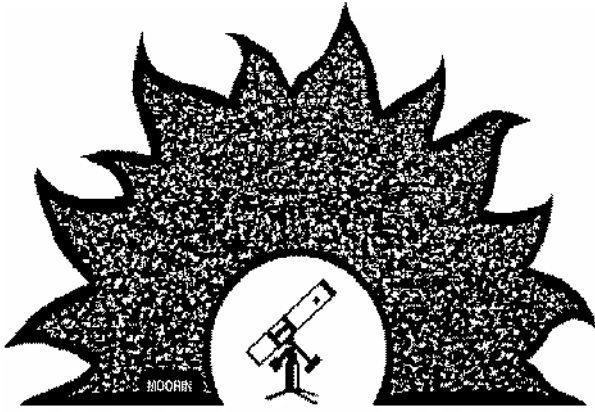




PAStimes

Phoenix Astronomical Society

www.pasaz.org

January 2018

Volume 69 Issue 5

PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Mike Marron to Speak at January Meeting

“Reading Galactic Jets”

Astronomical objects make jets, astronomical objects are made by jets and some astronomical objects are jets. Understanding how jets are made and evolve allows the observer to read the detailed history of the object that made the jet. This lecture will concentrate on the history of the universe as revealed by billions of galactic jets including the where, when, how and why of the Big Bang event. I will show that the Big Bang did not create the universe, that dark energy is a misunderstanding and that inflation is an overblown and misguided attempt to keep Big Bang big. Curious? Come and see how learning to read galactic jets is fundamental to understanding how every part of our universe was made.

Everyone is welcome at PVCC Main Campus in **Room LS-204**. Doors open at 7pm. The meeting begins at 7:30 and can go to 10pm. Bring a snack to share. Bring a friend!

A “Meet the Guest Speaker” dinner will be at Chili’s prior to the meeting with a start time of 5pm. RSVP is required by the day before the meeting. Please see this link <https://tinyurl.com/ya478c6o> to RSVP and read about the details of dinner. If you are unable to RSVP at the link, please just email Terri at Events@pasaz.org with the number in your party. Everyone is welcome.



Mike Marron. Photo taken by William Finch.

Dec 7 Meeting with Stephen Desch

By Terri, Event Manager

This was our Annual PAS Swap Meet/meeting. After a hectic start getting the room set up for the swap meet, we started the meeting at 7:30.

President Mike Marron was not at this meeting so Vice President Paul Facuna filled in capably as meeting chair, sharing a couple articles on asteroids before passing the floor to Terri Finch, who explained the swap meet procedure. Paul then introduced guest speaker Stephen Desch. Stephen was accompanied by Emilie Dunham (Our February 2018 Guest Speaker) who brought meteorites that illustrated points in the talk and which were passed around while Stephen spoke. His talk on how the planets were formed and how studying meteorites can give us major clues about the process was fascinating and well received, generating lots of questions.

After Stephen concluded around 9:00, we had announcements and the raffle which Bruce Wurst won. Many thanks to Stephen and Emilie for the fantastic presentation and to everyone who provided snacks and/or donated to the snack fund. We had 27 in attendance plus the two Guest Speakers.

Looking forward to the Wednesday, January 17th meeting in Room LS-204. Please note the day of the week and room change. We hope to see you there!!!



Stephen was the Dec 7th Guest Speaker and his topic was Meteorites. Photo by Don

President	Mike Marron	480 488 3031	President@pasaz.org
Vice President	Paul Facuna	602-246-1554	VicePresident@pasaz.org
Secretary	Pete Turner	480-510-4191	Secretary@pasaz.org
Past President	Sam Insana	602 315 4750	PastPresident@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	Brulipps@yahoo.com
Member at Large/Equipment Manager	Bruce Wurst	602-971-3555	Jennifer.Weitz@paradisevalley.edu
Webmaster	Chris Johnson		Webmaster@pasaz.org
Phoenix Astronomical Society	3039 W Peoria Ave #102-188, Phoenix AZ 85029		

Upcoming January Events

By Terri Finch, Event Manager

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

Jan 7: Free Telescope Workshop at Bookmans, 19th Ave and Northern in Phoenix - 3:30pm to 5:30pm. RSVP is required with Terri - events@pasaz.org. When you RSVP, email the make and model number of the telescope you need assistance with. 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=2411&day=2018-17&c=1>

Jan 11: School Star Party (Private) -

PAStimes Star Tour Members Only.

