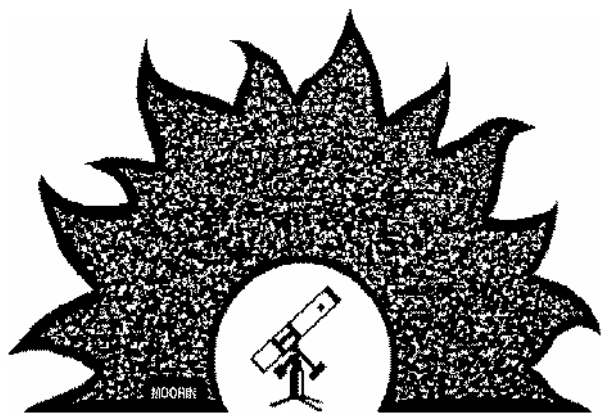




PAStimes

Phoenix Astronomical Society

www.pasaz.org

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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Lauren Edgar to Speak at January 19 Meeting

“Recent Results from the Mars Science Laboratory Curiosity Rover Mission”

Since landing in Gale crater, the Mars Science Laboratory (MSL) Curiosity rover has investigated a number of sedimentary outcrops. These outcrops reveal a rich array of sedimentary rocks that record ancient rivers, lakes and deltas. This talk will provide an overview of the MSL mission, including results from several key outcrops and evidence for a substantial aqueous history, and where we're heading next.

Dr. Lauren Edgar is a Research Geologist at the USGS Astrogeology Science

Center. She earned her bachelor's degree from Dartmouth College in 2007, and a Ph.D. in Geology from Caltech in 2013. Lauren is an active member of the Mars Science Laboratory and Mars Exploration Rover science teams. Her research aims to understand martian surface processes through the use of rover and orbital observations and terrestrial field analogs. She uses sedimentology, stratigraphy and geomorphology to infer past processes involving water, wind, ice, and volcanic activity, and to identify potentially habitable environments on Mars.



For the January Meeting

By Terri, Event Manager

Bring a friend and your family to our first meeting of the year. Bring a snack to share or donate to the snack fund. PAS

provides a case of bottled water at every meeting, which is purchased via the snack fund, so your donations help to provide

water for the next month's meeting. Please note the change in week of this month's meeting.

December 1st Meeting

By Terri, Event Manager

Prior to the meeting, Kevin, Mike, Ofelia, Don, Paul, Bill, Sam, Frank, William and I took our speaker Suzanne to dinner.

The meeting had a standing-room only attendance of 40 people for the talk and the yearly PAS Swap Meet. Sam opened the meeting and turned it over to Suzanne for her talk entitled “Meteorites 101.” She did a fantastic presentation with tons of great questions from the audience and really good answers. After Suzanne finished, we had a few announcements: Bill Powell is putting together a Spectroscopy group and wants participants, Sam, Don and Paul talk-



Suzanne Morrison, the December PAS Meeting Guest Speaker. Photo by Don.



The December PAS meeting had a full house with standing room only. Along the sides of the meeting room we had the PAS Swap Meet and Garage Sale setup. It was a large group of attendees. Photo by Terri Finch.

See December Meeting on page 3

Phoenix Astronomical Society Contact Info

President	Sam Insana	602-315-4750	President@pasaz.org
Vice President	Alex Vrenios	602 789-6556	VicePresident@pasaz.org
Secretary	Kevin Witts		Secretary@pasaz.org
Event Manager	Terri Finch	602-561-5398	Events@pasaz.org
Treasurer	Eric Steinberg		Treasurer@pasaz.org
Newsletter Editor	Don K. Boyd		Editor@pasaz.org
PAS Host	Rodney Fong		
Librarian	Rod Sutter		Librarian@pasaz.org
Member at Large	Jenny Weitz	602-787-6818	jennifer.weitz@paradisevalley.edu
Member at Large/Equipment Manager	Bruce Wurst	602-971-3555	PastPresident@pasaz.org
Webmaster	Chris Johnson		Webmaster@pasaz.org
Phoenix Astronomical Society	3039 W Peoria Ave	#102-188	Phoenix AZ 85029

January 2017 Upcoming PAS Events

By Terri Finch, Event Manager

Check out these and other events on the PAS Calendar: <http://www.pasaz.org/forums/calendar.php>. RSVP where requested to Events@pasaz.org.

Jan 5: Meeting of the Minds: This is a private meeting of PAS members to discuss other club business. See this link for location to meet at 7pm on this date: <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2244&day=2017-15&c=1>

Jan 15: 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 of the telescope you need assistance with.

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=2017&day=2017-15&c=1>

Jan 19: PAS Meeting at PVCC in Room LS 205. Come enjoy a presentation by Lauren Edgar. Bring a snack to share. Bottled water provided by PAS snack fund. 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=2006&day=2017-19&c=1>

Jan 20: School Star Party (Private)

Jan 21: PAS Social for PAS Members only.

<http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2219&day=2017-21&c=1>

Jan 26: Huge public star party at PVCC Black Mountain Campus, 60th Street and Carefree Hwy from 7pm to 10pm. 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. We usually provide 10-14 scopes for your viewing pleasure. Please do not touch the telescopes. More details: <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2088&day=2017-26&c=1> ***

Are your dues for 2017, past due?

A quick reminder that your 2017 dues were due by Dec 31, 2016.

By Terri, Event Manager

The PAS year runs from January to December, but we start asking our members to renew their membership in September.

