PAStimes

Phoenix Astronomical Society
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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Emilie Dunham to Speak at Feb 1 Meeting

Data provided by Emilie

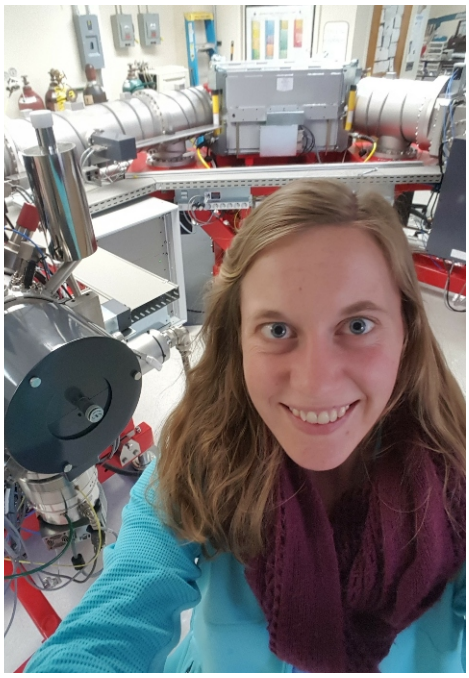
"Violent Events in the Solar System: From the Inner Solar Nebula to the Kuiper Belt"

Emilie Dunham is a 4th year PhD candidate at Arizona State University in the School of Earth and Space Exploration and Center for Meteorite Studies. She will talk about 3 different topics during her presentation on February 1st, which relate to Solar System formation and meteorites. The first topic will be about clues retained in the first solids formed in the Solar System: what can they tell us about the violent nature of the young sun? The second topic is Mars. Emilie has studied martian meteorites with mass spectrometry techniques in order to learn about the composition of Mars' past mantle. The third topic she'll present is the interesting Kuiper Belt object Haumea. This object is located near Pluto and has unique characteristics such as an oblong 'football' shape, a 3.9 hour rotation rate, and an icy crust. In modeling these features, they have found that Haumea endured a catastrophic past but may have been potentially habitable.

February 1st PAS Meeting

We are looking forward to seeing everyone at the February meeting. Emilie recently assisted Steven Desch in his presentation at PAS on December 7th, which included some great meteorite examples. You can read about that meeting in the January 2018 issue of PAStimes. Download it here: http://www.pasaz.org/PAStimes/2017 2018/2018-01.pdf.

Bring a friend to the meeting. Doors open 7pm with the meeting starting at 7:30 with a few brief announcements. As Emilie is covering 3 topics, she will do a presentation of about 20 minutes for each, followed by a 10 minute Q&A. Time permitting, the final question period can be extended to accommodate any missed questions. Bring a snack to share; bottled water will be provided by Bruce Wurst. Please donate to the PAS Snack fund for future snacks. See you there!



Emilie Dunham is scheduled to speak at the February PASMeeting. Photo provided by Emilie.

Spectroscopy SIG Meeting Dec 29

By Sam Insana, Past President

On December 29th, PAS members Bill Powell, Chet Schuler, Paul Facuna, Don Boyd and Sam Insana attended and participated in the Spectroscopy group. The event was at Bill Powell's house from 7 to 11 pm. We started outside taking photographs of various stars with a star-analyzer grating attached to the cameras. Chet used his 4 inch telescope for more aperture. We then transferred data to our laptops where we used RSpec software to do a profile and calibrate each star's spectrum to determine the chemical elements. There was a lot of discussion of just what settings should be used to achieve optimum results and how we could use a telescope to try to achieve better data than just with a camera on a tripod. Bill Powell set a fine agenda for the evening, listing topics for discussion, types of stars to analyze, what settings to use and more. We hope to use spectroscopy at future star parties and school events as public outreach, showing a star with its spectrum and showing on a computer screen what elements were found in the star. At the next spectroscopy meeting Chet will show us his own software that should help us achieve more accurate analyses.