Jan 13: Tonto National Monument Public Star Party 6pm to 9pm.

Jan 17 Wednesday: PAS Meeting at PVCC main campus in room LS-204. Please note the room and day of the week change! Come enjoy a presentation by Mike Marron. Bring a snack to share. Bottled water provided by Bruce Wurst. Everyone welcome. Doors open 7pm. Meeting begins 7:30pm. Here's the link for more details about this event: <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2436&day=2018-17&c=1>

There is a "Meet the Guest Speaker" dinner prior to this meeting; RSVP must be sent by the day before to Event@pasaz.org or signup done on this calendar link: <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2497&day=2018-17&c=1>

Jan 18: School Star Party (Private) - PAStimes Star Tour Members Only.

Jan 19: School Star Party (Private) -

PAStimes Star Tour Members Only.

Jan 25: Free Telescope Workshop at PVCC main campus, 32nd Street and Union Hills Rd - 7pm to 9:45pm. RSVP is required with Terri Events@pasaz.org. Seating is limited. When you RSVP, please tell us your first name and the make and model number of your telescope. Bring your telescope and accessories to this event. We meet in both G-147 and by the telescope dome on campus. We have no telescopes for sale at this event. This event is weather permitting. More details: <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2408&day=2018-125&c=1>

Jan 27: PAS Social (Private) - Party for PAS Members. More details are in the Forum Thread for this event. RSVP your attendance at this link: <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2550&day=2018-1-27> Then follow link in this calendar listing to the Forum Thread for more details about this year's party.

Sweet 16 Star Party Sept 29

By Mark Johnston

I provided a scope for a Sweet 16 birthday party in Scottsdale. The birthday girl, Rebecca has an interest in astronomy and invited 10 of her friends to a party at her home with an astronomy theme. There was a cake with 'planets' in it, astronomy-themed paper plates and napkins and decorations, a 'star' piñata to smash and more.

They enjoyed seeing the Moon, Saturn,

the Owl Cluster, Mizar/Alcore, Alberio, Epsilon Lyra, T Lyra, Mu Cephei, Neptune and Uranus. Despite the Moon, we also saw M31, M57, and M13. I spent some time with the laser showing the constellations and talking about the distance to various objects, some of the mythology and some of the physics. They enjoyed the event and we wrapped up around 9:30.



Mark, his telescope plus 10 teens enjoyed a viewing party on Sept 29. Photo provided by Mark Johnston.

PVCC Science Update

By Jenny Weitz

I have had many informal conversations over the past couple of weeks and just wanted to update everyone at once on our wonderful progress. As our Aquila Hall Observatory is now ready for prime time, I will be adding an 8-week 3-Credit AST294 Special Projects class (Astronomy Research Seminar) to the second half of the Spring 2018 schedule for students who wish to conduct and publish original research. In the first half of Spring 2018 we will identify strong STEAM students that want a hands on experience and an opportunity to publish, encouraging them to enroll in the course.

In the AST294 Special Projects (Astronomy Research Seminar) students will form research groups to observe a binary star system and write up their observation for publication in the Journal of Double Star Observations. The text for this course

will be STAR: Small Telescope Astronomical Research Handbook, which was designed by the non-profit InStAR organization and features research guides as well as examples of published student research. (And an affordable price tag of \$40)

This seminar will build on existing events on our campus in the following ways:

At our campus event Mathposium on Nov 27th, 2017 at 4:20PM in KSC1000 (Today) I will be presenting the math behind double star observations and pitch the class to math students to get the momentum going.

At our Mancini Science Symposium in May students from the AST294 class will present their original research.

A two week STEAM Summer Camp will feature a "Telescopes and Conducting Research" theme aimed at middle school

and high school students from backgrounds underrepresented in science.

If the Spring run of AST294 proves successful, AST 294 will potentially be offered in Summer II as a 5-week course targeted to high school and university students looking for research experience. Likewise it may be offered in the second half of Fall 2018 as an 8-week course.

So that's the plan for now. I owe a million thank-you's to the people (too many to enumerate here) that have helped this project get this far: Thank you, thank you, thank you!

