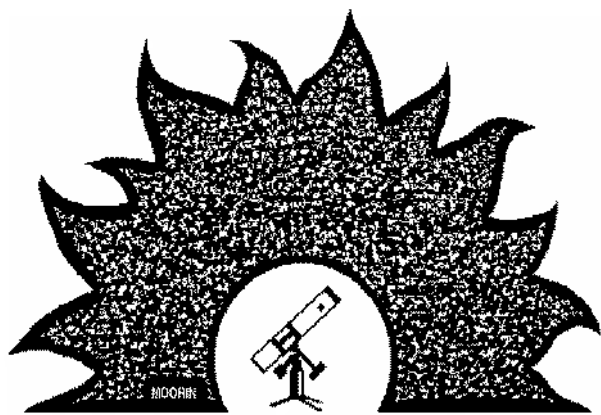




PAStimes

Phoenix Astronomical Society

www.pasaz.org

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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

"NASA's New Horizons Mission to Pluto"

Professor David Williams to speak at Mar 3 Meeting

(Provided by David Williams) The United States completed the initial reconnaissance of the Solar System with the New Horizons flyby of Pluto last July. What did we discover? Join Professor David Williams of ASU's School of Earth and Space Exploration to discuss all the exciting new results!

Terri, Event Manager, adds: Bring the whole family. We've all been eager to hear about the mission to Pluto - the data (and enthusiasm) David will share is captivating and intriguing. You won't want to miss this

presentation.

Bring a snack to share. Bottled water is being provided by the PAS snack fund, so please donate a little to the snack fund for future water bottle purchases, when you take a bottle or a snack. We expect a large crowd for this presentation, so arrive early. Doors open 7pm. The meeting begins promptly at 7:30pm. David has a few things to give away and other great stuff to share with us. Everyone Welcome! We meet in LS-204 for this meeting. See you there!



*David Williams, March 2016 Guest Speaker.
Photo taken by Don Boyd at the Nov 6, 2014
PAS Meeting.*

PAS Meeting of Feb 4

By Terri, Event Manager

At this well-attended meeting, we began as usual with President Sam Insana introducing the new attendees and the officers of the club. We then turned the evening over to guest speaker Ted Blank. Ted comes to us from the East Coast - he attended our Venus Transit event as a visitor and was so amazed by the weather that he moved here! His topic was "Observing Occultations and Recording Them." This was a great, energetic presentation - by the end of it, I was very much interested in getting into occultation observing. It sounds like so much fun!

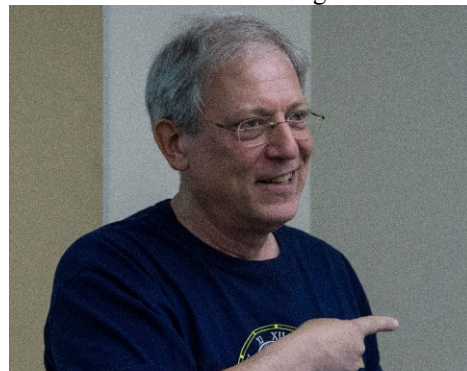
At the conclusion of the presentation, we had a discussion about the upcoming Jan 29 solar observing event at Black Mountain Campus of PVCC, with Sam sharing what he knew about the new observing deck. We talked about the Tucson Gem and Mineral Show and how we might carpool to make that trip on Feb 6 and we

also talked about the upcoming PAS Awards Ceremony, particularly what the recipients of the awards might like to receive for their attendance and help at PAS events.

In other business, the newsletter team recently created a survey to find out how many are reading the PAStimes Newsletter and what they would like to see added, taken away or adjusted. At this meeting, several members were given a free raffle ticket in thanks for having participated. The results can be found later in this issue. The newsletter takes Don (Editor), Terri (contributor), Eric Steinberg (copy editing) and Ora Kurland (proofreading) about 2 weeks per issue to assemble. The survey didn't produce the expected results: we had hoped that the majority of the PAS members, were reading or at least reviewing the newsletter sometime prior to attending each PAS Meeting but that doesn't seem to be the

case. In view of that, further discussion on the topic will take place at the Feb 25 Meeting of the Minds.

Finally we had the raffle which Steve Palmer won. Based on his excellent presentation, I invited Ted Black back to do another one in the future. We hope to see you all at the Mar 3 PAS Meeting!



Ted shared some great info with us at the February PAS Meeting. His enthusiasm was highly contagious. Photo by Don Boyd.

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March 2016 Upcoming Events

By Terri, Event Manager

Check out these and other events on the PAS Calendar:
<http://www.pasaz.org/forums/calendar.php>

Mar 2: School Star Party (Private)
 PAStimes Star Tour members Only

Mar 3: PAS Meeting at PVCC in Room LS 204. Come enjoy a wonderful presentation by David Williams. 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=1751&day=2016-3&c=1>

Mar 5: Dark Sky Observing Session - PAS Members with scopes only. RSVP is with Sam to attend.