Dec 29 2017 Spectroscopy Meeting attendees. Photo by Don.

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February PAS Upcoming Events

By Terri Finch, Event Manager

Check out these and other fun events on the PAS calendar: http://www.pasaz.org/forums/calendar.php. RSVP where requested to Events@pasaz.org. On the PAS calendar, "Private" means the event is for PAS Members only. If you wish to become a PAS member and attend the private events, please download a membership form here: http://www.pasaz.org/forums/downloads.php?do=file&id=129

February starts the busy season for PAS, which continues through to the end of May. We have a lot of events so RSVP is highly recommended.

Feb 1: PAS Meeting at PVCC main campus in room LS-203. Come enjoy a presentation by Dr. David Williams. Bring a snack to share. Bottled water provided by Bruce Wurst. Everyone welcome. Doors open 7pm. Meeting begins 7:30pm. Here's the link for more details about this event: http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2387&day=2018-2 1&c=1

Feb 4: Free Telescope Workshop at Bookmans, 19th Ave and Northern in Phoenix - 3:30pm to 5:30pm. RSVP is required with Terri - events@pasaz.org. When you RSVP, email the make and model number of the telescope you need assistance with. This is necessary to make sure we have a telescope teacher who can assist you with your model of telescope. We also assist with suggestions and advice on what telescope to purchase to match your needs. We have no telescopes for sale at this event. More details: http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2412&day=2018-2-4&c=1

Feb 8: PAS Meeting of the Minds (Private) http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2562&day=2018-2 8&c=2

Feb 15: Huge public star party at PVCC Black Mountain Campus, 60th Street and Carefree Highway from 7pm to 9:30pm. Follow the signs to the star party at the observing deck next to the Aquila building. Set up is 6pm for telescopes. Everyone welcome. RSVP is requested with Terri - events@pasaz.org. This event is weather permitting. When you RSVP by email, please include the number in your party. An auto-reply will be provided from the above email address on the date of the event with a weather update. PAS usually provides 10-14 scopes for your viewing pleasure. Please do not touch the telescopes. Highlight on this night is the Orion Nebula. Prior to the Star Party, PVCC is will have STEAM activities indoors at the Aquila building from 6pm to 7pm with child and adult-friendly activities. Everyone welcome! More details:

http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2401&day=2018-2 15&c=1

Feb 16: School Star Party (Private)

Feb 17: Public Star Party at Tonto National Monument. See details at this link and the flier in this newsletter for this event: http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2504&day=2018-2 17&c=1

Feb 21: School Star Party (Private)

Feb 22: School Star Party (Private)

Feb 22: Free Telescope Workshop at PVCC main campus, 32nd Street and Union Hills Rd - 7pm to 9:45pm. RSVP is required with Terri Events@pasaz.org. Seating is limited. When you RSVP, please leave your first name and the make and model number of your telescope so we can be sure to have a telescope teacher who can assist you with your model telescope. Bring your telescope and accessories to this event. We meet in both G-147 and by the telescope dome on campus. We have no telescopes for sale at this event. This event is weather permitting. More details: http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2409&day=2018-2 22&c=1

Feb 23: School Star Party (Private)

Feb 24: PAS Music Jam (Private) This event is for PAS Members only and their immediate family. Come for the potluck, stay for the music. RSVP is required to attend. More details can be found at this link: http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2566&day=2018-2 24&c=2

Sci-Fi Movie Trivia:

Contact (1997) - During the filming of the few exterior scenes at the Very Large Array, the array was actually collecting data. Most of the scenes shot at the VLA were actually done at a full scale reproduction set of the control facility in Culver City, CA.

Total Solar Eclipse from Berwyn Nebraska on Aug 21

By Paul Facuna

I signed up for a Ring of Fire Expeditions Solar Eclipse tour organized by Paul Maley. (More about the tour in the article below.) The tour's destination was Grand Island Nebraska, an area that is surrounded by fairly flat farm land with some small, gently rolling hills, leaving an unobstructed view.