There is still a lot of work ahead so I better get back to work... :) Prof Jenny Weitz, Director & Astronomy Faculty: Creating an environment where learning is possible at Paradise Valley Community College Honors Program <https://www.paradisevalley.edu/honors>

Has Your PAS Membership Expired

By Terri, Event Manager

Happy New Year to everyone! I know, the last thing you want to think about is if your membership in PAS that may be about to expire. If you were a PAS member for 2017 and have set up an account on our website, use this link to see if your membership for 2018 is paid for or due: <http://www.pasaz.org/forums/downloads.php?do=file&id=48> The December 31st deadline has passed but PAS really appreciates your membership. You can use the following link to download the most current

PAS Membership form and get your 2018 membership current so you can stay connected with the many facets of PAS including your private access on the PASaz.org site. Here's the link: <http://www.pasaz.org/forums/downloads.php?do=file&id=129>. Send in your dues today! 2017 members who don't renew by Jan 31st will be removed from the roster and all access. There are many "Members Only" events coming up in 2018 where we hope to see you!

For Sale:

- 3 Scopes for Sale with Accessories: 1) **10 inch Dobsonian** 2) **Meade ETX-LS8** with hard case and built in dolly 3) **Celestron NexStar 5** with high quality hard case. Additional items: empty small hard case, never opened cover, two hard cases with lenses. I have small boxes for all lenses. Spreader-lens holder. Also have two cotton cloth scope covers, not shown. The actual retail prices are to the left of the items, in the photos of the lists, and the half price selling price is on the right. I have all the original sales slips, software and user manuals. I check email every day. I want to sell my three telescopes and a selection of books. I am asking 1/2 of the purchase price. Equipment is like new. Here's the link to the lists and photos: <https://www.dropbox.com/sh/o8ri3j4ba4xws0t/AADvvlqlb9jK-0sfT7pc6sska?dl=0>. It's a lot of equipment for sale, something for everyone. Contact Mary to purchase these items marylj3@gmail.com. Phone is 602 866-8693.. Land line, please leave message. Email is much better, as I check it daily. The location to see this equipment will be near PVCC Main Campus.

- **Meade 12" LX200 F/10** telescope with Astro Pier stand and numerous eyepieces and filters: \$1200 or best offer. Also includes telescope cover, Meade Pictor Autoguider. Telescope is in excellent condition, with original Meade shipping box and manual. Seller lives in Sun City West, AZ. Contact Cindy at 920-737- 7018.

- **Meade LX 200 10-inch** Goto telescope with tripod and many extras. The telescope comes with a three wheel dolly for for easy transportation over a smooth surface. Telescope is in excellent condition, about 15 years old. The following extras are sold with the telescope: DC Power adapter for car, dew cap and moon filter, 32 mm 2" super-wide eyepiece, TeleVue 12 mm Nagler Type 2, 26 mm Plossl, 4.8 mm Nagler, 2 X Barlow Amplifier, f 6.3 focal reducer, 2- 90 degree eyepiece diagonals 1 1/4" and 2", 45 degree eyepiece diagonal 1 1/4", Tel Extender with Canon fitting. Asking price \$1750. Telescope can be seen in North Peoria above Happy Valley Rd. Contact Michael at smrumbin@aol.com.



Mike Marron and Ron Walker practicing a dance step before the October 19, 2017 BMC star party. Photo by Sam Insana.

Black Mountain Campus Nov 9

By Terri, Event Manager

We had a large number of RSVP's for this event which had clear skies but slightly chilly temperatures. Attending from PAS with telescopes were: Don Boyd (8" Newtonian), Pete Turner (12" Dob), Eric Steinberg (22" Dob), Sam and Frank Insana (16" Dob), Rick Cunningham (8"), Ray Adams (10") and Mike Cawley.

Mike Marron brought his meteorites, while Paul Facuna, Ron Walker and Rich-

ard Pipkin assisted in walking vehicles down to the observing deck. The 6 pm to 7 pm indoor portion featuring various science activities (and pizza) actually lasted until about 7:45, after which Mike, Terri, William and Scott moved outdoors to the top of the observing deck path with the PAS and meteorite tables. Objects shown included the last glimpse of Saturn for the year! I estimate we had about 700 people from the

public attend this event overall. The event concluded about 9:45pm.

Many thanks to Loretta Mondragon at PVCC BMC for having PAS at this event. Thanks also to Courtney who set up the activities indoors with me. And thanks to PVCC for the pizza. Looking forward to the next BMC Star Party on February 15, 2018. See you there!

