressure inside. He reported the synthesis of diamond! A third attempt in 1905 by C V Burton dissolved C in Pb – 1% Ca alloy, then oxidized the Ca with steam at dull red heat. He claimed diamond precipitated from the alloy. Then in 1917 Charles Parsons repeated the 1890 Moissan experiment and reported he, too, found diamonds. It seemed an easy process to synthesize diamonds. Interestingly, Parsons also tried firing a very high velocity rifle bullets at point-blank range into graphite contained in holes in steel blocks. There is no evidence of any transformation of the graphite into diamond.

Thermodynamics theory back in those times was not a mature science as it is today, but understood enough to give insight into Nature. Let's say a temperature of 1,500 degrees would need a pressure of 20,000 atmospheres of pressure to be near the regime of where thermodynamically diamond ought to exist.

So, with that in mind, lets take a look at some of those early experiments.

1880: Pipe bomb – no one was ever able to repeat this experiment. The pipe max pressure was 2,000 atmospheres. But the British Museum X-rayed the 9 synthetic samples Hannay sent and they were diamonds! Subsequent examination using modern analyses, clearly showed the Hannay diamonds were *natural* diamonds, not synthetic. By the way, of the 80 experiments Hannay conducted, 77 of the tubes exploded! The suspicion is that he went out and bought the diamonds and sent them to the British Museum. It was a fraud.

The 1890 Fe and C in the crucible…well, a lab assistant, in his death bed confession, said he got tired of doing the experiments, having molten iron flying around and burning his clothing and skin, so to please his boss, bought some diamonds and put them in the pot. The repeat crucible attempts in 1917 showed to be a fraud, as well.

Onward, thermodynamics says nothing about the rates of reactions. Harry Drickamer of University of Illinois did some experiments: heated carbon at 425 kbars at room temperature and 70 kbars at 500˚ for prolonged times. He did not synthesize diamond. To get 70 kbars of atmospheres of pressure, you must go down 230 km into the earth. It is equivalent to 1,015,264 pounds per sq inch. Whew!

Now we look back, what is the rate to convert diamond back to graphite, what is the stability limit of diamonds? People heated graphite at 3,000˚at 30 kbar and no diamond forms but if they heated diamond at these temperatures and kbars, diamond did not revert to graphite. Other control experiments and tests finally gave us the first Diamond Phase Diagram (photo on screen). Temperatures of 1,500 to 2,000˚ absolute Kelvin, 50,000

to 70,000 atmospheres of pressure to make diamond but still no information on the rate. How to make it work? Every good chemist knows that to speed up a reaction, you need a catalyst. What's the catalyst in this process? Finally, GE Corporation in the 1950's found it: mixture of manganese, chromium powder mixed in with graphite in high pressure vessel at 45,000 atmospheres and 1,500˚C will do the trick, you can make diamonds.

Dr. Rossman displays a photo showing very large 100 kbar press. It's huge. Tracey Hall led the very first successful synthesis of diamond because of the incorporation of a catalyst to speed up transition of graphite into diamond. In the 1970's GE was successful in growing synthetic gem quality diamonds. It's very easy now, quite common, in fact. If you want to buy your own diamond press, you can for $210,000 to $260,000 (US). China has quite a lot of them. The Chinese diamond production is major. They make diamonds for the jewelry industry (gem quality and others) and for the abrasive industry (cutting, sanding, drills, honing, etc.).

There are other ways to make synthetic diamonds. Shock. Blocks of graphite held over a swimming pool. On the blocks, explosive charges and sandwiched between, a slab of metal to focus the blast. The charge would be ignited and the blast produced diamonds up to a mm in size (DuPont). These diamonds used for abrasive industry (saws, blades, sandpaper, etc.). Now, a Chinese company is selling the nanodiamonds and some of the applications include super abrasion-proof lube electroplating, plastic and glass, artificial teeth and bones and *cloaking of aeroplane.*

Meteorites also have diamond. In the late 1800's a meteorite fell in Siberia. It consisted of 2 chunks. One was eaten by the local people (wait, what?) and the other was taken to the British Museum. At the museum, they put a piece of the meteorite in a mortar and pestle, but the meteorite chewed up the mortar and pestle because the meteorite was full of diamonds.