Based on the weather reports, our tour guide and director decided to bus our group further west because the sky was predicted to be clearer in that direction. As we headed west, there were fewer and fewer clouds but we drove into fog! We stopped at several places looking for a clear view and decided on a dirt road leading to what appeared to be two farm houses, found a spot and began setting up chairs, tripods, telescopes, cameras, and blankets.

I had my prescription sunglasses, a pair of solar glasses and a small pocket camera. As the eclipse started I alternated watching with solar glasses and resting my neck. Also while waiting for totality I looked through a piece of #14 welder's glass, solar binoculars and some telescopes fitted with solar filters that tour members had set up. One of the tour members standing near a tree pointed out that the tree branches were projecting images of the crescent sun on the ground, just like in articles I had seen.

I walked across the highway to the top of a nearby hill that had a 360° view of the horizon. I heard the crickets chirping as it became darker. Our tour director, Paul Maley, was on this hill and I was close enough to him to hear him blow his whistle when it was safe to view the eclipse without eye protection. Just before totality, the sky and ground darkened very rapidly and I heard the whistle. Seeing the brilliant corona naked-eye for a few seconds was amazing, though I had to put on my sunglasses so I could clearly see the edge of the moon and sun. I also saw for a few seconds, a sliver of red about the one and two o'clock positions of the sun along with Venus to the right of the sun. The clouds near the horizon had a reddish color like normal sunset clouds but this was a 360° sunset! The sky was amazingly beautiful, like nothing I had seen before. As totality ended, the sky and ground brightened very rapidly. It was a wonderful experience that I am so glad to have been able to see.

I was also really pleased with the organized tour. I learned a great deal and met some great, interesting people, some of whom were regular eclipse chasers known as "Umbra Chasers" or "Umbraphiles."

Total Solar Eclipse in Salem Oregon Aug 21

By Sam Insana

Mike Marron, Ophelia Waters, Frank and Sam Insana drove to Oregon for the total solar eclipse of Aug 21st, stopping in Las Vegas for a night. Mike put in $1 on a "Big Bang" slot machine. He got 3 "Bazingas" in a row on his first try for $25!!

Our next stop was Reno and a stop near Area 51. On the morning of the eclipse we drove to a spot near the center line about 15 miles SE of Salem.

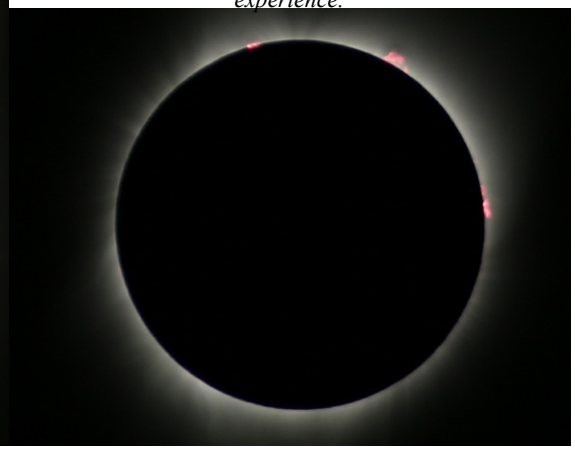
The temperature was in the 70's, no wind, no clouds, and no smoke. Attached are pictures Sam took with his Canon DSLR at 100 ISO, F 5.6, and a 1/60th sec exposure for the corona (photo 1), a 1/500th sec for the solar flares (photo 2), and a photo of all 4 of us (photo 3) .

We felt the temperature drop during the few minutes before totality. We also saw the diamond ring. The totality lasted over 2 minutes. Some stars were visible in the sky during totality. There were hundreds of people at the place where we viewed the event. They had a rock band, food, and drinks. It was a festive occasion. Afterwards we went to Silver Falls Star Park to see their beautiful waterfalls. Later on Frank and Sam saw a gray whale near a lighthouse on the Oregon coast. Frank and Sam also went to the Newport Aquarium.