If you are a current member of PAS, your membership officially ends December 31. This year, there is no extension; at the beginning of January, those who have not renewed will be removed from the PAS website and the PAS Roster, so be sure to update your membership with Eric or Terri. If you are unsure of your status, pop into the Roster at this link in the Member's

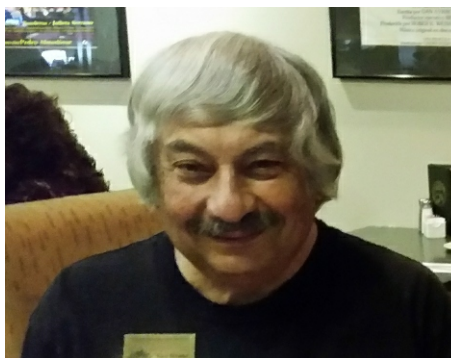
Download section: https://docs.google.com/spreadsheets/d/1H8x3Qoq3m6j3nt6y1ZRUWoM9LiM0VQ_XtY22e8tFdvM/edit?usp=sharing to see if your membership shows you are current through 2017 (right side of document). If not, please consider renewing your membership, and soon. Also, PAStimes Star Tour members must be current before December 31 to receive compensation for helping at a paid event. Convenient ways to pay include: bringing a check (strongly preferred) or cash to a meeting to give to Terri (I will confirm a receipt via email) or

sending a check with your membership form to the PAS Mailbox (you will get an email receipt). Be sure your membership form shows "2017" at the top of the page, as no other dated membership forms will be accepted. The PAS Dues Sheet / Membership Form is at this link: <http://www.pasaz.org/forums/downloads.php?do=file&id=129>. The updated version (2017) is available now.

Can't get into the Private access of PASaz.org? Only current Members have access. Renew your Membership today!

PRESIDENT'S CORNER

By President Sam Insana



PAS President Sam Insana. Photo by Terri

We have gotten to the time of year when the weather can really put a damper on our stargazing activities. We run into cloudy, windy, rainy or just too cold conditions making it difficult to drive out to dark

places and do our favorite activity. When that happens, try to take advantage of the free time and do other astronomy related activities.

Go to a planetarium like Ron Walker's, the Arizona Science Center or ASU Marston theater and catch big screen views of the night sky or great space photography.

Read the latest edition of an astronomy magazine like Astronomy or Sky and Telescope.

Research a new area of astronomical activity like spectroscopy, occultation timing or meteor studies. We have PAS members who engage in these citizen science projects who would be happy to get together with you to help you get started.

Take time to actually read our PAS newsletters, or even write an article for our PAS newsletter. You have an interest in astronomy: now is the time to share your interest and knowledge with the rest of us.

Look at your astronomy equipment and see whether eyepieces, filters, mirrors, etc. need a little cleaning so you will be all set for the next star party.

Or simply get together with other PAS members and take in the latest sci-fi movie.

Just be thankful we live in the Valley, where our bad weather is counted in days rather than months like back East. Have fun.

December PAS Meeting

From page 3

ed about Occultations and I went over some upcoming events, We did the regular raffle with one winner also getting a meteorite donated by Suzanne. Sam closed the meeting at 9:30 after which we took 30 minutes to conclude the swap meet.

Thanks to Suzanne for the presentation and her donation to the raffle. Thank you to all who helped arrange the room for the swap meet and then put it back at the end and finally to those who provided snacks and those who donated to the snack fund.



The December PAS meeting had a full house with standing room only. Along the sides of the meeting room we had the PAS Swap Meet and Garage Sale setup. It was a large group of attendees. Photo by Terri Finch.



Leah was given an award she missed receiving earlier in April 2016 when we had the PAS Awards Cermeony. Sam presented her with a Certificate for the Messier Marathon and for Public Outreach which came with an NSN Pin. Congrats Leah! Photo by Don.

Year in Space Calendar Orders Update

By Terri, Event Manager

I wish to thank everyone who participated in this year's purchase of the Year in Space 2017 Calendars. We were able to meet our goal of 10+ calendars which

brought the price down from \$14 to \$13 for each calendar. I love this calendar and can't see being without it each year. It's large, informative, fun to look at and read. I look

forward to next year's calendar order for which we will begin taking orders in September! Watch for the notice.

Telescope For Sale:

MEADE 12" 10/200 and Accessories, eyepieces and filters. MEADE 12 " 10/200 (L x 200 f/ 10) Excellent condition in original shipping box. Includes the following items: Astro Pier – LeSueur Mfg, Mead #1812 DC Adaptor, Outdoor cover for telescope, Meade Pictor CCD Autoguider, Meade Pictor 201XT Autoguider, case for eyepieces and filters. Eyepieces: Meade Super Plossl 25 mm multicoated, Meade Super Plossl 9.7 mm multicoated, Meade

Super Plossl 40 mm multicoated, Meade Ultrawide Angle 6.7 multicoated, Meade Super Plossl 5.5 mm multicoated, Celestron Reducer/Corrector-f/6.3, Meade Illuminated Reticle MA 12 mm, TeleVue 2x Barlow. Filters:, Meade Series 4000 Filter ND96 (0.9), Meade Series 4000 Filter # 80A, Meade Series 4000 Filter # 23A, Meade Series 4000 Filter #12, Meade Series 4000 Filter #58, Lumicon UHC filter.

Asking \$1625 for telescope or best offer. Other items for sale as a package or individually. Telescope in excellent condition. Have manuals and original shipping box. Have original receipt for telescope \$4,584.94. Seller lives in Sun City West, AZ. Contact Cindy at 920-737-7018 or email: post.cyn@gmail.com.

Happy New Year 2017

By Terri, Event Manager

As we begin the new year, we look forward to some great events coming our way! PAS hosts a bunch of free public events that you can bring the whole family to:

The Black Mountain Campus star parties that occur once a month during the school season. These events are in a darker location of town usually with 10 - 14 telescopes available for viewing.

Free telescope workshops that occur once or twice a month all year long, so that anyone looking for advice on purchasing a new scope who has a scope they want to learn to use, can get assistance from the telescope team.

PAS Meetings held once a month from Sept to May, where we have guest speakers who bring their knowledge and enthusiasm on a variety of topics.

Sidewalk Astronomy Events at Bookmans, which we hold at various times of the year, based on the phase of the Moon; we

also try to show some brighter objects such as Planets.

PAS hopes to be a Comicon and Leprecon again this year doing daytime promoting of the club, as well as evening viewing at these locations.