Diamonds occur in meteorites formed by thebshock wave that goes through when the meteorites crash either into Earth or when they crash into other objects up in the cosmos itself. Dr. Rossman shows a photo Meteor Crater in Arizona. Fragments that contain diamonds suggest the pressure of 130 to 750 kbars of pressure existed for about 1-4 milliseconds. The shockwave went through the sandstone, converting some of the organic material (plants, roots, dead organics, etc.) into very fine diamonds, which are now around the rim of the crater. But, even more spectacular than the Meteor Crater in Arizona is the Popigai Crater in NE Siberia, Russia. An asteroid struck around 35mya. There are trillions of carats of diamonds in the impact crater. The diamonds are about 1mm in size and consist of nanodiamond agglomerates. It is estimated there are 800,000,000 pounds of diamonds there.

For you explosion aficionados, 25% of the soot from the explosion of TNT mixture is ~4nm diamond! Interstellar diamonds have been found in Ogueil meteorite; they are nanodiamonds. High-P rocks found in Kazakhstan, Norway and Germany have micro diamonds. Dr. Rossman goes on to talk about Gemesis Diamond growing factory in Florida, CVD synthetics Vs. HPHT synthetics, production today in China (more than 10,000 presses making diamonds), mining production 35-40 tons yearly, industrial use has on 10% natural diamonds and around 2,000 tons of synthetic diamonds are produced each year. In labs, high pressure, high temperature diamonds can be produced by size.

Dr. Rossman explained about the color of diamonds. The Blue Moon diamond has a very small trace (measured in parts per million, ppm) of boron substituted for carbon. These diamonds produce electricity. The Hope Diamond is the very famous blue diamond. The Oppenheimer Diamond is yellow and the color is due to a very few ppm of nitrogen. The Arkansas Diamond is also yellow. The Kazanjian Red Diamond is from the Argyle Mine in Western Australia and is on display at the Natural History Museum in Los Angeles. The color in pink diamonds is related to shear deformation bands when the diamond is deep in the earth; we do not know the exact origin of these colors. The Dresden Green Diamond is very old, has natural radiation via gamma ray that literally sliced the carbon atom out and left an "interstitial complex" vacancy for the radiation. The colors in diamonds are detected by extensive testing in the laboratory using a spectroscope and other equipment.

WOW! This presentation was riveting, impressive, informative and interesting. The Q&A following Dr. Rossman's talk was lively and full of member participation.

Thank you, Dr. Rossman, for a wonderful presentation. We'll see you again next time!

Adjourned at 8:49 p.m.

Submitted by Angela Guzman, MSSC Secretary

To those of you who missed this presentation, you missed a good one. MSSC, however, has an excellent line up of speakers well into 2023. As usual, Members will automatically be notified of our next ZOOM presentation. If you're a non-member, kindly sign up to support and be a part of a great society. Our next Membership meeting will be January 13, 2023. The speaker will be Denise Nelson. The next MSSC Board meeting will be held Sunday, January 15, 2023 via ZOOM. All are welcome.

Membership dues are due. Please check the Bulletin for details, or look on the website for information.

Happy Holidays to you and yours! See you in 2023!

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The Ride Share Listing is being temporarily discontinued until such time as MSSC starts holding in-person meetings again.

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List of Upcoming MSSC Events : Mark your Calender!