The four of us met up with Pete and Andie Turner for breakfast in Salem. On the way back to Phoenix we stopped at Crater Lake, a magnificent National Monument. We also stopped in Pasadena to see the Huntington Gardens and Library. The 10 day, over 2500 mile road trip was fun, exciting and exhausting. Frank and I finally saw totality on the 3rd try!!!

Photo was provided by Sam and in it is (L to R) Ofelia, Mike, Frank and Sam attending this Solar Eclipse experience.

Solar Eclipse Totality showing the Solar Corona. Photo taken by Sam Insana.



Solar Flares can be seen in this photo by Sam Insana.

RSVP Requested - RSVP Required

By Terri Finch and Eric Steinberg

For our new members, public attendees and anyone who can use a refresher, here's a recap on event RSVP's. Most of our events are either RSVP-requested or RSVP-required. RSVP's when requested allow us to plan events better and to tailor them to the expected number of attendees. For example we might add additional telescopes to a public star party if there are a large number of attendees. Most importantly, your RSVP allows us to communicate with you about any changes to or cancellation of an event. It can save you a lot of frustration. For example, it could be something as simple as not having enough handouts or materials or as annoying as driving out to an event that has been moved to another day or location, or canceled altogether.

Some events are RSVP Required. These involve specific planning for the number and type of attendee. They include telescope workshops, telescope teams for star parties, some private events with limited space, dinners and similar functions.

We ask your ongoing cooperation, particularly with RSVP-Required events.

RSVP's can be done by email to the designated person in charge of the event (email address will be provided), or directly on the website where a link will also be provided. If RSVP-ing by email, be sure to include the name and date of the event, your name, number of people in your party and a phone number if you want. For telescope workshops include the kind of telescope you are bringing and/or what you want to accomplish at the event. Always try to RSVP at least a day before the event to make sure there is still room – same-day RSVP's may not be approved.

Thanks to all for your understanding and help in making the best possible events.

Bookmans Telescope Workshop Jan 7

By Terri, Event Manager

This was a crowded but very successful event. In attendance from PAS were Terri Finch, Bruce Wurst, Sam Insana, Rodney Fong and William Finch. We had a large number of public attendees - so many in fact that we had to move some of the store's book racks out of the way to make room for them (Thanks, Rodney!). Gary Pollock, Kathryn Moore and Rose Prince were helped by Terri at the PAS Table, while Bruce assisted several others. Sam worked with Hussein Yasser and William helped Patricia Brown who brought her Celestron 8SE, Jordan Eisgrou who brought his Celestron Astromaster 114EQ, Nick Johnson who brought his Celestron MAK 102 and Holly Simonette, with Paul, who had their Meade ETX 80AT and came to us through Meet Up. Christa Sadler came as a walk-in with an orange Celestron 8" and we had one other gentleman stop by as a walk-in just to pick up handouts. Finally, Jenny's assistant, Liam O'Mara helped round things out. It was a full event - we had extra chairs, but after all the scopes were set up, we still ran out of space. Thanks go to the attending students for their patience while we provided assistance with a limited number of telescope teachers and thanks as always to Bookmans for providing the space to do this event. We had a great turnout and it appeared that everyone left pleased with the information and help the PAS telescope teachers provided.

Afterward, 10 PAS members including Ed and Bette Wurst met at Carlos O'Briens for a great dinner after a very busy event.

Norterra Canyon School January 11th

By Sam Insana, PAS officer and Board of Directors

It was a clear night at Norterra Canyon Middle School Thursday night January 11th. Roger Anzini, Bruce Wurst and I operated telescopes and Mike Marron had his meteorites. At least 100 students, teachers and parents looked through the telescopes. They loved viewing the Orion Nebula, the Pleiades Open Star Cluster, the Andromeda Galaxy and Gamma Andromeda Double Star. At first there were a lot of lights on so we asked Melissa, the school contact, to help us out. She managed to get about 90% of the lights turned off. That got us down to a Bortle 6.3 which was very acceptable for these bright objects. They had other activities indoors besides Mike and his meteorites, including the students building their own planispheres along with other astronomy projects.