PAS also has many fun members-only private events. For example:

The PAS Social, which is a once a year party for PAS Members and their immediate family members. We get together for games, prizes and a potluck. This year's event is on Jan 21.

The PAS Music Jam, which is also once a year for PAS Members and their families. You can play with us or if you don't play an instrument, just come be the audience (or participate with a rhythm instrument such as a tambourine). This year's event is on Mar 4.

The PAS Messier Marathon, which happens once a year and is a serious observ-

ing event in which a scope owner attempts to view all 110 Messier Objects in one night. This year's event falls on March 25.

Night Sky Training Sessions which are a class for PAS Members who want to learn to learn the night sky and how to locate objects without a go-to system. It is an opportunity to try eyepieces, filters and accessories lent to you by other PAS members so that you can find out what works in your scope before purchasing those items. This event is on March 18, this year.

The PAS Awards Ceremony. Have you been active in the club? To be awarded for your participation in club Public Outreach events, you are invited to attend this event on April 27 in which awards will be presented. It's also the yearly Pizza Party.

We hope to see you at these and more PAS events this year. As long as the online calendar doesn't say "Private" in the title of the event, anyone can attend. Come enjoy PAS in 2017!!!

1st Ever Fall Binocular Star Party Oct 22

By Various PAS Member Attendees

Sam writes: October 22nd was a rare binocular star party for PAS members. After a fine potluck, 17 of us gathered to hear Alex lecture on the use of binoculars. He went over power, field of view, eye relief, exit pupil, how to focus and many other details to allow us to better understand and use the equipment. Sam pointed out how convenient binos are when camping, hiking or just stopping in your car when you are out at night to take a good look around a dark sky. You can also conveniently carry a pair in your suitcase when you fly to other latitudes and do not have a telescope with you. We then went outside about 7 pm to enjoy Mike's dark sky in Carefree. Howard, Sam and Alex each took turns using a green laser pointer to help locate stars, double stars, open clusters, globular clusters, nebulae and galaxies that were visible with binos of power from 7 to 20 magnification. When using binos of power 12 to 20, a tripod aided in holding the heavy instrument steady. Frank had his 20x80 binos which enabled us to split Albireo and enjoy the gold and blue double star. A short talk to discuss the name of the object, its type, size, magnitude, distance and age followed each viewing. After enjoying about 24 such viewings in about a dozen constellations, we went back inside Mike's to see

See Bino Star Party on page 7

episodes of "Gotham" first season. After a few more hours, we went back outside and saw 6 more objects that had appeared above the eastern horizon. The list of objects came from our PAS Binocular Objects list that PAS has on its Observing section of our Website along with additional objects that Alex, Howard and Sam added. These were mainly fall objects with some from late summer and some from early winter. We hope to have another such binocular viewing session in April to see objects from late winter through spring and into early Summer. I wish to thank Alex, and Howard for their



The potluck prior to the Binocular Star Party was very good with lots of variety. This photo has Don against the window on the left, and then L to R we have Alex at the back of the table, Kevin, Rodney and then William has his back to the camera. It was a fun event. Photo by Terri.



This photo was taken by Sam. From L to R we have Don, Mike, Kevin, Terri, Alex, Paul, Howard, Frank, Rodney & William.

The Astronomical League

If you are reading this newsletter, you are probably a member of the Phoenix Astronomical Society (PAS). If you are a member of PAS, you are definitely a member of the Astronomical League (AL), because PAS is an affiliated club. We send a small portion of your dues to the AL every year so that each of our members can enjoy the benefits of their observing programs and events, like ALCON, and the annual conference, which is held in a different part of the country each year so everyone has an opportunity to participate. You will also receive a copy of their quarterly publication, the *Reflector*. More information about the League can be found at <http://www.astroleague.org>.

The AL membership benefit I enjoy most is participating in the observing programs. There are about 50 of them to choose from. To me, they represent a structured approach to observing. They are intended to be a learning experience, but they can also be fun. If you have not done one yet, read on. I've done 14 of them to date. The rest of this article describes my experience with each of them, to give you an idea of what to expect.

I joined the AL about the same time I purchased my first motor driven telescope, a Celestron C5+, a 5" aperture Schmidt-Cassegrain. I bought a good quality solar filter for it and started work on the AL's Sunspotter program. I downloaded the "rules" page from their website, along with the list of required observations. I learned the names of the parts of a sunspot, how to classify them and how to calculate a Wolf number. Unfortunately, I also learned that I began these tasks at the very bottom of a solar cycle, in 2007, when there is hardly any solar activity. As luck would have it, however, a few small sunspots appeared in January and reappeared in February, allowing me to observe a complete cycle of at least one sunspot, and then to complete the program requirements.

After the Sun, what's more appropriate than the Moon? The AL's Lunar Club required me to record observations from a list of 100 lunar features, along with some alternative projects that can count for one or more of the list items. For example, I calculated the height of Pico Mons (a mountain on the Moon, just south of Plato) from its shadow on a photograph I made, and data from a couple of websites. Plugging these data into a formula gave me a

By Alex Vrenios, PhD, Vice President of PAS height of 9,647 feet, which is close to the high end of the official height range of between 7,000 and 9,600 feet. The Lunar Club's coordinator wrote me a special note, complimenting me on my effort.

The Lunar II Club, another trip to the Moon, had me doing another list, but also taking and analyzing more photos. I photographed the Moon at moonrise on two days, a month apart, showing their relative positions, and another set of photos of the Moon at apogee and perigee, showing the relative difference in apparent size.

Outreach has always been an interest of mine. I've hosted many viewing sessions for my neighbors at the end of our cul-de-sac. When I joined PAS, I became even more involved. I recently achieved Stellar level, and I'm about half way to Master. PAS offers a lot of outreach opportunities.

