Bulletin of the Mineralogical Society of Southern California

Volume 93 Number 9 - September, 2020

The 981st meeting of the Mineralogical Society of Southern California

With Knowledge Comes Appreciation

A ZOOM Meeting

September 11th, 2020 at 7:30 P.M.

Program : **Supervolcanoes Require Superplutons: A Tale of Minerals From Yosemite National Park** Presented by: Dr. Vali Memeti

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: Supervolcanoes Require Superplutons: A Tale of Minerals From Yosemite National Park Presented by: Dr. Vali Memeti

Supervolcanoes are well-known, if not well-understood. Granitic rocks in Yosemite National Park represent the frozen magma chambers (plutons) of an ancient volcano. The minerals from these rocks tell the tale of the processes that occurred over 10 million years and the large magma chambers that likely once fed supervolcanic eruptions in the Cretaceous Sierra Nevada volcanic arc. Dr. Memeti's research group at Cal State Fullerton has been using field observations, petrography and mineral geochemistry and geochronology on the granitoids from Yosemite to tease out the evidence, which is what she plans to share with us

Dr. Vali Memeti is an assistant professor of geology at Cal State Fullerton, where she has been teaching and doing research since 2014. Dr. Memeti is originally from Germany, where she completed her MS degree in Geology. She then received her PhD from the University of Southern California and spent two years teaching as a lecturer and completed two years of postdoctoral research as a Marie Curie fellow at Durham University in England.

As a geologist focusing on the spatial and compositional evolution of volcanic chains and associated subduction tectonics, she is particularly interested in the connection between volcanoes and the growth and evolution of the underlying magma plumbing systems that feed them. The primary tools she uses include field mapping, petrography, whole rock and mineral scale element and isotope geochemistry, and U-Pb zircon geochronology. Dr, Memeti's current projects are located in Yosemite and Joshua Tree National Parks in California, the Organ Mountains in New Mexico, Bonanza caldera in Colorado, and in Argentina.

Members who want to do this must respond to our Programs chair, Rudy Lopez at programs@mineralsocal.org no later than Tuesday September 8th, 2020. Please include "September 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 at Caltech.

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From the Editor:

Wow, Happy Labor Day to one and all. Time sure flies when you're having fun! Summer's almost over but "quaranteen" goes on…..and on….and on. It's hard to believe that this has been going on for six months with no clear end in sight.

Stay safe, attend ZOOM meetings and enjoy your minerals! …. Linda Elssnau

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FROM THE PRESIDENT: Interesting Minerals, A to Z. Round 2, installment 6, the letter "F": by George Rossman

Forsterite, Mg_2SiO_4

Forsterite is better known to most of you as olivine. Olivine, technically, is a group of minerals that commonly run from magnesium silicate **Mg_2SiO_4** to iron silicate **Fe_2SiO_4** but which also includes calcium- and manganese-containing members

The mineral has been known since ancient times. We know it was mined in Egypt on Zabargad Island in the Red Sea more than 1500 years ago **(Figure 1).** However, the first scientific description that provided the mineral species name occurred much later. Forsterite was first described in 1824 for an occurrence at Mount Somma, Vesuvius, near Naples, Italy. It was named by Armand Lévy in 1824 after the English naturalist and mineral collector Adolarius Jacob Forster, a German mineral collector and mineral dealer, who variously resided in England and Russia.

Levy introduced the new mineral with: “I shall feel obliged if you can spare room for a short description of, I believe, a very scarce and new mineral from Vesuvius.”

> Levy M (1824) Observations on the preceding paper, with an account of a new mineral. The Annals of Philosophy 7, 59-62

Well, Levy got that part wrong: forsterite is not particularly scarce. It is the most abundant mineral in the upper mantle of planet Earth. More on that later.

In 1928, a paper appeared in American Mineralogist describing the forsterite from the Hawaiian Islands. There, it is an essential constituent of the basalts and occurs as inclusions of larger, etched crystals in the basalts called xenoliths. It also occurs as loose crystal fragments at many places in the Islands as it weathers from the primary sources. Think of the green sands beach (Papakolea) on the big Island where the olivine on the beach comes from a nearby cinder cone that erupted about 49,000 years ago. Here the olivine is about 10-11% by weight iron.