Fall Binocular Class in Carefree October 21st

By Richard Pipkin

I got to the event at about 6:45, after driving back from a visit to my grandson in San Diego. I took my tripod-mounted 10x50 Nikon bino's. Unfortunately, my tripod is too short for comfortably viewing anything much above 45 degrees, but I did manage to get a look at a beautiful moon early on, a magnificent view of the Double

Cluster to the northeast, and a few other deep sky objects later in the evening.

Many thanks to Howard Moneta, who invited us to see several objects through his bino's mounted on a very sturdy 80-inch-tall tripod. Also, thanks to Eric Steinberg for his comprehensive "star tour" of the

heavens, and, of course, to Mike Marron for his generous contribution of his "dark site" for the evening.

Terri, Event Manager, adds: (absent from event) Also attending this event was Paul Facuna, Charles Beaudet, Don Boyd and Eric Steinberg.

PVCC Telescope Workshop Oct 26

By Terri, Event Manager

Attending this event from PAS were Rodney Fong, William and Terri Finch, Sam Insana and Alex Vrenios. We had four RSVP's, of whom two attended. Susan Mularkey who joined PAS at the meeting, brought a scope to donate and wanted guidance on purchasing a new one. Bob Cassidy (who also joined) brought his new Celestron Evolution 8" which features lots of

automation and so-called HD optics which have actually received excellent reviews. The PAS telescope teachers took turns assisting Bob with his scope.

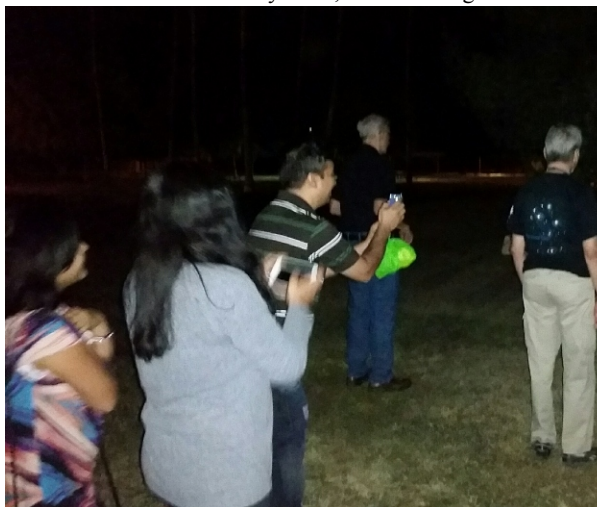
During the evening, Liam, who is a high school student who assists Jenny Weitz (also in attendance) at various PVCC events, was there working with the new

Star Tracker. Around 7:30 the group of us went out to the observing deck looking for the HST and an Iridium flare, both of which eluded us. Nevertheless, this was a very successful event. It was a pleasure to meet Bob and Susan. Thanks so much to the telescope team for assisting. Looking forward to the next telescope workshop. See you there!

Int'l Observe the Moon Night Oct 28

By Terri, Event Manager

Rick Cunningham, Sam Insana and Don Boyd all brought 8" scopes to the annual event at Roadrunner Park. William and Terri Finch attended with the PAS Table and Paul Facuna also attended, helping efficiently with setup and take down. Finally, Alex Vrenios came with his Galileo Scope. The temperature was pleasant throughout the night. We estimate that we saw about 400 people, while elsewhere in the park, a party with loud music kept us entertained. The event was from 7:30 to 9:30pm. Looking forward to the next Roadrunner Park event.



Guests taking photos of M45 open cluster on Paul's shirt at this event. Photo by Sam Insana.



This photo is taken by Alex Vrenios as a child looks through Alex's scope.

PVCC Non Profit Community Breakfast Nov 9

By Sam Insana, Past President

This event - the first one - was hosted by PVCC for a number of non-profit organizations that partner with PVCC to do various programs. For example, PAS partners with PVCC to do star parties and have public meetings with speakers while PVCC provides observation decks, lecture rooms and A/V equipment. Other non-profit organizations included job referral agencies, seekers of low cost financial aid, low cost housing and dozens more.

PAS was represented by Sam Insana, Terri Finch and Ed and Bette Wurst. Each organization had a representative speak about what they do, so I spoke about PAS, having been a member for 32 years and President for 2 years. In addition to a description of what we do, I also announced the star party happening that night (Nov 9) at Black Mountain Campus.

Each organization also left material on

a table so everyone attending could learn more about them. Near the end of the meeting, elected representatives from the City Council and State Legislature gave brief remarks how they could try to help these non profits and then fielded questions from the attendees.