Feeling confident about my burgeoning skills now, I mounted my binoculars on a solid photography tripod and went after the Binocular Messier award. It isn't possible to observe all 110 of the "M" objects through binoculars, but the AL requires only 50. Many were easy, M42 and M45 for example, but most were difficult at best. I found each object in a star chart, and star-hopped to where the object was supposed to be. Most of the time they were right there. But quite a few of them tested my patience, wrapped in a hoodie at 2am, using averted vision, jiggling the tripod, and trying whatever else I could think of. These are the ones that made me work hard for the right to claim them. And there was one that I'm still not absolutely sure I saw. This was by far the most difficult program to date, but two others would soon break that record.

The Planetary Club sounded like it was for school kids until I got into the details. In March, and again in July, I sketched the location of the solar disk near sunset on three consecutive evenings, relative to a stand of trees, noting the progression to the north in spring and south in summer. I observed the lunar maria (seas), highlands and compared the ages of adjacent craters. I spotted Mercury after sunset and before sunrise, and viewed Venus in the daytime. I observed Martian surface features, Jupiter's belts and the Great Red Spot. I spotted up to three Jovian moons in 7x50 binoculars, and all four in my C5+ telescope. I observed a Jovian moon transit and an

emergence from behind its disk. I noted the rings of Saturn, Cassini's Division, a surface band, and five of its moons. Finally, I observed a comet, an asteroid and two of our distant outer planets, Uranus and Neptune. Using a Celestron Micro Guide eyepiece, I recorded the phases and sizes of Venus over a five month period. This was by far the most educational program to date, and by far the most interesting!

Galileo made his famous observations in 1610. Now, 400 years later, I built a "Galileo" telescope out of a couple of lenses and some PVC pipes, from plans I found in the *Reflector*. I duplicated several of his experiments and even tracked the positions of the four Galilean Moons over time in order to calculate their orbital periods.

Having recovered from the Binocular Messier program, I opted for the Binocular Double Star Club. I chose 50 of the widest separated pairs from the official observing list, making it easier on myself, but the task was by no means easy. Unexpected differences in size, magnitude and color made it worth the effort.

Now for something completely different: a newly minted observing program called the Analemma Club. I had to design and build a shoebox-sized device that would project a tiny image of the Sun through a pinhole, onto an 8x10 piece of paper so I could mark each observation point on the page. After a year, and about 200 observations, one has a figure 8-shaped plot of the individual data points. From this plot (and only from this plot!), I calculated the tilt of the Earth's axis and the latitude of my location. A translation of the plotted points was used to create a drawing of the Sun's path in the sky. (Remember that famous figure-8 photograph by Dennis di Cicco?) I also plotted a graph of the Equation of Time curve and calculated the eccentricity of the Earth's orbit around the Sun. This program easily won first place for hardest to complete.

I first got interested in the Messier objects way back in the early 1980s. I bought a pair of Nikon 7x50 Prostar binoculars and decided to observe them all, beginning with (what else?) M1 ! but that's a story for another article.

I started and stopped observing the Messier list with my 5" telescope many times. I got serious when I got a larger scope for the back yard, and finally com-

pleted it early last year. The AL will send you a certificate for your first 70 observations, and another (Honorary level) certificate, along with a pin, when you finish observing all 110 objects.

Transient events have always been of special interest to me. I observed both the Venus and Mercury transits of the Sun. I used my data from the Mercury transit to calculate the value of 1 AU (Astronomical Unit), the Earth-to-Sun distance.

Another on-again, off-again task (for me) was the Urban Observing program. All objects must be viewed from a location where one cannot see the Milky Way galaxy, and my backyard qualifies. I finally completed it late last year. (The pin has an interesting design of a cityscape when viewed one way, and a desert scape when viewed upside down. According to the coordinator, it represents the best and worst viewing conditions!) The point was to impress upon you how light polluted the skies are getting. This program succeeded in showing me how bad the skies are from my backyard in north Phoenix.

Finally we come to, by far, the most difficult observing program I've undertaken to date, the Radio Astronomy Observing Program. I finally completed it and, as I write this, the Gold-level pin and certificate are on their way. I cordially invite you to

come and hear my presentation on the four out of five projects one must complete in order to achieve this award. See the February 2, 2017 entry in the PAS calendar for further details. I am presenting a paper about this program at the SARA (Society of Amateur Radio Astronomers) Western Conference in March. I also submitted a shorter, similar article for publication in the *Reflector*.

What's next? AL's Master Observer award requires one to complete ten observing programs. Five must be from the mandatory core list and five others can be any of the AL's programs, with a few excep-

tions. I have completed three of the five core observing programs, and I have about seven other completed programs from which to choose the other five. I need only complete the Herschel 400 and the Double Star, which I've just begun. Eyes on the prize.



Seville West School Oct 26

By Alex Vrenios

I estimate that between fifty and a hundred kids and their parents came into the school grounds to look at binary stars, Saturn (while it was up), the Double Cluster and a few other objects. Nebulae were not as good as they could be due to some high thin clouds so I stayed on Mars all night. After looking at Mars through my scope one kid said, "Mommy, let's go look at the cannon," referring to Roger's 16" dob, but the highlight of my evening was when a 7 year-old in a wheelchair came over by me and his mother held him up to see Mars. That made the loading and unloading worth it.

President **Sam Insana** writes: October 26th, 6 PAS members put on a star party for the Sevilla middle school in West Phoenix. Kevin did a great job being the meteorite man when Mike got ill at the last minute.

For telescope team we had Don Boyd, Sam Insana, Alex Vrenios, Roger Anzini and Peter Turner. Over 100 students, teachers and parents enjoyed the night sky. We showed Venus, Mars, Saturn, ET cluster,

Perseus double cluster, Andromeda Galaxy, and Albireo binary star system. Our school contact, Mark Thornton, took very good care of us with bottles of cold water, pizza, sub sandwiches and chips. He also had a bright light in the area covered with a box. The students were very interested in our presentation of the night sky and asked a lot of intelligent questions. The seventh graders will be studying astronomy next month.



We have Roger's scope with Roger and his hand over his eyes as Sam takes this photo and the attendees of this school star party enjoy a wonderful view of Saturn.