Event	Date	Comments / Scheduled Program (if known)
Meeting Dates:	**ZOOM** Feb 17, 2023	Paolo Sanchez TBA
	ZOOM Mar 10, 2023	Wes Andree: "JMDC's Dinosaur Trek".. our augmented reality (AR) dinosaur hunt.
	ZOOM Apr 14, 2023	Michael "Mike" Kaas: Zinc Mining in the Friedensville Mining District and The Birth of the U. S. Zinc Industry
	ZOOM May 12, 2023	Mike Sanders: "Digging For Blue Barite at Stoneham, Colorado"
Board Meeting	**ZOOM** Jan 15, 2023	ZOOM at 1:00 PM
Field Trip	Jan.. 14, 2023	Lavic Jasper near Barstow
Conference	Jan. 27-29, 2023	56th Annual Micro Mineral Conference, Fallbrook, CA

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

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MSSC fieldtrip to Lavic jasper, Sat, Jan 14, 2023

Hi, fieldtrip friends, Happy New Year!

We had a beautiful Saturday collecting at Hodge Rd. Everybody collected hematite and lazulite. Some other rarities were found too.

Let's kick off the New Year with a visit to a classic California location. It's not easy to find a gap between the clouds, so the announcement is a bit on short notice. On Sat, Jan 14th, we will visit the jasper areas just NE of Lavic, 40 miles east of Barstow. This is one of many productive areas near Lavic. The material is plentiful. The colors range from rare golden honey, greens, and olive greens to yellow, orange, bright red, dark red, brown, and even rare black. There are some chalcedony nodules waiting to be found as well.

We will meet on Saturday at 9:00 AM at a flat spot next to the overpass just south of the freeway at these coordinates: 34°44'05.1"N 116°18'17.2"W (34.734747, -116.304777). The meet place is 146 miles, an approx. two and 1/4-hour drive from Pasadena. Drive on I-40 towards the east and take Hector Rd, exit 33. Continue on Route 66 east for 9.5 miles. Turn right into Lavic Rd just before the road turns left and over the freeway. The dirt road leading to the collecting areas is on hard desert pavement, so even sedans will have no problems driving on it.

This is a kind of collecting that kids of all walking ages will also enjoy. Dress warm, as the cool winter winds in this area are prevalent. Bring buckets and your favorite tools. There is so much good material on the surface that digging is not really necessary, but not discouraged either.

The weather forecast shows only 15% chance of rain on that day. However, if the forecast will change I'll reschedule for a week later (Jan 21) and update the website.

Hope to see you all there,
Marek Chorazewicz

Link to the invite (and eventual weather updates): https://mineralsocal.org/lavic-jasper-jan-14-2023

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OTHER FREE THINGS TO DO...by Ann Meister

The **Watson Lecture** at Caltech's Beckman Auditorium is on Wednesday, **January 18** at 7:30 PM, or you can view the livestream at Caltech Watson Lecture Series - YouTube. By entering the auditorium, attendees attest to being fully vaccinated or having a legal medical exemption. Masks are optional inside Beckman Auditorium. The speaker is Claire E. Bucholz, Assistant Professor of Geology, Caltech. The title is **"When Earth Breathed Deeply."** Earth's climate has not been constant throughout history. Oxygen levels in the atmosphere, for example, have increased by many orders of magnitude over time, profoundly affecting biologic and chemical cycles at the surface of the earth. These changes in Earth's climate can be traced through the imprints left behind inside the planet. In this lecture, Bucholz will explore how such shifts in atmospheric oxygen concentrations altered Earth's inner workings. *Find more past Watson Lectures on* Caltech's YouTube channel.

The **Von Kármán Lecture** information is not available yet. You can view the livestream on YouTube at NASA Jet Propulsion Laboratory - YouTube. Check Lecture Series (nasa.gov) for information.