Mar 10: 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=1688&day=2016-310&c=1>

Mar 11: School Star Party (Private)-
 PAStimes Star Tour members Only

Mar 12: Private Event in Carefree. PAS Members Only Messier Marathon with potluck at 5pm. More details:
<http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1887&day=2016-312&c=2>

Mar 13: 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=1896&day=2016-313&c=1>

Mar 17: Free Telescope Workshop at PVCC main campus, 32nd Street and Union Hills Rd - 7pm to 10pm. RSVP is required with Terri Events@pasaz.org. Seating is limited. When you RSVP, please leave your first name, and the make and model of your telescope. Bring your telescope and accessories to this event. We meet in 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=1949&day=2016-317&c=1>

Mar 24: Private - PAStimes Star Tours Members Only Meeting:
<http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1946&day=2016-03-24>

Mar 30: School Star Party (Private)-
 PAStimes Star Tour Members Only

Mar 31: Public Star Party at ASU West. RSVP is with Paul. Details are at this link:
<http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1883&day=2016-331&c=1> Bring the whole family for a night of observing!

Free Planetarium Shows in Carefree

By Terri, Event Manager

Carefree has a lot to offer the amateur astronomer and recently, Ron, a friend of PAS, has offered his awesome and Free Planetarium shows to any and all who wish to attend. Each month, he puts on several shows that are open to the public. These shows can be found on the PAS Website

Calendar
<http://www.pasaz.org/forums/calendar.php>. Most of his show times are on the weekend. Seating is limited, and there are no bathroom facilities. However, I have heard that this is an awesome opportunity to spend an hour+ engulfed in a fantastical-

ly enjoyable presentation about the night sky. RSVP is always with Ron, and required, for these events, as he limits attendance based on seating. See more info about these events on the PAS Calendar.

PAS Meeting of the Minds Jan 27

By Terri, Event Manager

This meeting was open to anyone interested in PAS Business; 18 PAS Members attended. It began at 7pm with President Sam Insana introducing new members and officers. Secretary Kevin Witts then asked for and received approval of the minutes from the last MOM's on Sept 10, 2015, after which we moved to vote on a number of bylaw changes, all of which were approved. We then had a Treas-

urer's report from Eric Steinberg. We had a brief discussion about the PAS Website and data that needs to be updated. Sam then read a letter from the National Math and Science Institute that thanked PAS for the \$285 donation on behalf of Bob Senzer. Terri Finch, Event Manager, reviewed the results of the January 14 newsletter survey. After a short break we covered a number of StarTours-only items, including the up-

coming DBG Lumi events as well as a thank-you letter from Susan Rubin, our contact at Desert Botanical Gardens (read by Sam). Finally, Roger Anzini shared some ideas about other events PAS could do during the summer months at DBG. Hope to see you at the next Meeting of the Minds Feb 25 for all PAS Members, and Mar 24 for PAStimes Star Tour Members.

PRESIDENT'S CORNER

By Sam Insana, PAS President

PAS members can help each other and the public by listing their favorite night sky objects. There are 4 main considerations: 1) size of telescope aperture, 2) season of the year, 3) where observing and 4) the name of the object.

For example, with an 8 inch aperture in the fall at school events in Phoenix (Bortle 6-8), my favorite night sky object to show

is Gamma Andromeda a blue and gold double star. If it is winter and I am at Mike's place or PVCC Black Mountain (Bortle 4-5), Orion Nebula is a favorite of mine. In spring at the Antenna's (Bortle 2), my favorites are M 81 and M 82 in the same eyepiece, two beautiful galaxies. In summer, M 13 globular cluster is a favorite of mine at any location.

This can be quite a complicated endeavor, but I would like PAS members to send me a list of your favorite objects, the aperture you use, for each season, and at least one viewing area, either the city (Bortle 6-8) or the outskirts (Bortle 4-5) or dark sky area (Bortle 2-3). I will then compile the list and if we get enough responses, put it on our PAS website. Have fun doing this project.

"That's Dope!"

Dos Rios School Star Party Jan 15

by Christine Mintzmyer, PAS Member

If you were at the Dos Rios Elementary star party, that is a phrase you heard quite a lot as some kids saw the stars for the first time ('dope' is modern slang for cool, sweet, golly gee, etc.). There were many 'ooohs' and 'aaahhs' as families got a chance to look at the Orion Nebula, Pleia-

des, Gamma Andromeda, Perseus Double Cluster and of course the Moon in all its glory. Earl DeLong, Pete Turner, Roger Anzini, Don Boyd, Sam Insana and I brought scopes and shared what we knew about the various objects and what PAS is all about. Kevin Witts and Mike Marron

had rocket and meteorite displays to give a close-up illustration of what's been going on amongst the stars. From small children, teenagers and parents, everyone who looked through the eyepiece came away with a delighted smile and that oft repeated phrase, "Ah man, that's DOPE!"

PAS Messier Marathon

By Terri, Event Manager

PAS will be holding its Messier Marathon on the evening of Mar 12 in Carefree. This will be a private viewing event for PAS members only. Bring the whole family and make a party of it. Potluck will begin at 5pm. Bring a main dish and a drink to share so we have a hearty meal to last us through the night. Those needing to sleep, just inform the host of the party - you are welcome to do so in the living room. You may wish to bring snacks for yourself for the 'into the early morning hours' observing.