Kevin Witts at Seville Middle School on Oct 26 sharing his meteorites with a group of students & parents. Photo taken by Sam Insana.



We have a line of attendees waiting to look through Sam's scope at Alberio. Photo by Sam.

PLANS FOR THIS YEAR: PAS SOCIAL Jan 21

By Terri, Event Manager

The PAS Social is our annual “event of the year”, a gathering where we get to know our fellow PAS Members. You can bring your spouse and immediate family only - no guests, please. The ongoing joke about this event is that this is the one event in the year that we get to see each in the daytime.

The event is at Mike’s home in Care-free: map, directions and RSVP can be found on the PAS website. The event begins on Saturday January 21 at 4:30pm, with food ready at 5:30pm. Those wishing to help me set up should please be there around 4pm (Thanks!). The games begin about 7pm and go until we are done for the evening.

Here are the plans for this years’ event!

1) Food - lots of food. This is a potluck. Please bring a main dish to share, enough to feed your attending party plus 5 people. It is best if each person brings a dish that can feed 10 to assure that there is enough to go around. Please bring a drink to share also - a 2 liter bottle of pop, 6 pack, or some equivalent amount. Please, no alcohol.

2) White Dwarf Gift Exchange. It’s a game we play at every PAS Social, whereby you bring a wrapped, disguised astronomy-related gift, worth \$20 or more. Please, only new, unused gifts. The idea is to disguise all gifts so they are fought for. If you are re-gifting, it is best to donate those items to the door prizes. Please see article below about how to play the White Dwarf Gift Exchange game.

3) RSVP is Required! I need to know who is attending. You can RSVP by email Events@pasaz.org up to Thursday Jan 17th by end of day. Please wear your PAS name badges.

4) Sign up at PerfectPotluck.com with the main dish, any extras and drinks you

will be bringing. We are avoiding duplicates so the first to post an item, gets to bring it. The list will be at PerfectPotluck.com. See the Forum Thread for the login. Try to bring something different and unique. Home made food is always appreciated.

5) Bring a movie to share if you plan to stay later after the crowd has departed. This way, we can watch something that will keep our attention as we wind down the evening and do the clean up. Help is requested for the clean up.

6) Dart Game - We hold the dart game in the front yard at Mike’s home. Darts will be provided, but it would be helpful if we had more dart boards to make the game flow more quickly. Dress warmly.

7) Bean Bag toss: provided by Sam, who is also providing the prizes for this game, 1st and 2nd place.

8) Door prizes are needed. If you can, drop me an email to let me know how many you can provide. Door prizes can be anything and don’t have to be astronomy related. Just tell me how many you have to donate. Wrap them and don’t say what’s in them. Past door prizes have been mugs, knick knacks and other non astronomy-related items. The more door prizes we have available, the more can be awarded.

We hope everyone can attend - it is always lots of fun. The food and people are a good enough reason to come, even if you don’t wish to play the games with us. Many thanks go to Mike Marron for hosting this year’s event. Watch for an email with the link to this event so you can RSVP your attendance.

How to play the White Dwarf Gift Exchange game

At the party, I will go over the rules of the game with everyone in brief, but to save

time I put them here for you to read ahead of time.

The fun part of this game is “stealing” gifts. Here’s an example of how to play. Gifts on the gift table are wrapped and disguised - at the start of the game...

Player A chooses a gift from the gift table.

Player B can then choose to steal the gift Player A has, or pick a gift from the gift table. Let’s say, for this example, B stole the gift from A. A now has to pick another gift from the gift table.

Player C is then asked to make a choice. C can take from B or A, or from the gift table.

Play continues like this until all gifts have been used up and everyone who brought a gift, has gotten a gift in exchange.

Here are some rules:

All gifts stay wrapped until the end of the gift swapping.

No stealing back from the player who just stole from you. If A steals from B, B can not take back from A, but must steal from another player or take from the gift table.

All gifts must be visible to the current player who is picking gifts to steal, i.e. you can’t hide them.

Gifts need to be astronomy-related. Past items have included telescopes, accessories, books, star charts, videos, t-shirts, warm clothing, mugs, games, cases and even a disguised \$20 bill. Tickets to AZ Science Center, or a planetarium show, an observatory like Lowell have also been offered as prizes.

Remember, to be involved in the game, you have to bring a wrapped, disguised gift and trade it for a ticket to the game. Hope to see you there!

Bino Star Party Oct 22

Continued from Page 4

hard work and dedication and for Mike in letting us use his facilities. The night was perfect as far as the weather was concerned and just relaxing in a gravity chair with a pair of lightweight binoculars was a fine break from the work of unloading and setting up and using heavy telescopes.

Paul writes: I used my own 10X50 binoculars which provided fairly good viewing for most objects but I had difficul-

ty seeing some of objects because of my diminished visual acuity. With a more powerful pair of binoculars I might have seen some objects better and enjoyed them more. I enjoyed the excellent presentations and viewing the beautiful and fascinating objects.



Alex teaching the binocular class of Oct 22. Photo taken by Sam Insana.

Scope for Sale:

For Sale: I am selling this telescope at a firm price of \$1700.00, no trades or other offers. Serious inquiries are welcomed. I am the original owner and it is perfect condition. The purchase price was \$2674.00 for the telescope and \$199.00 for the Series 4000 Eyepiece and Filter set. The following accessories are included: 1: a "Thousand Oaks Optical" Glass Solar Filter (this filter fits over the aperture and not an eyepiece) Very Safe !! 2: Imaging Flip Mirror #5523 by Orion 3: StarShoot USB Eyepiece #52173 by Orion 4: Two diagonals and one that corrects to an upright view 5: Three cushion pads for the tripod legs (helps minimize vibration) 6: Plossl 5 Element 26mm Eyepiece (Meade Series 5000 #07654 FOV 60°) 7: 10 amp 13vdc power supply by Radio Shack 8: 3x Tele-negative Barlow Lens by Meade #07278LF The Meade Series 4000 Eyepiece and Filter