> Aurousseau M, Merwin H E (1928) Olivine: I. from the Hawaiian islands; II. pure forsterite. American Mineralogist 13, 559-564

But, certainly, one of the most important localities for forsterite is San Carlos, Arizona, where it nodules of forsterite and some associated pyroxenes occur with great abundance in the basalt flows **(Figures 2-4).**

Figure 1. Forsterite from Zabargad Island, Egypt.
Photo Credit: Marc Garcia

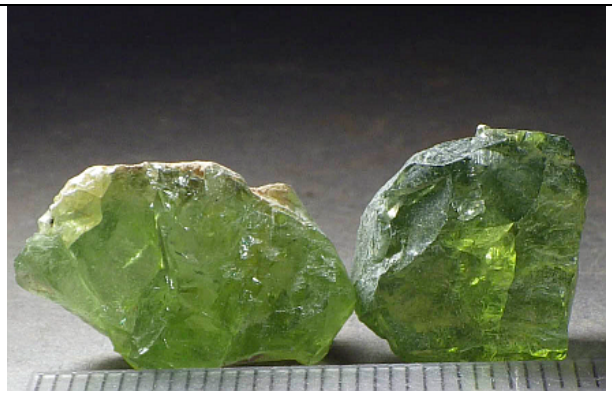

Figure 2, Forsterite from San Carlos, Arizona.
Photo Credit: Marc Garcia

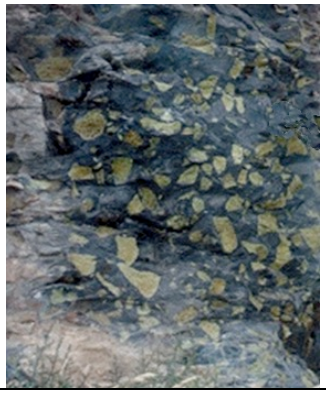

Figure 3. A basalt flow with forsterite nodules at San Carlos, Arizona.
Photo credit: GRR

Figure 4. A nodule with forsterite in the basalt from San Carlos, AZ.
Photo credit: GRR

Figure 5 Forsterite crystal from Ohn-bin, Myanmar
Photo credit: GRR

Figure 6. Forsterite from Sapat Gali, Pakistan.
Photo credit: Marc Garcia

There are many other important localities for forsterite, worldwide, but for specimens and crystals, Myanmar and Pakistan are two localities that stand out in recent times as sources for spectacular crystals **(Figures 5,6).** Essentially, all the forsterite from San Carlos and from the localities in Northern China that were a significant part of the market in the past couple decades are irregular and somewhat rounded in part possibly by abrasion in the magma chamber or by partial reabsorption into the host basalt.

Let's take a moment and worry about the color of forsterite. Pure, end-member Mg_2SiO_4 would be colorless. Occasionally, crystals and gems of near-colorless forsterite are found **(Figure 7).** But most often, forsterite is yellowish green due to the fact that it nearly always contains some iron that replaces the magnesium. It is the iron that is responsible for the yellow-green color. The iron is in the 2+ oxidation state. Faceted forsterite **(Figure 8)** is sold under the name of peridot. It is not certain where that name came from far back in history. Most gem peridot is forsterite with about 10 to 12% of the magnesium replaced by iron. Peridot from some localities such as Norway, may have slightly elevated nickel concentrations that can also add to the green color.

Figure 7. A near-colorless forsterite from Mogok, Myanmar.
Photo credit: Marc Garcia

Figure 8. Faceted forsterites from Hebei Province, China, sold as peridot.
Photo Credit: GRR

If more than ½ of the magnesium is replaced by iron, the mineral is now named fayalite **(Figure 9).** There is a complete solid series between forsterite and fayalite. The intermediate compositions are almost always found as small ill-formed crystals in igneous rocks. Commonly they occur in basalts, for example. This beautiful example formed in an open space (a vesicle) in the obsidian at Coso Hot Springs. It likely formed at high temperature from the gas phase.