Melissa Lee writes: Hi Terri & Sam, Thank you so much for making our 1st star party a huge success!!!! I appreciate everything both of you did to get this setup and completed. Hopefully this will be the first of many (fingers crossed). Thanks again!

Planetarium Shows

By Terri, Event Manager

PAS Members are invited to the Star Barn for planetarium shows each month. We ask that you make a small donation to Ron for hosting these shows. These events are open to PAS Members only. The dates & times of the shows vary each month. Please see Private Calendar at www.pasaz.org to attend and RSVP is directly with Ron for these events. Enjoy!

PAS is incorporated in the state of Arizona as a non-profit, scientific and educational 501(c)(3) organization. Our newsletter PAStimes is published monthly from September to May and distributed viahe Internet. All Issues are available for download on our website www.pasaz.org . Ads for astronomy equipment are provided as a courtesy to sellers and buyers, and do not constitute any endorsement by PAS. All Photos by Don Boyd unless otherwise credited.

Sixty Years of Observing Our Earth

By Teagan Wall

This photo shows the launch of Explorer 1 from Cape Canaveral, Fla., on Jan. 31, 1958. Explorer 1 is the small section on top of the large Jupiter-C rocket that blasted it into orbit. With the launch of Explorer 1, the United States officially entered the space age. Image credit: NASA

Satellites are a part of our everyday life. We use global positioning system (GPS) satellites to help us find directions. Satellite television and telephones bring us entertainment, and they connect people all over the world. Weather satellites help us create forecasts, and if there's a disaster—such as a hurricane or a large fire—they can help track what's happening. Then, communication satellites can help us warn people in harm's way.

There are many different types of satellites. Some are smaller than a shoebox, while others are bigger than a school bus. In all, there are more than 1,000 satellites orbiting Earth. With that many always around, it can be easy to take them for granted. However, we haven't always had these helpful eyes in the sky.

The United States launched its first satellite on Jan. 31, 1958. It was called Explorer 1, and it weighed in at only about 30 pounds. This little satellite carried America's first scientific instruments into space: temperature sensors, a microphone, radiation detectors and more.

Explorer 1 sent back data for four months, but remained in orbit for more than 10 years. This small, relatively simple satellite kicked off the American space age. Now, just 60 years later, we depend on satellites every day. Through these satellites, scientists have learned all sorts of things about our planet.

For example, we can now use satellites to measure the height of the land and sea with instruments called altimeters. Altimeters bounce a microwave or laser pulse off Earth and measure how long it takes to come back. Since the speed of light is known very accurately, scientists can use that measurement to calculate the height of a mountain, for example, or the changing levels of Earth's seas.

Satellites also help us to study Earth's atmosphere. The atmosphere is made up of layers of gases that surround Earth. Before satellites, we had very little information about these layers. However, with satellites' view from space, NASA scientists can study how the atmosphere's layers interact with light. This tells us which gases are in the air and how much of each gas can be found in the atmosphere. Satellites also help us learn about the clouds and small particles in the atmosphere, too.

When there's an earthquake, we can use radar in satellites to figure out how much Earth has moved during a quake. In fact, satellites allow NASA scientists to observe all kinds of changes in Earth over months, years or even decades.

Satellites have also allowed us—for the first time in civilization—to have pictures of our home planet from space. Earth is big, so to take a picture of the whole thing, you need to be far away. Apollo 17 astronauts took the first photo of the whole Earth in 1972. Today, we're able to capture new pictures of our planet many times every day.