Those doing the Marathon should be

sure to let the rest of us know not to bother you while you compete. The rest of the attending members and families can view through additional telescopes set up for a not-so-dark-sky viewing evening. The moon will be 5 days old on this night and will not set until about 10:30pm. Jupiter and the Orion Nebula will be the highlights of this evening. Those doing the Messier Marathon should go as far back away from the house as possible to keep away from the lights.

Certificates provided by PAS will be

given at the awards ceremony on Apr 21. Be sure to report your total observed objects to Terri prior to April 1st so you can be included in the awards. Any number of objects, of the 110 possible, gets you a certificate of completion. If you make it near 110 objects, talk to Eric, Treasurer about an award from the Astronomical League. Let's see how many Messier Objects we can see on this one night! Good luck to all who are competing! See you at this event! Here's the link to RSVP: <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1887&day=2016-3-12>

The Messier Catalog

Alex Vrenios, PAS Member

At some point in time, after you've been in the hobby for a while, you'll discover the dozens of lists of stellar objects that have been compiled over the years. Completion of some lists can earn a formal certificate from the Astronomical League, while some are just for fun. Most lists are collections of objects with something in common: double stars, galaxies, lunar features, etc. The Messier Catalog is one of them, but it stands head and shoulders above the rest, kind of a right of passage in observational astronomy and well worth your time. Observing all 110 Messier objects is an accomplishment to be proud of and more. If you use star-hopping techniques, you will learn the constellations and you will be introduced to the wide variety of deep-space objects it has to offer.

Charles Messier, if you've not heard the story, was an 18th century comet hunter (If you discover a comet they will put your name on it, a guarantee of sorts that you will never be forgotten!). In his quest for comets he found a lot of objects that looked like comets, but were something else. They stayed fixed against the background stars instead of drifting across the sky, like a comet should.

Perhaps out of kindness, but more likely out of a desire to be recognized as a serious comet hunter, he made a list of these non-comet objects. He numbered each of them and carefully recorded their locations in the sky. Future comet hunters, he mused, shouldn't have to be fooled like

he was, wasting their precious observing time on these impostors!

He included sightings from other comet hunters, whom he credited in his list; after his death others continued his good work, ending up with 110 Messier objects in all.

The list lives on today, not because of all the future comet hunters who wanted the edge that the data provided, but because it contains some of the brightest, prettiest and most accessible deep-space objects in the sky. They include open star clusters, globular star clusters, galaxies and all manner of nebulae.

The Latin word nebula means cloud-like; the English word "nebulous" precisely describes what these objects looked like in the telescopes Messier used.

About 150 years after Messier, however, instruments like the 100-inch Mt. Wilson telescope that Edwin Hubble used offered a lot more detail. In 1924, Hubble made a photograph of M31 (Messier's 31st recorded object), a "nebula" in the constellation Andromeda, and found something no one else had: there were stars in this otherwise fuzzy blob! Even more interestingly, one of them turned out to be a variable star. Specifically, a Cepheid Variable that could be used to estimate its distance from Earth. This find was important because it indicated that the star was much further away from Earth than the diameter of our galaxy. It meant that this "nebula" was really another galaxy full of stars, just like our own, but

very far away from our own. Many more such galaxies were discovered afterward, and the "universe as we knew it" seemed to get a whole lot bigger.

Other nebulae turned out to be gas and dust. Some gave off light because they were heated to very high temperatures by nearby stars. Some reflected the light from another very hot object, and some actually showed by blocking the light from the stars behind it.

Later on, some of the dust and gas clouds were discovered to be remnants of old stars that had exploded, and some were found to have new, young stars being born inside that gas and dust: stellar nurseries.

Bottom line: Messier's list of non comets contained objects that were much more interesting than the comets he sought.

By all means view them and enjoy them. The best advice is to get a guidebook on how to find and view these objects and ask the more experienced observers in the club about them (and be ready to hear some interesting stories).

Further Reading:

"The Year-Round Messier Marathon Field Guide," Pennington, Harvard, Richmond, VA: Willmann-Bell, 2013.

"The Next Step: Finding and Viewing Messier's Objects," Graun, Ken, Tucson, AZ: Ken Press Books, 2005.

"The Messier Album," Mallas, John H. and Kreimer, Evered, Cambridge, MA: Sky Publishing Corporation, 1978.

STEM-tastic at Black Mountain Campus of PVCC Mar 10

By Terri, Event Manager

PVCC Black Mountain Campus is hosting an event for STEM-tastic on March 10th. Bring the whole family. From 4 to 7 pm there will be indoor science activities including Mike the Meteorite Man. Come touch, feel, hold real meteorites!

From 7 to 10 pm in the parking lot, the Phoenix Astronomical Society will have telescopes set up for your viewing pleasure. The meteorites may also be set up in the

parking lot, in case you missed them earlier indoors.

RSVP is requested to ensure there are enough handouts for everyone. When you RSVP, leave your name and the number in your party - email that information to Events@pasaz.org. PAS members wishing to attend this event (with or without a telescope), please RSVP in the calendar. For those attending who aren't PAS members,

you can see what scopes are attending by checking the calendar also - from there, go to the forum link for that page. Should the weather not cooperate, only the star party portion of the event will be canceled. All the indoor activities will still be available for your attendance. See you there! Here's the link with more details: <http://www.pasaz.org/forums/calendar.php?do=getinfo&c=1688&day=2016-3-10>

Results of Jan 14 Newsletter Survey

By Terri, Event Manager

At the January 14 PAS Meeting, Don and I conducted a survey to find out what the attending PAS Members would like to see in their newsletter. Here are the results of that survey (which was discussed at the Jan 27 Meeting of the Minds).