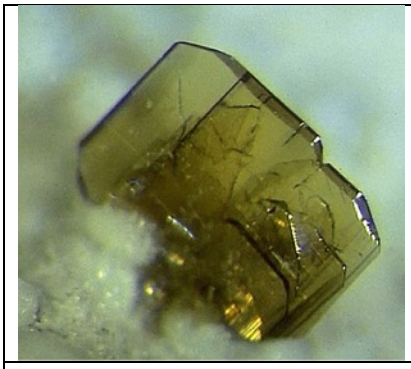

Figure 9. A microcrystal of fayalite from Coso Hot Springs, Inyo County, CA.
Photo credit: GRR

Figure 10. Tephroite crystal from the Kalahair Manganese Mines, South Africa.
Photo credit: Marc Garcia

Another member of the olivine group is tephroite, **(Figure 10)** the manganese member of the group with the chemical formula Mn_2SiO_4. Its name comes from Greek words meaning ash-colored in recognition of the usual gray color of tephroite crystals free of inclusions and alteration.

Forsterite also comes to us from outer space. It is found in many meteorites and is particularly significant and abundant in a class of meteorites known as pallasites **(Figure 11).** Pallasite meteorites are stony-iron meteorites that contain clear olivine crystals embedded in a matrix of iron-nickel alloy. It is believed that these meteorites represent material from the boundary layer between the core and rocky mantle of an asteroid.

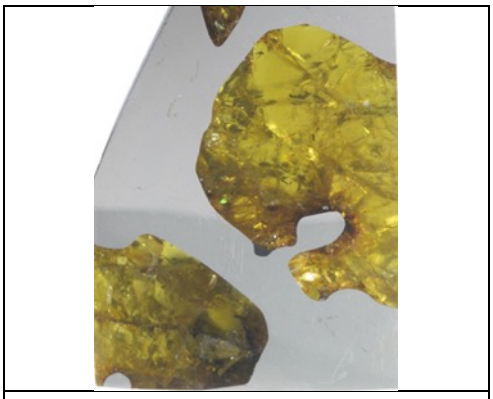

Figure 11. A polished slab of the Fukang meteorite with greenish-yellow forsterite inclusions embedded in the iron metal.
Photo Credit: Rob Lavinsky, the Arkenstone

A final question to ponder is 'what happens to forsterite deep in the earth.

At depths on the order of 250 to 320 miles, the pressure from the overlying rock causes forsterite to transform into a mineral known as wadsleyite. Wadsleyite has the same chemical formula as forsterite, but wadsleyite's atoms are arranged in an orthorhombic structure different from forsterite known as a spinelloid. Basically, the structure is a distorted spinel structure with both isolated SiO_4 units like forsterite has, and also with Si_2O_7 units. Wadsleyite was first found as tiny fragments in the Peace River meteorite from Alberta, Canada, where it is believed to have formed from the high-pressure shockwave generated when the meteorite impacted the earth.

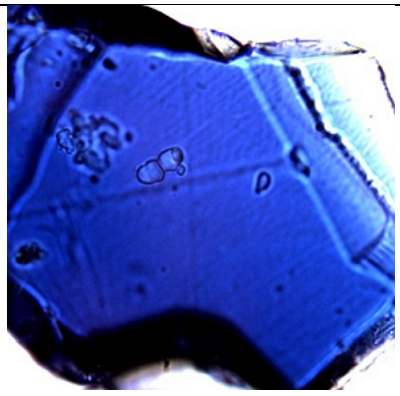

Figure 12. A magnified image of a ringwoodite crystal found within a diamond.
Photo Credit: Jasperox/Wikimedia Commons

Below a depth of about 325 miles, wadsleyite transforms into yet a different structural arrangement of the atoms but still maintains the same chemical formula as forsterite, namely Mg_2SiO_4. At these depths, the mineral is known as ringwoodite **(Figure 12).** Ringwoodite has a totally different structure, namely the cubic spinel structure. Often, its chemical formula is written as $SiMg_2O_4$. Tiny ringwoodite crystals have been found in ultra-deep diamonds where it stays compressed within the diamond. Ringwoodite is not stable in ordinary rocks near the earth's surface. Ringwoodite is often blue because of its minor iron content that occurs in both 2+ and 3+ oxidation states.