Set includes: (All eyepieces are Meade Super Plossl Multi-Coated) 1 of each: 6.4mm / 9.7mm / 12.4mm / 15mm / 32mm / 40mm.... The Meade Series 4000 colored filters, 1 of each - ND96 (reduces the glare when observing the moon) / #12 Yellow (74% transmission) / #23A Light Red (25% transmission) / #58 Green (24% transmission) / #80A Light Blue (73% transmission) I have a description of each lens and what they are best used for. I also have a hand held Celestron Sky Scout Planetarium (non-working) - I'll toss it in the package. The telescope is assembled on the tripod stand and is ready for inspection to show that everything is working. I have the original Meade Box for safe shipping. I offer NO guarantee and the purchase is considered AS IS. I'm selling all of this as I am in my 70's and it is getting harder for me to set-up so I am switching to binocu-

lars. Thank you very much for looking. My email address is dschumann2014@yahoo.com / Phone 520-559-1223 You can call me or email at any time if more info is required. Specifications: Meade 8" LX200®R Advanced Ritchey-Chretien Telescope, GPS and AutoStar® II Hand Controller, Clear Aperture..... 203mm (8"), Focal Length2000mm, Resolving Power.....0.56 arc sec, Mirror Coating(s)..... Meade Ultra High Transmission Coatings - (UHTC), Power.....8 C-cell batteries or 12vdc power supply (included), Tripod.....Variable height field tripod, Accessories..... 8 x 50mm viewfinder, 1.25" diagonal prism, 4 speed zero image-shift microfocuser, 16 Channel GPS receiver, True-level electronic sensor, Telescope Weight....(net) 62 lbs. / Tripod (net) 20 lbs.

Bookmans Telescope Workshop Oct 16

By Terri, Event Manager

Attending this event were William and Terri Finch, Rodney Fong, Alex Vrenios, Sam Insana, Bruce, Ed and Bette Wurst and Don Boyd. The telescope team got all set up and we had our first walk-in for the day, Bruce and Rainie who stopped by to find out about telescopes. The class was set up with 2 RSVP's but after Bruce and Rainie left, I checked my email and found that one of them had canceled. The remaining RSVP however, turned out to be an strong class participant. Tracey owned a Barska scope which she donated to the club before she left. It went into Bruce Wurst's care, as he is our Equipment Manager. She also had a lot of questions, particularly about what telescope to purchase. This led to a great discussion with mostly everyone involved,

talking about telescopes, what we do in PAS and several other topics. Tracey stuck around for about an hour and then departed. While Tracey was being assisted, Angela stopped by and was helped by Sam and Don. Alice also stopped by and chatted with the group for a bit - she sounds like she will be active in the club, when she joins.

The afternoon flew by. While no one was there for the class, we had a mini meeting in which we discussed the upcoming Binocular Star Party on Oct 22 and the November Bookmans event that was pushed back a week. At 5:30 we packed up and 11 of us headed to Carlos O'Briens where we celebrated Donna Zander's birthday and enjoyed a wonderful meal..

I wish to thank our telescope team for

taking care of the four attendees to this class and to Welcome Tracey Locke as a **new member of PAS!!!**

Tracey writes: It was so nice to meet you! What a nice group and so helpful and welcoming. Look forward to getting to know you at future events. Thanks for your hospitality.



(L to R) The Telescope Workshop at Bookmans on Oct 16 was a great success. In this photo we see Rodney, Don, Terri, William, Alex, headless Sam, headless Bette, and new PAS Member Tracey Locke. Photo credit Bruce Wurst.



(L to R) Here we have Bette, Tracey, Rodney & Don. Thank you to Bruce for capturing some great photos of this event.



Terri & Storm set up to do the Dec 6, 2015 Desert Botanical Gardens Luminaria event in the Wildflower Garden, in the area we named the Water Tower Overlook.

Photo by William

PVCC Telescope Workshop Oct 20

By Terri, Event Manager

Attending this event from PAS were William and Terri Finch, Don Boyd, Sam Insana, Rodney Fong and Alex Vrenios. From the public, we had three RSVP's: Tom Clausen brought his Celestron Nexstar 4SE, Chris Howes had his Orion Starblast 6" and Andrew Edwards brought his Celestron Astromaster 130EQ.

Alex teamed up with Tom, joined after a while by Tom along with William and Don who were assisting Andrew. Chris was assisted by Sam. As a group, all of us talked for about an hour and then to Chris's and Andrew's the scopes outdoors. Tom didn't take his out, as it needed parts and wasn't usable. Sam, Alex and Tom helped Chris set his scope up on the observing deck while William, Terri and Don assisted Andrew, showing him how to align his finder scope using Mars.

I wish to thank the three attendees for attending and hope to see them at our events. I wish to also thank the telescope team for keeping the event running smoothly and offering advice and help with the scopes.

The temperature outside was pleasant with a very slight breeze, with no clouds at all. Looking forward to the next Telescope Workshop where we get to assist others with their telescopes!!!

Sam writes: Our PAS members and customers arrived on time, but the security refused to let us into the classroom. Jenny, our Board of Director at Large and PVCC

liaison finally solved the problem and we were able to gain access. I spent most of the time with a gentleman named Chris who had a one month old Orion Starblast 6 inch newtonian. He wasn't really familiar with the night sky yet, so we took his scope outside. Unfortunately, the lighting was so bad that it was difficult to see much of anything. After many attempts I showed Chris how to find Gamma Andromeda, the blue and gold double star and the Andromeda Galaxy, M31. He was thrilled. I then showed him how to use the Sky and Telescope Pocket Atlas and a planisphere I borrowed from Terri to find such objects. He said he would purchase such aids asap.