Question 1: How often do you read the PAStimes Newsletter? Very Often: 8, Only Occasionally: 4, Rarely: 0, 1st Time: 4 (there were 4 new people at our meeting). One Member penciled in "Never." From

this data, I'd say we have a majority of members who do read the newsletter.

Question 2: What changes would you like to see in the format of the current Newsletter? 1) Articles to Add: "better flowing articles", "good as it is", "easy to find events", "shorter articles", "more astronomy articles." 2) Articles to Remove: "For Sale", "special meeting announcements", some votes for "none".

Question 3: Do you want more photos

in the Newsletter? Results were: Yes: 8, Same: 3, No: 0. Additional comments in the photo section were: "1-3 photos per event or less", and "We don't print - so it could be a book which would give everyone a chance to be published".

Thank you all for taking the survey in person. The 2 PAS Members who took the survey by the deadline, on line, received a raffle ticket each in thanks at the February PAS Meeting.

Bookmans Sidewalk Astronomy Events

By Terri, Event Manager

PAS will be hosting sidewalk events at the Phoenix Bookmans at 19th Ave & Northern on these four dates: Apr 23, June 11, July 9 and Aug 20. Times of events will

vary depending on when the Sun sets and when the first object can be seen that night, so check the listings on the PAS Calendar <http://www.pasaz.org/forums/calendar.php>

to be sure you have the correct start time. More details will be found in the April and May issues of the PAStimes Newsletter.

ASU West Public Star Party March 31

By Terri, Event Manager

Each year, ASU West hosts star parties, one in fall and one in spring. At this spring's party, we will need a number of telescopes to show the public the night sky. Signup for this event for PAS members, is at this link: <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1883&day=2016-31&c=1>. Details about the event are also at that link, so please check on it prior to attending this event.

Members of the public should RSVP

with Paul, my ASU West contact, so he can let them know should the event be canceled for any reason. He can be reached at Paul.Schmidtke@asu.edu.

On March 31st, attending PAS Members are asked to set up at 6:30, with the event running from 7:30 to 9:30 pm. The highlights of this event will be Jupiter and the Orion Nebula. A lot more objects can be found as well, since there is no bright Moon in the way.

The telescope team will be having dinner at 5pm at the Arby's across the street - please RSVP your dinner attendance with Terri at Events@pasaz.org.

Should this event be canceled due to weather, those who have RSVP'd, will get a notice by 4:00 pm via email. We look forward to a great observing night. Come take a look through our telescopes. We have two rules at our Public Star Parties: 1) Have fun, 2) Please do not touch the telescopes. See you there!

PAStimes Star Tours Meeting of the Minds Mar 24

By Terri, Event Manager

We are holding a Star Tours MOM's on Mar 24 to discuss a variety of issues. The meeting is for Star Tours members only; if you are part of this SIG (i.e. a Star Tours member), we request that you make every effort to attend. The topics will include the upcoming DBG Lumi event of

2016 along with several others of interest to all PAStimes Star Tours members. If you are being considered for becoming a member of this SIG, you may attend this meeting. More details can be found in the Private Calendar at this link: [http://www.pasaz.org/forums/calendar.php](http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1946&day=2016-03-24)

[?do=getinfo&e=1946&day=2016-03-24](http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1946&day=2016-03-24)

Doors open at 6:30, and the meeting will begin at 7:00 pm. Bring a snack to share, as with most PAS Meetings, this is a Party! Bottled water will be provided by the PAS Snack Fund. See you there!

Black Mountain Campus Star Party Nov 12

By Terri, Event Manager

This was a great event. We had a large turnout of scopes and an estimated 60 people from the public. From PAS we had Howard with his 8", Sam with his 8", Earl with his 10", Kevin Witts with his 8", Bob Ewing and George Sabo also with scopes. Paul came to assist, while William and

Terri brought handouts and the PAS Table. Mike Marron brought his Meteorites. The weather was cooperative and everyone seemed to enjoy themselves. Christine Mintzmyer signed up as a new member as did Justin Schultz. It also turned out that many previous BMC Star Party goers had

returned for this event - it was great seeing them again. We look forward to the great line up we have of these events in 2016. Many thanks to our fantastic telescope team!

Kitt Peak Nov 8

By Howard Moneta

On November 8th 2015, several members of PAS traveled to the Kitt Peak National Observatory located in the Quinlan Mountains on the Tohono O'odham Nation. The observatory is 55 miles outside of the city of Tucson Arizona and is home to the world's largest collection of telescopes. We picked a beautiful day for a drive up the mountain to an elevation of 6880 feet.