Today, many satellites are buzzing around Earth, and each one plays an important part in how we understand our planet and live life here. These satellite explorers are possible because of what we learned from our first voyage into space with Explorer 1—and the decades of hard work and scientific advances since then.

To learn more about satellites, including where they go when they die, check out NASA Space Place: https://spaceplace.nasa.gov/spacecraft graveyard

Earth and Space Exploration Day Nov 18

by Don Boyd, Sam Insana, Paul Facuna

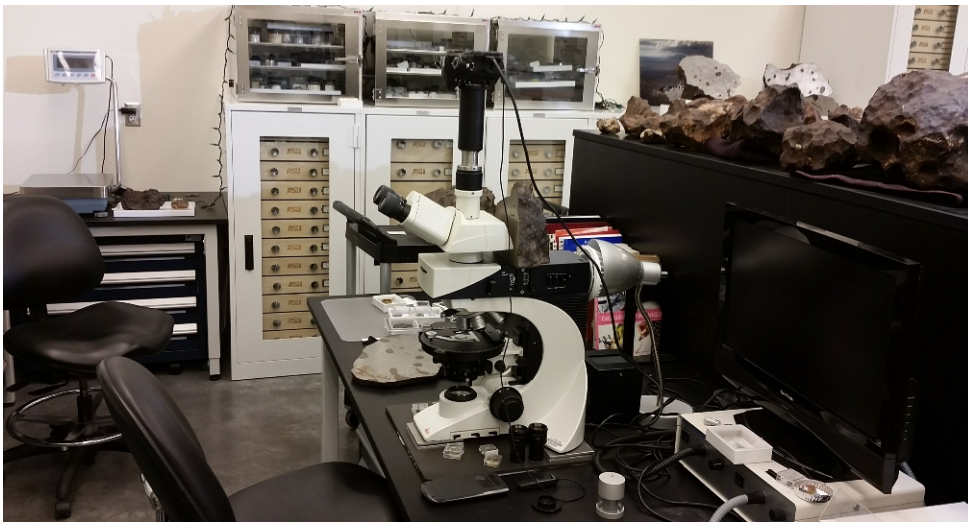
Don Boyd, Sam Insana and Paul Facuna attended the Earth and Space Exploration Day at ASU on Saturday, November 18, 2017. There were many exhibits and activities for both adults and children. We attended two 3D planetarium programs. The first one showed the many satellites orbiting the earth and some orbiting the moon. The next generation of earth orbiting satellites will most likely be cubesats. These small, relatively inexpensive satellites contain just one or at most a few off-the-shelf instruments. The show also displayed some features imaged by currently orbiting moon satellites. The second 3D program was about some of the geological features imaged by various missions to Mercury, Mars, Earth's moon, Jupiter, and the moons Enceladus and Europa. It also presented some information about the cores of these objects.

Sam brought a rock to the second floor of the ISTB4 building that he thought might be a meteorite. It was magnetic, dark in color, smooth with some depressions, and weighed a little more than expected. Professor Laurence Garvie of ASU used a hand held x-ray spectrometer to analyze the elemental composition of Sam's rock and said it was not a real meteorite. He added that over thousands or millions of years some meteorites degrade because of harsh environmental conditions becoming meteorodes that are no longer considered meteorites. He could not say for sure if Sam's rock was a meteorode but as of now it is not a meteorite. There were some actual meteorodes on display but Sam's rock did not look anything like them.

We spoke with a graduate student whose field of study is radioactive dating of meteorites. She went to one of two side-by-side meteor craters in Canada, obtained meteorite samples and used radioactive isotopes and decay products from them to date the crater. She explained how quantitating 4He isotopes in certain minerals can indicate the temperature conditions of the meteorite. It was originally thought that both impacts occurred at about the same time but her analysis and other research have found evidence that the two impacts may have occurred about 200 million years apart.

Don and Paul stopped at a display illustrating and explaining how "black and white smokers" (chimneys) work along with the life around them. The black

Don Boyd with the Psyche Mission artwork at ASU Tempe for Earth & Space Day Nov 18. Photo taken by Sam Insana.