I also spent about 15 minutes with Andrew who had a 5 inch Celestron newtonian and wanted to learn how to use his setting circles. William had shown him how to align with the North star and I showed him that he had to also align the right ascension with another known object. From there he could find many objects by looking up their right ascension and declination coordinates. He will call me if he has any problems in the future with his setting circles. Andrew and Chris are both eager to get to dark skies. We told them about coming to the Black Mountain PVCC star party and I also told them about the Picket Post Trail Head observing area since they both live in the southeast valley less than an hour away from that dark site. They were both interested in joining PAS and Terri helped them with membership applications. Alex

and Rodney also attended and gave assistance to another customer, Tom. Don attended and took photos of the event and also gave advice to the customers.



Sam & William assist the attendees at the Oct 20 PVCC Telescope Workshop. Photo by Terri.



It's all about telescopes at this Workshop. It was a great event. Photo by Terri Finch.

What's Up For January?

By Rod Sutter
Planets

Name	Date	Rise	Set
Mercury	01-15-17	05:54	15:57
Venus	01-15-17	09:59	21:26
Mars	01-15-17	10:22	22:03
Jupiter	01-15-17	12:30	11:54
Saturn	01-15-17	05:16	15:17
Uranus	01-15-17	11:41	12:28
Neptune	01-15-17	09:55	21:13
Pluto	01-15-17	06:59	17:05

All Times Arizona Time
Bolded dates and times are nighttime objects

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January 15 2017

Sunrise: 07:32

Sunset: 17:44



Q1: January 5



Full: January 12



Q3: January 19



New: January 27

ASU West Star Party Oct 13

By Various Attendees

Terri Finch, Event Manager writes: From PAS we had seven telescopes: William and Terri Finch doing handouts and assisting the telescope team, Bruce Wurst with his 14", Sam Insana with his 8", Bill Powell, Don Boyd with his 8", Mark Johnston with his refractor, Ray Adams and arriving right at setup time George Sabo. Dr. Paul Schmidtke, our host and teacher at ASU West (and my friend) also had a telescope. I estimate 100+ in attendance from the public.

The evening began with six of us, William, Terri, Bill, Sam, Don, and Paul at Arby's for dinner before heading over to ASU West across the street to set up. By 6:30 we were all set, and the first public arrived. The event, which went until around 9pm was graced with mostly clear skies after a beautiful sunset. The temperature was absolutely perfect with no need for a jacket. There was a constant flow of people walking among the scopes, enjoying the views. Bruce showed Saturn for most of the night and Sam had the Moon. Congrats to new PAS Member Lisa Trapp who has been a long time guest through MeetUp. It was a successful and fun event. Looking forward to the next ASU West star party in Spring 2017 on Mar 30.

President Sam writes: Several PAS Members attended the ASU West star party. Paul Schmidtke, an astronomy professor, invited us to his astronomy open house. PAS brought 7 telescopes and showed the Moon, Albireo double star, M57 Ring Nebula, Saturn, Mars, M27 Dumbbell Nebula and other heavenly objects to ASU students and members of the public. There were a few high thin clouds, and the moon was rather large, but it was a pleasant night for stargazing.

Mark writes: I arrived (after fighting traffic) at 5:45 and set up. Venus, the Moon and Mars were quickly visible and before long I got my scope aligned. I had pretty steady traffic, a mix of Professor Paul's students and general public. The high clouds persisted and throughout the evening I had to choose objects that were in the clear.

I showed the Moon at 280x with a nice close up of craters on the limb. Saturn looked good early in the evening but then sunk down into the murk. Mars showed a polar cap and some surface detail. A new member, Lisa, told me Neptune was her

favorite planet and so I showed it to her and some others, contrasting it to Uranus which was a little bigger disk and bluer rather than the green of Neptune. I had a couple of requests for Jupiter and one for Sirius which I could not oblige tonight!

I showed the double double in Lyra, Albireo, Eta Cassiopeia, and the coat hanger cluster. People were amazed when I told them epsilon Lyra was 162 LY away, which means the light they were looking at left in 1854! The scope showed a very clear split with both pairs at 218x.

In all it was a fun event with a good mix of people attending and a nice variety of scopes to look through.

Bill writes: Last night was the latest PAS Star Party at ASU West Campus. The observing site was on the East side of the campus on an elevated dirt flat field with a fairly good horizon. Despite being among the city lights and having a nearly full moon, the conditions were good for the approximately 50 people or so that showed up to take a peek through about 10 different telescopes. Comments I overheard and received directly from viewers were all positive. Just about all the folks who viewed the Moon through my 80mm APO refractor were somewhat surprised at the details visible through even a smaller scope. A couple of the little ones seemed very excited at seeing our closest space neighbor. I can only imagine their thoughts when they saw the rings of Saturn...

One of the highlights of this session for me was the ability to see some pretty awesome detail of the Pythagoras Crater on the Moon. It turns out that the best time to view this crater is a few days before the full Moon. That is when the sunlight on the crater provides the best lighting for showing shadow relief. It is definitely worth checking out if you have not done so. The crater is approximately 128 kilometers across. We see it from a steep angle, so it is rather oblong in shape. It is possible to observe a mountain cluster in the center that reaches to a height of about 1.5 kilometers.

Lessons learned from this event: 1) Check all your batteries to ensure they are working. Carry spares like Don, who saved me at the last minute. Thanks Don. 2) Bring a chair. 3) Bring a Moon map. 4) Bring a star map - a good backup for the iPad/iPhone apps.



Setting up on Oct 13 at the ASU West Star Party. Sam Insana is in the foreground, Bill Powell is setting up his white scope, and Don Boyd is seen setting up his black scope. Photo by Terri Finch.



Paul Schmidtke is setting up his scope and chatting with William Finch. Many thanks to Paul for having us at this fantastic event! Photo by Terri.



A wonderful sunset takes over the skies as the clouds burn off just before the event begins.

We see Mark Johnston looking at me taking this photo, Don is getting something from his silver case, Bill Powell and a guest at the star party, Dan Webb look to the sky, and Sam Insana is looking into his scope to find the first object of the night. Photo by Terri.