Our group attended all three daytime tours. The first tour was the McMath-Pierce Solar Telescope. This instrument was built in 1962 and is currently the world's largest solar telescope. We were able to enter the slanted shaft and look up toward the sky and down to the 1.6-meter primary mirror. Next we visited one of the oldest instruments on the peak, the 2.1 Meter Telescope. We learned about Vera Rubin, the pioneering astronomer who often worked from this telescope. Vera and her colleagues were responsible for some significant discoveries that changed humanity's understanding of the universe. The last stop on our tour was the 4-Meter Mayall Telescope. This giant telescope on a hill is the highest point on the mountain. The Mayall Telescope has been in operation for over 40 years and has aided in our understanding of the size and large-scale structure of the universe. Future plans for this telescope are to participate in a long term study of dark energy.

We had very knowledgeable tour guides and found the museum and gift shop to be quite interesting. All in attendance were grateful to Kevin Witts and Sam Insana for coordinating this fun trip.



Kitt Peak Solar Observatory. Photo by Sam.



Attending this Awesome PAS Field Trip was (L to R): Dewell Howell, Sam Insana, Earl DeLong, Frank Insana, Howard Moneta, Vera Stiesmeyer, Peter & Andie Turner, Kevin Witts, Paul Facuna, Mike Marron & Bob Ewing. Photo provided by Sam Insana.

“Reading Galactic Jets” Lecture Nov 5

By Terri, Event Manager

Our guest speaker this night was Mike Marron, doing a “test” version of this lecture prior to presenting it at a Mensa meeting on November 26th. The talk started around 7:15, though it had been announced for 7:30, causing some attendees to miss the beginning. Nevertheless, the modestly sized audience was quiet and polite throughout. We really appreciated Mike for giving us a personalized “beta test” of the lecture - tickets at the Mensa version are \$75 each! The Lecture was well organized and filled with great information. Thank you Mike.

Attending along with Mike were: William and Terri Finch with equipment to record the lecture, Don Boyd, Alex Vrenios, Rodney Fong, Ofelia Waters, Darlene

Ahlefeld, Louis Roberts and new members Hugh Clark and his fiancée, Terri Poh - welcome new members.

Mike's presentation came off well and was uninterrupted; we timed it at 1 hour and 20 minutes which Mike felt he had to cut to 45 minutes for Mensa, so he will be busy editing between now and the 26th.

I wish to thank those who attended to support Mike along with everyone who brought snacks to share. The bottled water was purchased as usual through the PAS snack fund. Mike is considering doing a summer lecture series again for Summer 2016, so watch for the announcement. Many thanks as always to Jenny Weitz for providing the room.



Mike did a fantastic lecture entitled “Reading Galactic Jets” on Nov 5 for PAS Members & 2 additional attendees who joined club. This lecture was recorded. Photo by Terri Finch.



The Closest New Stars To Earth

By Ethan Siegel

When you think about the new stars forming in the Milky Way, you probably think of the giant star-forming regions like the Orion Nebula, containing thousands of new stars with light so bright it's visible to the naked eye. At over 400 parsecs (1,300 light years) distant, it's one of the most spectacular sights in the night sky, and the vast majority of the light from galaxies originates from nebulae like this one. But its great luminosity and relative proximity makes it easy to overlook the fact that there are a slew of much closer star-forming regions than the Orion Nebula; they're just much, much fainter.

If you get a collapsing molecular cloud many hundreds of thousands (or more) times the mass of our sun, you'll get a nebula like Orion. But if your cloud is only a few thousand times the sun's mass, it's going to be much fainter. In most instances,

the clumps of matter within will grow slowly, the neutral matter will block more light than it reflects or emits, and only a tiny fraction of the stars that form—the most massive, brightest ones—will be visible at all. Between just 400 and 500 light years away are the closest such regions to Earth: the molecular clouds in the constellations of Chamaeleon and Corona Australis. Along with the Lupus molecular clouds (about 600 light years distant), these dark, light-blocking patches are virtually unknown to most sky watchers in the northern hemisphere, as they're all southern hemisphere objects.

In visible light, these clouds appear predominantly as dark patches, obscuring and reddening the light of background stars. In the infrared, though, the gas glows brilliantly as it forms new stars inside. Combined near-infrared and visible light

observations, such as those taken by the Hubble Space Telescope, can reveal the structure of the clouds as well as the young stars inside. In the Chamaeleon cloud, for example, there are between 200 and 300 new stars, including over 100 X-ray sources (between the Chamaeleon I and II clouds), approximately 50 T-Tauri stars and just a couple of massive, B-class stars. There's a third dark, molecular cloud (Chamaeleon III) that has not yet formed any stars at all.

While the majority of new stars form in large molecular clouds, the closest new stars form in much smaller, more abundant ones. As we reach out to the most distant quasars and galaxies in the universe, remember that there are still star-forming mysteries to be solved right here in our own backyard.



Image credit: NASA and ESA Hubble Space Telescope. Acknowledgements: Kevin Luhman (Pennsylvania State University), and Judy Schmidt, of the Chamaeleon cloud and a newly-forming star within it—HH 909A—emitting narrow streams of gas from its poles.

Telescope Workshop at PVCC Nov 19

By Terri, Event Manager

We had a great event! Attending from PAS were Rodney, William and Terri, Howard, who helped everyone outside, Don, who helped Christine collimate her scope and Sam who brought his scope and set it up on the Moon. We had 4 original

RSVP's: 2 non-members (only of whom one showed up) and 2 members looking for assistance. The public attendee was Patrick Cassidy who came to find out what telescope to purchase, while from PAS, we had Christine with her 10" and George Sabo.