Thanks to PVCC and Jenny Weitz for inviting PAS to this learning and networking opportunity.

Thunderbird HS Star Party Nov 16

By Terri, Event Manager

The weather was questionable for this event, but based on Sam Insana's early weather update, we decided we would go ahead and do the star party. We discussed with Elaine Campbell, our contact at Thunderbird HS, the fact that we might get clouded out around 8:00 and decided to move the event to an earlier time to accommodate the weather. In attendance from PAS were: William Finch as helper, Terri Finch with an 8" scope, Rick Cunningham with his 8" scope, Roger Anzini who had his 16" dob plus a new scope he had recently purchased and was getting "first light" and Bruce Wurst with his 12" scope. Mike Marron also came with his meteorites with Ofelia Waters assisting. The night was slightly cool when we arrived and many of us put on jackets by the end of the event.

Elaine had an electric jacket and she was the warmest of us all! We each took an object and mostly stayed on it, as the sky wasn't dark enough to find fainter objects. Bruce stayed on Andromeda Galaxy, Rick had E.T. Open Cluster, Roger and I took Saturn. I later switched to Alberio (very popular) and Roger moved to the Pleiades the rest of the night, as Saturn dropped behind a building. The weather was cooperative up until about 7:15 when clouds started taking over parts of the sky, but we were still able to observe until 8pm, as predicted. Since it became overcast at that point, we stayed set up until about 8:20 when Elaine told us to pack up. Of course as we were packing up, about 8:50pm the sky cleared up totally. Roger, William, Bruce and I left campus at 9:30pm.

Many thanks to Elaine for having us - The attendees weren't as numerous as we were hoping for because the school jazz band was playing and food was offered at a different location. I estimate we saw around 80 students with their parents, including seven or so students who stuck around the whole time talking to each of the telescope team members. Elaine's husband Kevin thanked us at the end of the event saying that he was very impressed with the amount of knowledge we had to share about the objects and how it wasn't just a 'look here' and leave situation at the telescopes. He appreciated that we spent time with each group and provided information that actually tied in with classroom material they were learning - it's great to be able to do that... It was a highly enjoyable event!!!

Bookmans Telescope Workshop Nov 19

By Terri, Event Manager

This was a busy class with lots of attendees. Keith Thompson brought his Orion 6" tabletop scope and hooked up with Rick Cunningham who helped him with the collimation. Ramiro Cardenas came to find out what scope to purchase, as did Sheri and Bruce Berl and Vern and Mark West. They spent most of their time with Sam

Insana and Bruce Wurst. Michael came to talk scopes but didn't bring his with him. Finally, Mike Bonilla brought his 114mm Meade - we chatted with him for a long time. The class began with Terri introducing the telescope team after which Sam took the floor for about 20 minutes to go over Kevin Witts' handout describing the different types telescopes and how to select one for purchase. William then held a Q&A for about an hour with the attendees to help them figure out what wanted to do with the scope they had or wished to purchase.

Additional helpers were Ed and Bette Wurst, Rodney Fong,

Ted Blank, William and Terri Finch and Bruce's friend Jackie.

After the event, 14 people, both members and non members, met at Carlos O'Briens for dinner to celebrate Ed and Bette Wurst's 60th Wedding Anniversary. Many thanks to Daniel, our waiter, for the awesome service and cheesecakes.



At the Bookmans Telescope Workshop, Ted Blank explains telescopes to the group around him. In front of Ted in this photo is his telescope on display. Photo by Terri Finch.



Ted captures the whole group at this Free Telescope Workshop. It was a good turnout and we were maxed out on available seating. Photo taken by Ted Blank.

The Partial Solar Eclipse in Phoenix Aug 21

By Terri, Event Manager

William Finch and I got up this morning at 5:30am. PAS was scheduled to get to ASC at 8 am for setup and a 9 am start time, but we learned that ASC was actually starting setup at 5:30am. We informed the team for the day and headed out as quickly as we could, arriving at around 7:30.

We were joined shortly by Roger Anzini, Rick Cunningham and Don Boyd. We put up the two PAS Canopies, and before we even had time to set up the tables, we had a crowd of people asking questions, wanting information and solar viewing glasses, all 40 of which we gave out by 8:30 (thanks to those who donated in return).