The **UCLA Meteorite Gallery** is open. Check the website for hours. The monthly lecture will be presented on Sunday, **January 15** at 2:30 PM. The speaker is Dr. Alan Rubin, University of California, Los Angeles. The title is: **"IE Irons: The Most Reduced Group of Ordinary Chondrites."** IIE irons were derived from chondritic precursors that were the most reduced ordinary-chondrite group. The bulk chemical and bulk O- and Ge-isotopic compositions of IIE irons lie along extensions of LL-L-H trends. Chondrule-bearing silicate clasts in IIE irons have mineralogic and petrologic characteristics that extend LL-L-H trends. IIE irons are modeled as agglomerating before H-L-LL chondrites; they acquired more 26Al and reached the Fe,Ni-FeS eutectic temperature. An FeS-rich metallic melt separated from unmelted silicate and drained to the asteroid's core, eventually generating a dynamo. Most IIE metal remained within the crust/mantle region alongside recrystallized chondritic clasts. Because most Type-I chondrules formed before most Type-II chondrules, the (Type-I)/(Type-II) modal ratio decreased from IIE to H to L to LL during agglomeration. Earlier-formed chondrules (most abundant in the IIE-iron precursors) acquired higher abundances of refractory metal nuggets within CAI fragments; this accounts for systematic changes in bulk OC of refractory/(common-siderophile) and refractory/(volatile-siderophile) ratios (IIE>H>L>LL). Because more Au and Co than Ni were retained in silicates, loss of metal globules from spinning, partly molten Type-I chondrules caused systematic whole-rock decreases in Au/Ni and Co/Ni from IIE through LL. Expelled globules had different nebular aerodynamic properties than chondrules and drifted away. This mechanism could be partly responsible for the metal/silicate fractionation. **Zoom Registration:** https://ucla.zoom.us/meeting/register/tJEqduyupj0vGd3S0_52FsbHTbPjYr0sZQUj If you need detailed instructions on how to join a meeting via Zoom please contact our Curatorial Assistant, Juliet Hook,

at jahook@ucla.edu. Note: Registration is only needed once as this is a recurring meeting in Zoom. Visit the website and check on events and videos and other neat things about meteorites, go to https://meteorites.ucla.edu

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Calendar of Events:

Only S. CA shows are listed here. Other CFMS Club shows can be found at: http://www.cfmsinc.org/

March 4-5, 2023 – Ventura, CA
Ventura Gem & Mineral Society
Ventura County Fairgrounds, 10 W. Harbor Blvd.,
Ventura, CA 93001
Hours: Sat 10 AM-5 PM, Sun 10 AM – 4 PM
Website: http://www.vgms.org

March 10-12, 2023 – Stoddard Wells
Victor Valley Gem and Mineral Club
47th Annual Stoddard Wells Rockhound Tailgate
Time: Friday, Saturday & Sunday – 9 AM – 5 PM
Website: http://vvgmc.org

March 18-19, 2023 – Lemoore, CA
Lemoore Gem & Mineral Club
Trinity Hall, 470 Champion St., Lemoore, CA
Hours: Sat 10 AM – 6 PM, Sun 10 AM – 4 PM
Website: https://facebook.com/AndLemoore

March 24-26, 2023 – Clovis, CA
Fresno Gem and Mineral Society
The Clovis Rodeo Grounds, 748 Rodeo Dr.,
Clovis, CA 93612
Hours: Fri & Sat 10 AM – 5 PM, Sun 10 AM – 4 PM
Parking and Free Admission
Website: https://www.fgms.online

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The Mineralogical Society of Southern California
proudly presents the 56th annual Pacific Micro Mineral Conference
January 27 and 28 at
The Fallbrook Mineral Museum
123 W. Alvarado St., Fallbrook, CA

FRIDAY, January 27

3:00-6:00 PM: On-site Registration, greeting friends, setting up scopes, $1 sales table opens

6:00-7:00 PM: Dinner (on your own) Several cafes and a great Mexican restaurant are within a few blocks of the museum

7:00-8:00 PM: Evening talk by Robert Housley "The 16 New Te Mineral Species of Otto Mountain"

8:00-9:00 PM: Contributed Talks and Mineral Photos

SATURDAY, January 28

8:00-9:00 AM: Doors open, on-site Registration, filling give-away and sales tables

10:00 AM: Welcome, Special Announcements and Morning speaker introduction

10:15-11:30 AM: Morning Presentation by Paul Adams "Three high temperature calc-silicate skarns in Southern California"

Noon – Lunch (on your own)

1:30 PM: VERBAL AUCTION of donated specimens

3:00 PM: SILENT AUCTION of donated specimens, mineralogical books/magazines, maps, etc.