We didn't have any walk-ins from the public during the time we were set up outdoors, but those in attendance enjoyed the views through the three scopes on hand. Many thanks to my telescope team!!!

U of A Mirror Lab and PAS

By Peter Turner

On Monday afternoon, Nov. 9th, 11 PAS members were treated to a presentation and tour of the University of Arizona's Richard F. Caris Mirror lab, the only place in the world capable of making large glass mirrors to outfit today's giant telescopes. The lab's motto is: 'If it can't be built, WE will build it'.

During the presentation we learned about the lab's history, the process of making a mirror and a number of their projects. Pioneering work allows them to build very large mirrors for earth-based telescopes that are much less expensive than space-based telescopes and provide much more light gathering power. Recent UA Mirror Lab projects, along with those under development or in design, will provide 10 to 100 times the detail of Hubble depending on the observation. Key to their success is R&D that allows the mirrors to be thin, light in weight and polished to variations measured in molecules.

One mirror lab project was the Large Binocular Telescope interferometer (LBT), built in 2004. It sits on Mount Graham and is currently the Earth's biggest optical telescope (infrared, visible and ultraviolet light). Supporting two 8.4 meter mirrors, separated by 14 meters, it has the light gathering detail of a single 22.8 meter mirror. The system was purpose-built to directly image exoplanets; we were privileged to see an LBT picture of three planets around a sun 51 light years away.

The largest single mirror the lab sends to customers is 8.4 meters. Although they can make larger mirrors in Tucson, they aren't able to deliver them due to the width of Interstate 10 between Tucson and Houston, TX. Nevertheless, their expertise al-

lows them to produce unique telescope designs and mirrors with an effective primary mirror width of 25 meters or more.

On our tour we viewed mirrors being produced for the Giant Magellan Telescope in Chile. That scope will have six 8.4 meter off-axis mirrors surrounding an 8.4 meter central mirror creating a primary of 25 meters. We saw one mirror being polished and the central mirror in the "oven" being heated to 2100+ degrees. Two other finished mirrors were locked up in a storage room. These mirrors have to be seen to fully appreciate their size. We were on a third story balcony overlooking the mirror as it was heated in the oven. Along the side of the room was another frame standing on end. It started at floor level and ended above our heads. In the picture notice the fork lift down below next to the frame. Needless to say, we came away from the lab amazed.



Mirror Frame. Photo taken by Kevin.



Mirror Polishing taken by Kevin Witts.



U of A Mirror Lab Tour: Mirror Oven taken by Kevin Witts.

Picket Post Dec 5

By Earl DeLong

Howard Moneta and Earl DeLong drove to Picket Post Mountain for an observing session on Saturday December 5th. We had hoped to meet other members of EVAC there, but none attended. It is a beautiful drive out US 60 West past the Superstition Mountains to Picket Post Mountain. The observing site is at the trailhead parking lot. It is a nice site with primitive restrooms (pit toilets and port-

potties). It can be dusty as the day hikers leave in the evening and the night sky this evening was rated fair. The seeing was not very steady and the haze and cirrus clouds to the west made the lights of Phoenix probably brighter than normal. Still, we had an successful but cold evening. We spent some of the evening comparing views of nebulae using an OIII and light pollution reduction filter. Some of the highlights

were the view of Caroline's Rose (an open cluster with dark lanes that truly looks like a rose), the Rosette nebula, the Helix nebula, the Little Dumbbell nebula, the Great Orion nebula, the Great Andromeda galaxy (great detailed view due to being overhead), the Sculptor galaxy, and Hubble's Variable nebula. It was an enjoyable evening, even with the fair atmospheric conditions.

Arizona Sky: The Planets This Month

By Leah Sapir

Jupiter is certainly the highlight of our sky this month. It reaches opposition on March 8, so it will be up all night for practically all of the month. Mars and Saturn are rising earlier, but still not enough to be considered “evening stars”. Mars rises around midnight at the beginning of March, and 11 pm towards the end of the month. Saturn rises around 2 am when March begins, and around midnight later in the month.

Venus is still a morning star, but just barely – rising less than an hour before sunrise, and visible in morning twilight only because it is so bright. It will be very low in the east – only around 5 degrees above the horizon on March 1, and getting lower by the day. For better visibility, we’ll need to wait till Venus returns from its hiatus in July, when we will be able to

see it as an evening star.

Mercury is already fading into the sunrise, and won’t be visible at all this month; but it will be making a guest appearance in our evening sky in April. Watch for it in the west from around April 10 to 25.

Neptune will not be visible this month, and Uranus is already getting low in the west, setting at around 9 pm in the beginning of March, and fading into the sunset by the end of the month.

The third-quarter moon will be near Mars on the morning of February 29 from around 1 am to dawn, going east to south, and it will be between Mars and Saturn on March 1, starting around 3 am. On the morning of March 2, the moon will be close to Saturn.

The crescent moon will join Venus

very close to the eastern horizon shortly before dawn on March 7, but both will be difficult to see.

The first-quarter moon will be following the Hyades in the west on March 13 from sunset till around midnight. And on the night of March 21-22, the full moon will escort Jupiter across the sky all night from east to west.