Inside the Meteorite Vault where they examine the many meteorites that come to ASU to be categorized & filed. Photo by Sam.

Inside ASU meteorite vault 3 with 100,000 specimens. Photo provided by Sam.

"smoke" from black smokers is FeS (iron sulfide) which is extracted by the hydrothermal vents from deposits of FeS. The white color of white smokers is caused by the hydrothermal vents extracting barium, calcium, and silicon. The life around these chimneys depends on chemosynthetic bacteria which use various minerals and chemicals as nutrients, a fact that has implications for life forming on exoplanets.

After a brief lunch we toured the building exhibiting the LROC (Lunar Reconnaissance Orbiting Camera) control room and various other exhibits on the moon, the orbiter and moon exploration. Paul and Sam played a game consisting of five questions based on the exhibits (the answers were in the captions and posters for the exhibits. Sam answered all the questions correctly and won a poster.

Paul Facuna, Don Boyd and Sam Insana (not shown) listen to the tour guide about meteorite categorizing. Photo by Sam.

Paul stopped at an exhibit on the Murchison Widefield Array which is a low radio frequency telescope that ASU has partnered with fourteen other institutions to build and use. The radio antenna array is currently being built in Western Australia. It is static and sweeps the sky as the earth rotates. The scope has a 180 degree view of the sky from horizon to horizon so it scans the entire sky at once.

We returned to the meteorite exhibits so Sam could take some photos of Don and Paul with them. We met Professor Garvie again, who gave us a quick tour of the meteorite storage area also referred to as "the meteorite vault." He showed us a cabinet of Allende meteorites and many other types and kinds of meteorites including a drawer of samples collected and sent to ASU by individuals still stored in the original ad hoc collection containers of bottles, jars, bags, etc. from various commercial products with the original product brand names on them. He also showed and demonstrated a microscope used for some meteorite analysis using light, polarized light and cross polarized light.

Inside the Meteorite Vault where they examine the many meteorites that come to ASU to be categorized & filed. Photo by Sam.

What's Up For February?

By Rod Sutter, PAS Past President

Planets

Name	Date	Rise	Set
Mercury	03-15-16	07:18	18:01
Venus	03-15-16	07:45	18:52
Mars	03-15-16	02:29	12:39
Jupiter	03-15-16	00:53	11:22
Saturn	03-15-16	04:13	14:11
Uranus	**03-15-15**	**09:53**	**22:46**
Neptune	**03-15-16**	**08:02**	**19:27**
Pluto	03-15-16	05:11	15:15