Below about 410 miles, ringwoodite transforms into phases with both a different chemical composition and different structure.

BUT WAIT:

A new polymorph of olivine has been recently approved by the IMA.

It is IMA number 2018-026. (the 26th mineral submitted for a vote in 2018). Its species name is poirierite. It was found in the Suizhou meteorite that fell in the Hubei province of China; and in the Tenham meteorite that fell in Queensland, Australia; and in the Miami meteorite that fell in Texas. It was announced in April this year, but the full publication has yet to appear so there is not much more to tell you at this time. Stay tuned. Mineralogy is dynamic.

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MINUTES of the August 14, 2020 Meeting

At 7:34 p.m., the **980th Membership Meeting** of the Mineralogical Society of Southern California (MSSC) was called to order by President Dr. Rossman, Ph.D. Due to the ongoing Coronavirus (COVID-19) pandemic, the membership meeting was broadcast via ZOOM, an internet conference medium, compliments of Caltech through Dr. Rossman. This was the 3rd MSSC Membership Meeting held via ZOOM. There were several member and non-member attendees. We thank you all for your participation.

Message from the Chair: Dr. Rossman reported that the number of International Mineralogical Association (IMA) published and approved mineral species are now 5,603. By comparison, last year at this time, there were

5,479 and a year before that in 2018, there were 5,373. George acknowledged Tony Kampf for his dedication, hard work and the identification of many of the minerals on the approved list.

Among newer approved minerals is a new member of the feldspar group: ferrisanidine. The chemical formula is $KFeSi_3O_8$, notice iron, not aluminum. This mineral is from active fumaroles on the Kamchatka Peninsula, Russia.

Regular Business

Minutes: Dr. Rossman directed our attention to the Minutes of the last membership meeting, July 10, 2020 as published in the August 2020 *Bulletin* and asked for a motion to approve. The motion was made by L. Ogg and seconded by R. Lopez. Seeing and hearing no objection, the minutes were approved.

Announcements and Reports:

a) Updates R. Lopez: Rudy Lopez, Program Chair, announced that, due to COVID-19, there will be ***NO 2020 August Picnic***. Instead, we are having this ZOOM meeting. Additionally, there will be ***NO Installation Banquet in January 2021***. Instead, MSSC will have another ZOOM meeting with featured speaker Denise Nelson. [Secy Note: ZOOM meetings to continue until it has been declared safe and the pandemic is over.];

b) Field trip report: No update regarding the proposed field trip. Please check the website and/or *Bulletin* for further information and updates;

c) Other announcement: A. Guzman commented on the "Mineral Talks, Live", an on-line seminar series presented by the Mineralogical and Geological Museum of Harvard University. This past week's talk was presented by Bill Larson of Pala Mine. It was an informative tour of his works and collections. Next week (8/19) is Jolyon Ralph of Mindat. *[Secy Note: Mineral Talks, Live will feature Salim Edde, Mineral Museum, Beirut on August 26th. On* ***September 2nd, Dr. George Rossman****, Professor of Mineralogy at Caltech and President of MSSC will present. The talks begin at 1pm eastern (10 am, pacific). You won't want to miss any of these awesome lectures, so register now! Here's the link to get you started: http://go.mineraltalkslive.com/register.]*;

d) Welcome to our guests from the US and abroad was extended by Dr. Rossman. You are invited to *join our society*. Details on our web page: http://www.mineralsocal.org

Program: Rudy Lopez introduced speaker, Howard Heitner, owner of Heitner Minerals and Crystals out of greater New York City area. Howard is a collector, has been for 60 years. He first started collecting then he began purchasing old collections, eventually he became interested in history of mineral collecting and dealing in the U.S. Other interests include fluorescent minerals and *pseudomorphs*.

Howard was president of Stamford Mineralogical Society for many years. His professional career was as a chemist specializing in water soluble polymers. He worked at Cytec Industries in new product development of products used to process minerals. Later, after retirement, Howard spent time organizing and cataloging his collection. He is a registered member of Mindat since 2007 and has uploaded 56 mineral photos.