On March 28, the moon will be near Mars from around midnight to dawn, going east to south; and on March 29, from around 1 am, it will accompany Saturn. Mars and Saturn will be relatively close to each other all month, but it’s not quite a conjunction. They are about 15 degrees apart at the beginning of March, and 10 degrees at the end of the month.

We will have the new moon on March 9, and the full moon on March 23.

Black Mountain Campus Dec 10

By Sam Insana, PAS President

We had 6 telescopes, Earl with his 10 inch dob, Christine with her 10 inch dob, Eric with his 22 inch dob, Bob with his 12 inch dob, our new member Mark with his 5 1/2 inch refractor and I with my 8 inch Newtonian reflector. We showed Andromeda galaxy, Gamma Andromeda double star, Albireo double star, the Pleiades open cluster, the double cluster in Perseus, and the hit of the evening: Uranus at 500 X in Eric’s scope.

The public arrived early so we showed objects from 6:30 pm until 8 pm, when we got totally clouded out. This was our last star party in the lighted parking lot. From now on we will be on an observation deck north of the new building, which looks like a much darker location. Paul assisted the Telescope team. Kevin Harcey and his friend Kevin also attended. We had about 10 members of the public enjoy the star party.

Messier Marathon 2016

Taken directly as posted, from this site:

<http://messier.seds.org/xtra/marathon/mm2016.html>

“In the year 2016, New Moon will occur on March 9 and April 7, so the best Marathon time in mid-March will be prevented by the Moon. There will be two opportunities for Messier Marathon, the first and primary on March 12/13, 2016 where M30 will be extremely difficult to impossible from most locations, and April 2/3, 2016 where it will be extremely improbable to succeed in finding the first evening objects, M74 and M77. According to Tom Polakis’ investigation, on the first primary occasion, a full score of 110 Messier Objects should be possible from locations between 9 deg and 27 deg Northern Latitude with most difficult object M30 in the morning, and southern limit from M52, while on the secondary date in April, the probable invisibility of M74 will make it so unlikely.” [sic]



Poster image provided by Dr. David Williams, announcing his March 3 2016 Presentation. See page 1 for more details.

Country Meadows School Star Party Nov 17

By Terri, Event Manager

Our contact at this school was Sarah Tekulve who was a dream to work with setting up this event. Thank you Sarah for having PAS at your event and for taking care of the telescope team!

Sarah writes: "Hi guys, Thank you so much for coming out last night...the kids loved you guys!!! I saw one of you snapping a couple of pictures with your phone...is there any way you can send those to me? If so I would greatly appreciate it!!

A baby alligator, a hedgehog, and so many snakes oh my! [sic] Last night was AMAZING! I just want to say THANK YOU to all of you for coming out. It was a big success and it seems that that is all many of our kids can talk about this morning. We had just over 300 people, which is lower than last year's turn out but it was still a HUGE success. We had so many great science opportunities from meteorites and telescopes to recycling and the mosquito population. It was a great learning experience for our students and their families, so thank you for helping to educate our students! Please be on the lookout for an email from me in the future trying to get you all to come back for next year's event!"



Kevin Witts with his "Exploring the Moon" display at Country Meadows School on Nov 17 2015. Photo by Sam Insana.



Mike Marron entertaining the crowd with his vast collection of meteorites at Country Meadows School. Photo by Sam.

Geminids Meteor Shower Party Dec 13

By Sam Insana

On Sunday night, December 13, Thirteen PAS members attended the best meteor shower of the year at Mike's place. From 11:45 pm to 12:15 am we saw 32 meteors! The highlight happened when Rodney decided it was too cold and got up to leave, missing the largest, brightest and greenest meteor of the night. Everyone kept warm with hot chocolate and hot apple cider. Attending were Mike Marron (Host of the party), Sam Insana, Frank Insana, Kevin Witts, Howard Moneta, Paul Facuna, Earl DeLong (who brought his telescope), Rodney Fong, Christine and Johnny Mintzmyer, Alex Vrenios (who brought his radio meteor non-detector) and Shannon and her daughter Tennessee, who both joined PAS at the meteor shower event. Best meteor shower ever!!!



Mike with 2 newest PAS members at meteor party Dec 13 2015. Photo taken by Sam Insana.

For Sale

Nexstar 9.25 carbon fiber and is Fastar Compatible. Asking price is \$1,500 for the package. Please contact: Terry Tmranger86@hotmail.com or (602)-703-3772. All photos & complete package list can be seen here:

<https://www.dropbox.com/sh/I9ak53vbwijupu/AABr2UwkkbaPxIRaJsEQyuMYa?dl=0>

Map of PVCC Main Location

18401 N. 32nd Street | Phoenix, AZ 85032

2016 PAS GUEST SPEAKER LINE-UP

By Terri, Event Manager, Events@pasaz.org

These meetings are held on Thursdays in Room LS-204, unless otherwise noted.

Do you have an idea for a Guest Speaker? Email me the details. Here are the scheduled Guest Speakers at PAS:

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

Apr 7: Elliott Rachlin "Usefulness of a Telescope Mounted on the International Space Station"

May 5: Dan Heim "Light Pollution: Where we are in 2016"

Summer Break: No PAS Meetings June, July or August

Sep 1: PAS Members and Guest Night - Sign up with Terri to do a 5 - 40 minute presentation.