Mark sets up his telescope. William Finch is seen in the background. This photo was taken at the ASU West star party of Oct 13. Photo by Terri,



Big Science in Small Packages

By Marcus Woo

About 250 miles overhead, a satellite the size of a loaf of bread flies in orbit. It's one of hundreds of so-called CubeSats—spacecraft that come in relatively inexpensive and compact packages—that have launched over the years. So far, most CubeSats have been commercial satellites, student projects, or technology demonstrations. But this one, dubbed MinXSS ("minks") is NASA's first CubeSat with a bona fide science mission.

Launched in December 2015, MinXSS has been observing the sun in X-rays with unprecedented detail. Its goal is to better understand the physics behind phenomena like solar flares—eruptions on the sun that produce dramatic bursts of energy and radiation.

Much of the newly-released radiation from solar flares is concentrated in X-rays, and, in particular, the lower energy range called soft X-rays. But other spacecraft don't have the capability to measure this

part of the sun's spectrum at high resolution—which is where MinXSS, short for Miniature Solar X-ray Spectrometer, comes in.

Using MinXSS to monitor how the soft X-ray spectrum changes over time, scientists can track changes in the composition in the sun's corona, the hot outermost layer of the sun. While the sun's visible surface, the photosphere, is about 6000 Kelvin (10,000 degrees Fahrenheit), areas of the corona reach tens of millions of degrees during a solar flare. But even without a flare, the corona smolders at a million degrees—and no one knows why.

One possibility is that many small nanoflares constantly heat the corona. Or, the heat may come from certain kinds of waves that propagate through the solar plasma. By looking at how the corona's composition changes, researchers can determine which mechanism is more important, says Tom Woods, a solar scientist at

the University of Colorado at Boulder and principal investigator of MinXSS: "It's helping address this very long-term problem that's been around for 50 years: how is the corona heated to be so hot."

The \$1 million original mission has been gathering observations since June.

The satellite will likely burn up in Earth's atmosphere in March. But the researchers have built a second one slated for launch in 2017. MinXSS-2 will watch long-term solar activity—related to the sun's 11-year sunspot cycle—and how variability in the soft X-ray spectrum affects space weather, which can be a hazard for satellites. So the little-mission-that-could will continue—this time, flying at a higher, polar orbit for about five years.

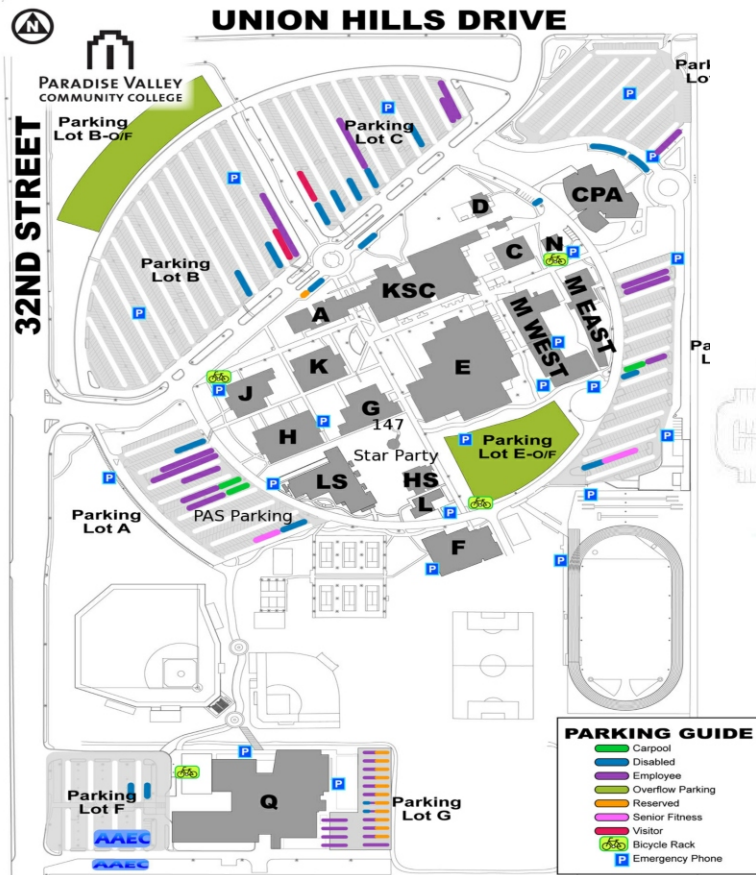
If you'd like to teach kids about where the sun's energy comes from, please visit the NASA Space Place: <http://spaceplace.nasa.gov/sun-heat/>



Astronaut Tim Peake on board the International Space Station captured this image of a CubeSat deployment on May 16, 2016. The bottom-most CubeSat is the NASA-funded MinXSS CubeSat, which observes soft X-rays from the sun—such X-rays can disturb the ionosphere and thereby hamper radio and GPS signals. (The second CubeSat is CADRE—short for CubeSat investigating Atmospheric Density Response to Extreme driving - built by the University of Michigan and funded by the National Science Foundation.) Credit: ESA/NASA

Map of PVCC Main Location

18401 N. 32nd Street | Phoenix, AZ 85032



Map of PVCC Black Mountain

34250 N. 60th Street | Scottsdale, AZ 85266



2017 PAS GUEST SPEAKER LINE-UP

By Terri Finch, Event Manager, Events@pasaz.org

PAS Meetings are held on Thursdays in Room LS-205 unless otherwise noted. Do you have an idea for a guest speaker? Email Terri the details. Here are the scheduled guest speakers at PAS:

<http://www.pasaz.org/index.php?pageid=meetings>

Feb 2: Alex Vrenios "Radio Astronomy"

Mar 2: Andy Odell "Stellar Evolution"

Apr 6: Harrison Smith "Potential Life on Exoplanets"

January 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1 New Year's Day	2	3	4	5 Meeting of the Minds (Private)	6	7
8	9	10	11	12	13	14
15 Telescope Workshop	16 Martin Luther King Day	17	18	19 PAS Meeting	20 School (Private)	21 PAS Social (Private)
22	23	24	25	26 Public Star Party	27	28
29	30	31				