Howard Heitner's presentation (via ZOOM) is entitled, "Pseudomorphs, Trickster Mineral Specimens". Howard describes pseudomorph, a Greek origin word meaning "false form". He tells us that a fossil, however, is not a pseudomorph. There is nothing false about a fossil. "Pseudomorph" does not actually refer to organic substances. However, a pseudomorph mineral has the same chemistry, density and volume of the original mineral. The pseudomorph does have, however, a different crystal structure.

Johann Blum (1802-1883) was one of the first to acknowledge pseudomorphs. A German mineralogist and the first authority of pseudomorphs, Blum was a professor at Heidelberg University. He was also a pseudomorph collector. His collection of 1,700 specimens was ultimately purchased by Yale University in 1870's. Blum spent about 35 years studying pseudomorphs.

Heitner's presentation includes many pseudomorphs such as photo of galena after pyromorphite. It's a stunning piece from the Yale-Peabody Museum. The flecks of golden and orange specks sprinkled throughout the piece

are actually beautiful. Another specimen Howard showed is acanthite after argentite. Keep in mind these are different crystal structure, same density with no change in volume.

In 1982, a fellow named Strunz creates a classification system that includes Paramorphs, Exsolution, Replacement (addition/removal of material and total replacement) and Incrustation.

Paramorphs are minerals of the same chemical composition but different crystal structure having the same density and no volume change. The molecular level change, a flip, results in the paramorph looking identical to the original unaltered form.

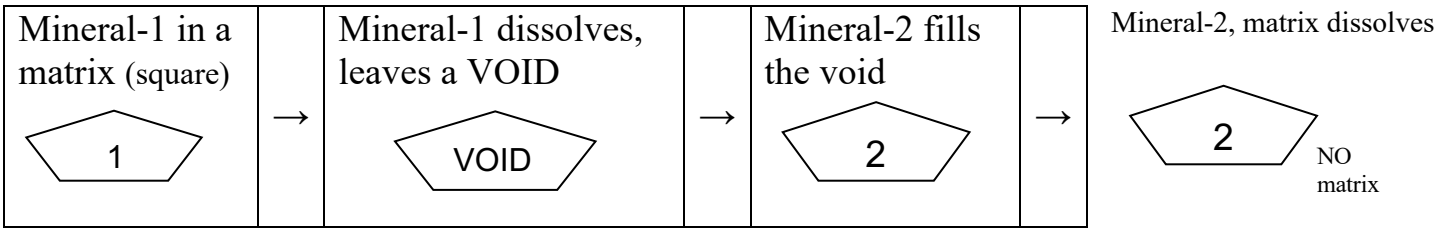
Exsolution Pseudomorphs: a type of chemical reaction in which the atoms in a crystal, at a certain temperature, separate to form thin lamellae (layer or sheet) of two different minerals. He cites, as crystals of ilmenite cooled, they separated into laths of rutile and magnetite forming a layer-like structure. Howard's photo of this specimen is a sharp example of crisp layer pattern. The most common example of exsolution pseudomorphs is, at high temperatures, nickel-iron alloy meteorites.

He talked about "Chemical Cousins", minerals with similar compositions. For instance, (a) magnetite Fe_3O_4 to hematite Fe_2O_2, (2) azurite $Cu_3(OH)_2(CO_3)_2$ to malachite $Cu_2(OH)_2CO_3$ and (3) galena PbS_2 to anglesite $PbSO_4$. If there is a chemical reaction in one there is a similar change in the other. Assuming all the metal goes into the second mineral, the volume change can be calculated using atomic weights and densities resulting in magnetite to hematite +2 %, azurite to malachite -10% and galena to anglesite +45%. The changes are very sharp pseudomorphs. For instance, in galena to anglesite example, the +45% causes swelling. In azurite to malachite the negative, -10%, gives a very porous pseudomorph, a tricky measurement of density because of the "air" (porous). Heitner cites other examples, as well.

Experimental Replacement, Strunz's second classification refers to just that. For instance, a halite cube replaced by silver chloride where the unreacted halite dissolves. The "cube" would still be there but contents are replaced, no more halite. Then, something completely different is quartz (SiO_2) after aragonite ($CaCO_3$). Howard poses the question: how do you explain replacement by chemically different mineral to unrelated mineral? Well, he says by way of general observation, a more soluble and/or less stable mineral is replaced by a less soluble and/or more stable mineral.