All Times Arizona Time

February 15 2018

Sunrise: 07:15
Sunset: 18:13

Full: No full moon this month

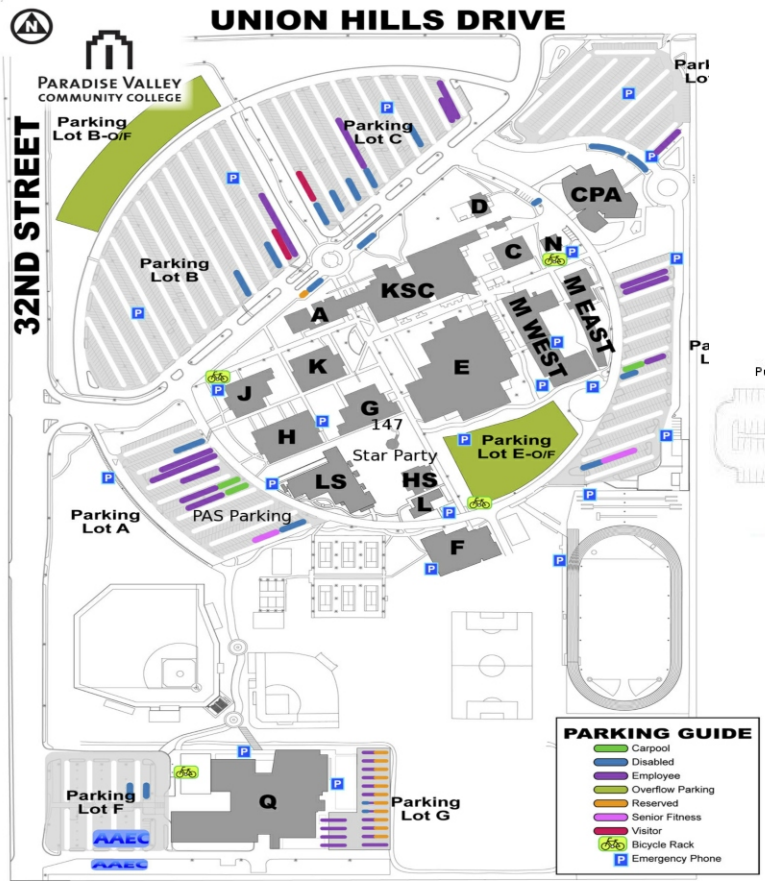
Q3: February 7

New: February 15

Q1: February 23

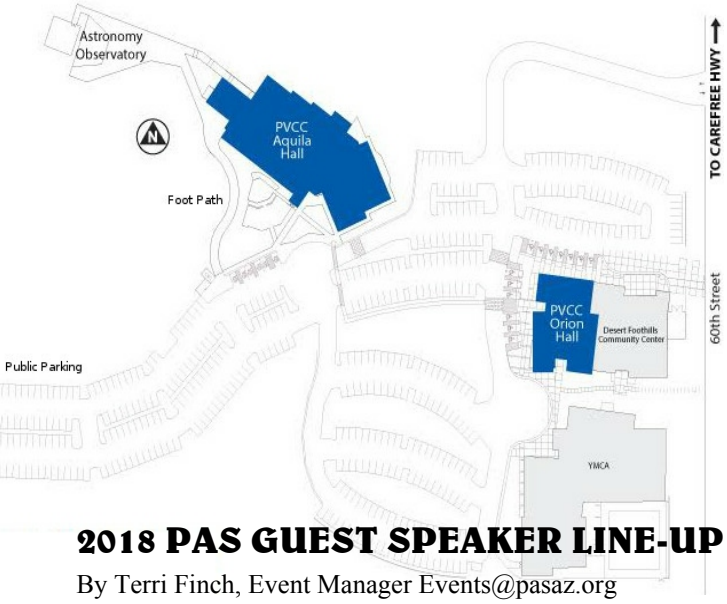
Map of PVCC Main Location

18401 N. 32nd Street | Phoenix, AZ 85032



Map of PVCC Black Mountain

34250 N. 60th Street | Scottsdale, AZ 85266



2018 PAS GUEST SPEAKER LINE-UP

By Terri Finch, Event Manager Events@pasaz.org

PAS Meetings are held at PVCC Main Campus on the first Thursday of the month in Room: LS-203 unless otherwise noted. Do you have an idea for a guest speaker? Email Terri the details. Here are the next scheduled guest speakers at PAS: http://www.pasaz.org/index.php?pageid=meetings

Mar 1: Andy Odell "Binary Stars"
Apr 5: Gene Hanson "A Look at Another Astronomy Club"
May 10: Tom Polakis "CCD Photometry from Inside the Light Dome"

February 2018

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 *PAS Meeting*	2	3
4 *Free Telescope Workshop*	5	6	7	8 *Business Meeting (Private)*	9	10
11	12	13	14	15 *Public Star Party*	16 *School Star Party (Private)*	17 *Public Star Party*
18	19	20	21 *School Star Party (Private)*	22 *School Star Party (Private) And Free Telescope Workshop*	23 *School Star Party (Private)*	24 *PAS Music Jam (Private)*
25	26	27	28			