3:15-4:30 PM: Afternoon Presentation by Dan Evanich "The Majuba Hill Mine and Majuba Gold Placer Gold District, Pershing County, NV"("superb copper arsenate microminerals and exquisite placer gold nugget specimens"

4:30-6:00 PM: Microscope time, scouting the give-away and sales tables

6:00-7:00: Dinner (on your own)

7:00 PM: Contributed talks and Mineral Photos

SUNDAY Field Trip, January 29

People planning on participating in the field trip should probably plan to stay in Barstow, rather than Fallbrook on Saturday night. We will meet Sunday morning at 9 am at a central location in Barstow and either collect at a nearby mine, continue to Otto Mountain, or continue farther to the Singer Mine at Goodsprings NV.

Now is a very good time to make your advance registration for the 2023 Pacific Micro Mineral Conference. The registration fee is $20 before the conference and $25 at the door. If you have question you can contact rhousley@its.caltech.edu. Continue below for a Registration Form, driving directions and list of accommodations within 10 miles of the museum. When registering please provide the names and current city of residence of all in your party. We like to have a personalized name-tag waiting for everyone in attendance. And please bring a couple of nice micro mineral specimens for the verbal auction and any unwanted mineralogical books, magazine, photo equipment or larger mineral specimens for the silent auction table. Hope to see you there!

Conference Location

Fallbrook Mineral Museum, 123 W. Alvarado St., Fallbrook, CA 92028 (760) 728-1130

Directions from L.A. / San Bernardino / Pasadena areas (~95 miles):
Take the I-210 E toward San Bernardino for 18.5 miles
Take Exit 45 for CA-57 South toward Santa Ana for 4 miles
Take Exit 22C for CA-71 South toward Corona for 16.7 miles
Exit left onto CA-91 East toward Riverside for 4.7 miles
Exit left onto I-15 South for 45.8 miles
Take Exit 51 toward Mission Rd. for 0.3 mile
Turn right onto Old Hwy. 395 for 177 feet, then quick right onto E. Mission Rd. for 4.4 miles
Turn left onto N. Brandon Rd. for 0.2 mile
Turn right onto E. Alvarado St. & proceed for 0.4 mile. Destination is on your right. Parking is on the left.

Nearby Accommodations

Motels listed in order of proximity to the Fallbrook Museum:

Name --- number of **Stars**
Miles to Fallbrook City Center --- **Rating**/10 ---
Price as low as ___
****

Fallbrook Country Inn **
1.0 miles --- 6.7 ---$49
1425 S. Mission Rd., Fallbrook
(760) 728-1114

Econo Lodge Inn & Suites Fallbrook **
1.1 miles --- 7.5 --- $49
1608 S. Mission Rd., Fallbrook
(760) 723-1127

Rodeway Inn Fallbrook **
1.2 miles --- 6.8 ---$39
1634 S. Mission Rd., Fallbrook
(760) 728-6174

Pala Mesa Resort ***
4.7 miles --- 7.2 --- $99
2001 Old Hwy. 395, Fallbrook
(760) 728-5881

Quality Inn Fallbrook I-15 **
5.3 miles --- 6.2 --- $60
3135 Old Hwy. 395, Fallbrook
(760) 723-2888

Temecula Creek Inn ***
8.8 miles --- 7.9 --- $199
44501 Rainbow Canyon Rd., Temecula
(844) 791-6073

Ramada Temecula Old Town **
9.3 miles --- 7.6 --- $78
28980 Old Town Front St., Temecula
(951) 676-8770