There is a theory, the Matrix Cavity Theory: Mineral-1 dissolves leaving a void, Mineral-2 fills the void, and meanwhile, the matrix erodes away.

Matrix Cavity Theory: [illustration by A.Guzman, MSSC]



Additionally, Strunz's complete replacement by *unrelated* mineral shows an original Mineral-A becomes encrusted by Mineral-C. Mineral-A dissolves and Mineral-D fills the void. Mineral-C dissolves. *[Secy Note: You had to be there to see the diagram explanation of this type of replacement!]*

Incrustation pseudomorph results when a mineral is coated by another mineral and the original encased mineral dissolves. The encasing mineral remains intact and takes the form of the original mineral. Howard had an example of calcite first coated by quartz, a stunning piece. Other examples included prehnite after galuberite, quartz after galena, and classic siderite after fluorite, halite cast in shale and others.

Howard discusses experiments, research, collections and "narben" (contact marks or scars). He concludes by reporting that Si Frazier, professor at San Francisco State University and himself a pseudomorph expert, recently passed. Heitner said Si wrote: "Pseudomorphs are the ghosts of crystals past." *[Secy Note: Si Frazier*

was the guest speaker at the MSSC January 2005 Installation Banquet and his presentation was Pseudomorphs: Mendacious Minerals That We Love.]

Q & A with discussion followed Howard's presentation with queries from audience members including the best place to see pseudomorph collections – answer is Yale (researcher may have best chance to have access), British Museum, Natural History Museum (LA) and Smithsonian. Thanks, Howard. Who knew pseudomorph crystals were so versatile?

Dr. Rossman thanked everyone, expressed his appreciation to Caltech for contribution of ZOOM for the evening's Membership Meeting of the Mineralogical Society of Southern California. Thanks to all who participated. "See you" next month on Friday, September 11, 2020 at 7:30 p.m. via ZOOM.

The meeting adjourned at 8:42 p.m.

Respectfully submitted by Angie Guzman, MSSC Secretary

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List of Upcoming MSSC Events : Mark your Calender!

Event	Date	Comments / Scheduled Program (if known)
Meeting Dates:	October 9, 2020	Karin Rice: Collecting Fossils via ZOOM
	November 13, 2020	Professor Abby Kauner UCLA: Minerals Under Pressure via ZOOM
	December 11. 2020	Renee Newman: Exotic Gems via ZOOM
	January, 2021	Denise Nelson: TBA
Board Meeting	October 4, 2020	Via ZOOM
Field Trip	October 24, 2020	Red Cloud Mine in Arizona (See Field Trip Report in Minutes)

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

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Future MSSC Zoom Presentations By: Rudy Lopez

MSSC zoom meetings have become a great success, great attendance, including Indonesia! I have set up zoom meetings for the rest of the year.

We have a great list of speakers and are adding more. If you have a speaker you want to present, please send me the information.

I will send an all call email each month to our members about the meeting.

For Non-Members,

If you want to participate in our future zoom meetings, please go to the MSSC website, read our Bulletin and send me an email and I will make sure you're contacted.

Email: **programs@mineralsocal.org**

Website: **www.mineralsocal.org**

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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 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 home after meetings	Ed Kiessling	1299 Linda Vista Ave. Pasadena, CA	*See emailed bulletin*
A ride	Richard Stamberg	North Orange County, near Cal State Fullerton	*See emailed bulletin*

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OTHER FREE THINGS TO DO...by Ann Meister

The **Von Kármán Lecture** on Thursday **September 17** at 7:00 PM. The event is live on Upstream. http://www.ustream.tv/nasajpl2 Check online for changes and other viewing options. https://www.jpl.nasa.gov/events/lectures_archive.php?year=2020&month=9
The speakers are Sasha Samochina, Deputy Manager of the Ops Lab, NASA JPL and Jason Craig, Visualization Producer, NASA JPL. The title of the presentation is **"Visualizing Space Exploration: AR, VR & Emerging Tech."** We will explore how Augmented Reality, Virtual reality, and other forms of Mission Ops visualization can influence our Public Outreach and vice versa. As we delve deeper into the synergy of this work, we will see how it affects the way we design our spacecraft and the way we look at the world.