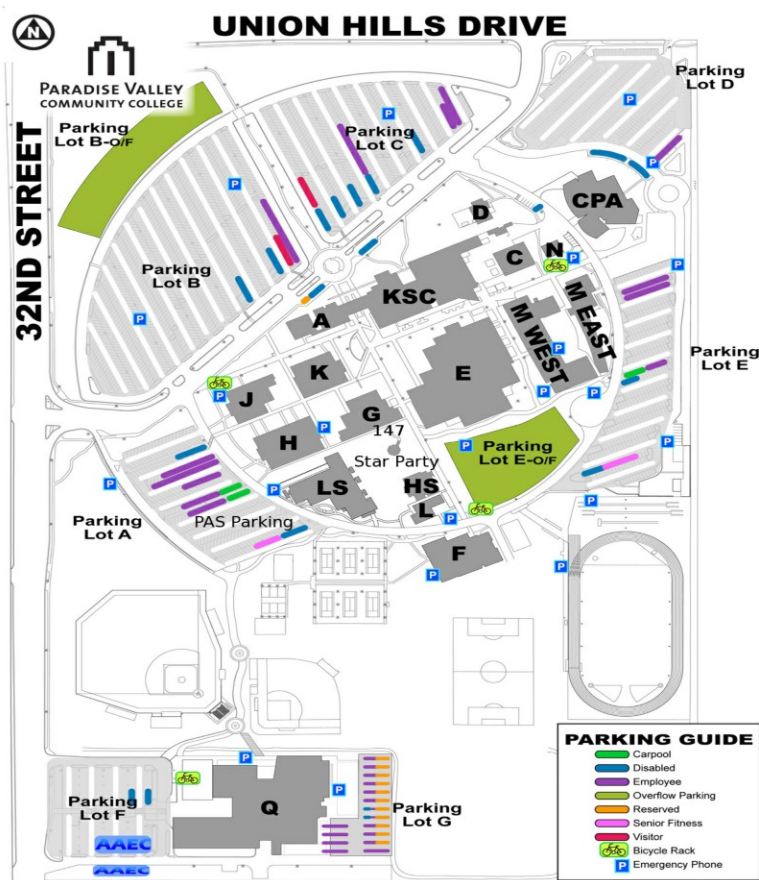
What's Up For March?

By Rod Sutter, PAS Past President

Planets

Name	Date	Rise	Set
Mercury	03-15-16	06:28	17:57
Venus	03-15-16	05:46	16:51
Mars	03-15-16	11:48	10:08
Jupiter	03-15-16	17:48	06:29
Saturn	03-15-16	12:51	10:59
Uranus	03-15-15	07:44	08:24
Neptune	03-15-16	06:01	17:20
Pluto	03-15-16	03:03	13:12

All Times Arizona Time



March 2016

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2 School Star Party (Private)	3 PAS Meeting	4	5 Dark Sky Star Party (Private)
6	7	8	9	10 Huge Public Star Party	11 School Star Party (Private)	12 PAS Messier Mara- thon (Private)
13 Free Telescope Workshop	14	15	16	17 Free Telescope Workshop	18	19
20	21	22	23	24 Private MOM	25	26
27	28	29	30 School Star Party (Private)	31 ASU West Public Star Party		

Moya Elementary Feb 5

By Sam Insana, PAS President

Mike Marron and his meteorites and Earl DeLong, Don Boyd, Howard Moneta, Rick Cunningham, and myself, with our telescopes, did a star party for Moya Elementary and 2 sister schools (Alta E Butler & Morris K Udall). The party started at 5:30pm, 30 minutes earlier than they had contracted. Luckily, Rick brought a solar filter and showed the sun for 30 minutes. We then described our telescopes to the hundreds of people until it got dark at 7pm. The school wanted us to end at 7:30 pm but that would leave many people without a chance to view. So as RSVP, I suggested we stay another 20 minutes so that everyone could view at least one object.



*Rick Cunningham at Moya Elementary on Feb 5 showing an awesome view through his telescope.
Photo by Sam Insana.*

Phoenix Marriott Mesa Star Party Feb 19

By Terri, Event Manager

On Feb 19, PAS was asked to do a star party for the night before their son's wedding. Jack & Nora had 2 scopes come to the party. It was a very fun event. They provided food, drink and a great collection of people interested in looking through our

telescopes. Bruce Wurst and Terri Finch did this event. The weather was cooperative and the location was ok for viewing. We saw the Moon, Jupiter, Andromeda, Perseus Double Cluster, ET open cluster, and 2 Messier objects Bruce showed, all in

about 2 hours of time. The party was for about 50 people, and we had some awesome conversations about a lot of topics. Thank you Jack, for having us at your awesome event!

Follow PAS on:

Twitter - <https://twitter.com/PASevents>

Facebook - <https://www.facebook.com/PhoenixAstronomicalSociety>

Map of PVCC Black Mountain

34250 N. 60th Street | Scottsdale, AZ 85266



March 15 2015

Sunrise: 0:38

Sunset: 18:37

Q3: March 1

New: March 8

Q1: March 15

Full: March 23