Pechanga Resort & Casino **
9.4 miles --- 8.3 --- $199
45000 Pechanga Parkway, Temecula
(951) 693-1819

Rodeway Inn Temecula **
9.6 miles --- 6.3 --- $70
28718 Old Town Front St., Temecula
(951) 676-4833

Motel 6 Temecula *
9.8 miles --- 6.8 ---$60
41900 Moreno Rd., Temecula
(951) 676-7199

Rancho California Inn **
9.8 miles --- 7.4 --- $70
41873 Moreno Rd., Temecula
(951) 676-5700

SpringHill Suites by Marriott Temecula Valley Wine Country ***
9.9 miles --- 8.5 --- $104
28220 Jefferson Ave., Temecula
(951) 699-4477

Tuscany Hills Retreat ***
9.9 miles --- 7.2 --- $99
29850 Circle R Way, Escondido
(760) 749-1290

Hampton Inn & Suites Temecula **
9.9 miles --- 8.8 - $119
28190 Jefferson Ave.
(951) 506-2331

Advance Registration Form

PACIFIC MICRO MINERAL CONFERENCE

January 27 and 28, 2023 (Field trip on Sunday, January 29)

Registration $20.00 per person by mail, $25 at the door

No. of people _____ **Amount _____**

Names – City of Residence

_____
_____
_____
_____

All meals are on your own this year – a few cafes and a great Mexican restaurant within walking distance of the museum

Field Trip on Sunday (no charge)

Are you interested in attending the field trip? Yes ___ No ___
Number of participants in your party ____
There will be a sign-up list for the field trip at the registration desk; please include a cell phone number for ease of contact with your party before and during the field trip

Send Payment to:
Al Wilkins, PMC Chair
23202 Via Celeste
Coto de Caza, CA 92679-3919

Make checks payable to MSSC

I plan on presenting a short, contributed talk _____
The topic will be _____
Approximate length of talk in minutes _____Format [flash drive (preferred), DVD, slides, etc.)
_____

2023 MSSC Officers:

OFFICERS		
President	Angie Guzman	*president@mineralsocal.org*
Vice President	Cheryl Lopez	*vicepresident@mineralsocal.org*
Secretary	Leslie Ogg	*secretary@mineralsocal.org*
Treasurer	Carolyn Seitz	*treasurer@mineralsocal.org*
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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. We are a scientific non-profit organization that actively supports those endeavors through public outreach, field study and related programs. 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. However, due to current health considerations, MSSC meetings are held via ZOOM conferencing until further notice**.** 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 Fallbrook Mineral Museum during the last weekend of January.

Annual Membership dues for the MSSC are $30.00 for an individual membership, $40.00 for a family membership. Bulletins are delivered by email, there is an additional annual fee if you prefer paper bulletins mailed to your address. The Society's contact information:

Mineralogical Society of Southern California
13781 Alderwood Lane, #22-J, Seal Beach, CA 90740
E-mail: *treasurer@mineralsocal.org*
Website: ***www.mineralsocal.org*** **The Mineralogical Society of California, Inc.**

DISCLAIMER: The Mineralogical Society of Southern California, Inc. is not responsible, cannot be held responsible or liable for any person's injuries, damages or loss of property at or traveling to or from any general meeting, board meeting, open house, field trip, annual show or any other MSSC event..

MSSC Bulletin Editor

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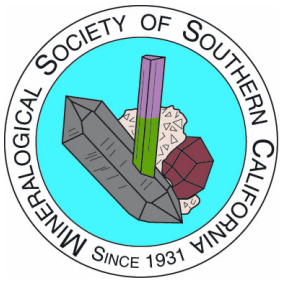
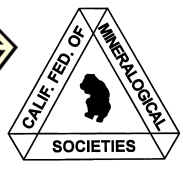
Glendale, CA 91214-2415

To:





With Knowledge Comes Appreciation

Your MSSC Bulletin Is Here!