The **Watson Lectures** at Caltech's Beckman Auditorium are on hiatus for the summer. Hopefully they will return in the Fall. Haven't seen a schedule yet. For online stuff at Caltech go to http://events.caltech.edu/

The **UCLA Meteorite Gallery** is temporarily closed until further notice, however the monthly lecture will be presented on Zoom on Sunday, **September 20** at 2:30 PM.
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. The speaker Dr. Andrew Davis, University of Chicago. The title of the presentation is. **"Rocks and Minerals from Stars."** One of the most remarkable discoveries of the twentieth century is that some meteorites contain dust grains made around other stars that lived and died more than 4.5 billion years ago, before our Solar System formed. Stars only twice the mass of our Sun eventually turned into red giant stars and lost much of their mass as gas and dust. More massive stars ended with spectacular explosions called supernovae, and throw off much of their mass. Both kinds of stars return copious amounts of dust to the interstellar medium (the stuff between the stars), a portion of which formed new stars like our own, and we have recognized dust grains from both red giants and supernovae in meteorites. Each dust grain retains a chemical and isotopic record of the star around which it formed and by analyzing individual dust grains in the laboratory, we can study the interiors of stars in ways not possible by astronomy with telescopes. The study of stardust in the laboratory has led to new understanding of how the chemical elements are made in stars. Stardust was also not uniformly mixed into the solar nebula, the disk of gas and dust from which the Sun and planets formed. This caused small differences in isotopic composition among Solar System materials that have proven to be powerful tracers of the relationships between planets and different kinds of meteorites. Visit the website and check on events and videos and other neat things about meteorites: **https://meteorites.ucla.edu**

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With Knowledge Comes Appreciation!

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 bulletin@mineralsocal.org and the payment should be sent to the
MSSC Treasurer 1855 Idlewood Road, Glendale, CA 91202

Calendar of Events:

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

Due to COVID-19 many clubs have cancelled or changed their show dates. CFMS updates this list if clubs notify them. If you have any questions, please reach out to the contact listed to make sure the show is still taking place.

2020

October 10-11; GRASS VALLEY, CA
Nevada County Gem and Mineral Society
Nevada County Fairgrounds,
11228 McCourtney Road, Grass Valley, CA 95945
Sat 10 am – 5 pm, Sun 10 am – 4 pm
Website: http://www.ncgms.org

October 11: FALLBROOK, CA
Fallbrook Gem and Mineral Society
123 W Alvarado St
Hours: 9-4
Website: www.fgms.org

OCTOBER 17 – WOODLAND HILLS, CA
Woodland Hills Rock Chippers
First United Methodist Church
22700 Sherman Way, West Hills CA 91303
Hours: 10 am-5 pm
Free Admission and Parking
www.rockchippers.org

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REMEMBER

Stay Safe and Healthy
Stay home as much as possible
If you must venture out,
Wear your mask &
Maintain a safe social distance

2020 MSSC Officers:

OFFICERS		
President	George Rossman	president@mineralsocal.org
Vice President	Ahni Dodge	vicepresident@mineralsocal.org
Secretary	Angie Guzman	secretary@mineralsocal.org
Treasurer	Jim Kusely	treasurer@mineralsocal.org
CFMS Director	Angie Guzman	
Past President	Ann Meister	
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2019--2020	Rudy Lopez	
2019--2020	Bob Housley	
2019--2020	Leslie Ogg	
2020-2021	Pat Caplette	
2020-2021	Cheryl Lopez	
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Hospitality	Laura Davis	
Membership	Cheryl Lopez	membership@mineralsocal.org
Micro Mount Conf. Chairman	Al Wilkins	
Program and Education	Rudy Lopez	programs@mineralsocal.org
Publicity	Linda Elsnau	bulletin@mineralsocal.org
Webmaster	Leslie Ogg	webmaster@mineralsocal.org

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 Fallbrook Mineral 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:

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To:

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