First contact for the eclipse was at 9:13am, with maximum of 62% at 10:33am, ending around noon. Initially, we did have some clouds to deal with, but they kept things cool until dissipating around 11:00 when the temperature and humidity went up drastically, resulting in heat exhaustion for some of our people..

We took in 3 new members to PAS on this day. I would estimate 2000+ people attended the solar eclipse part of the activities. The Arizona Science Center also had a bunch of fun projects for the kids to do: Rocket making, Bracelet making, Eclipse box viewers, and a few other thing. Ch 3 News, Kjzz Radio, Ch 5 news and Ch 12 news were all part of this event as well. William got on the news and Roger was interviewed by KJZZ. We had a handout table with many handouts from the Night Sky Network and NASA Space Place plus stickers, tattoos, postcards, bookmarks and PAS materials. The table was empty by the time we packed up!

The telescope team included Roger Anzini with his 81mm finder scope with a solar filter, William Finch with his large binoculars and new solar filters/scissor tripod, Don Boyd with his 8" scope, Rick Cunningham with his 8" dob and Steve Palmer with his solar capable scope. Kevin Harcey and James Desantes also helped with a few different filters and ways to project the eclipse.



James DeSantes attended this event with a Solar Filter to hold up for the public to look through. Photo by Don.



Steve Palmer attended the event, provided drinks, snacks, extra canopy for shade and was a great help at this event.



Some friends of ours, Scott and his family, attended the event. It was great to have friends come to this event. Photo by Don.



There were so many people enjoying the eclipse. Photo by Don.



Jessica Parsons interviewed William who had his huge binoculars set up at this event with solar filters. Photo by Don.

South Mountain Star Party Nov 24

By Sam Insana

On November 24th, Don, Rick and Sam provided 8 inch telescopes for the South Mountain Environmental Education Center Star Party. The site was just inside the South Mountain Park, which is the largest city park in the United States. The event was from 6:30 to 8:30 pm and had about 100 members of the public attend.

The Environmental Education Center had spread the word to South Phoenix schools and other facilities to try to encourage people to check out this year-old non-profit facility. It has several buildings, nature exhibits, nature trails, books and a movie theater showing environmental programming. During the 2 hour star party, astronomy films were shown inside, while outside, we showed the Moon, Andromeda

Galaxy, the Ring Nebula, the Pleiades open cluster, the Owl Cluster, Albireo double star, Gamma Andromeda and the Perseus Double Cluster. We handed out dozens of PAS cards to many of the people who expressed interest in astronomy and future star parties. SAC and EVAL each also sent one member with a telescope to help out. The night was beautiful; PAS should do this event again.

Lisa Hermann writes: "Hi Terri - The guys manning the scopes last night were so wonderful! We had a nice crowd that learned so much from them, and we really benefited having them here! I think they enjoyed it, too!"



*South Mountain Star Party Sign.
Photo by Sam Insana.*

Geminids Meteor Shower in Carefree Dec 13

By Sam Insana

Eight PAS members attended the viewing of the Geminids meteor shower at Mike's place in Carefree on December 13th and 14th. Ron Walker, Paul Facuna, Mike Marron, Don Boyd, Pete Turner, Mark and Michelle Peterson, and Sam Insana enjoyed a really spectacular meteor shower. From 8:30 to 9:30 pm we were seeing on average about one meteor a minute. About 10 pm 4 people left and then Paul, Mike, Don and Sam went inside to watch the movie "Minions" while some clouds were taking over

outside. After the movie the clouds were gone and we again enjoyed kicking back in our zero-gravity chairs and we saw on average about 2 meteors a minute from 12:30 am until 1 am. Then something incredible happened. We saw 10 meteors in 1 minute, something none of us had ever experienced. I set up my DSLR camera on a tripod on wide angle 18 mm f-4, 1600 ISO for 30 seconds and took about 20 photos during the night. We were lucky enough to capture a meteor in three of them, including one

that shows a Geminid passing through the Orion constellation with cactus in the picture. My son Frank Insana reported incredibly high counts seen at the South Rim of the Grand Canyon. He and his friends and coworkers were in sleeping bags braving the 20 to 30 degree temperature at Moran Point. In Carefree we "braved" the 60 degrees when we started viewing and about 48 degrees when we packed up.



Sam Insana caught this awesome photo of a meteor as seen from Carefree at the PAS Meteor Shower Party of Dec 13, 2017.

January 15 2018

Sunrise: 07:32

Sunset: 17:43



Full: January 1 and January 31



Q3: January 8



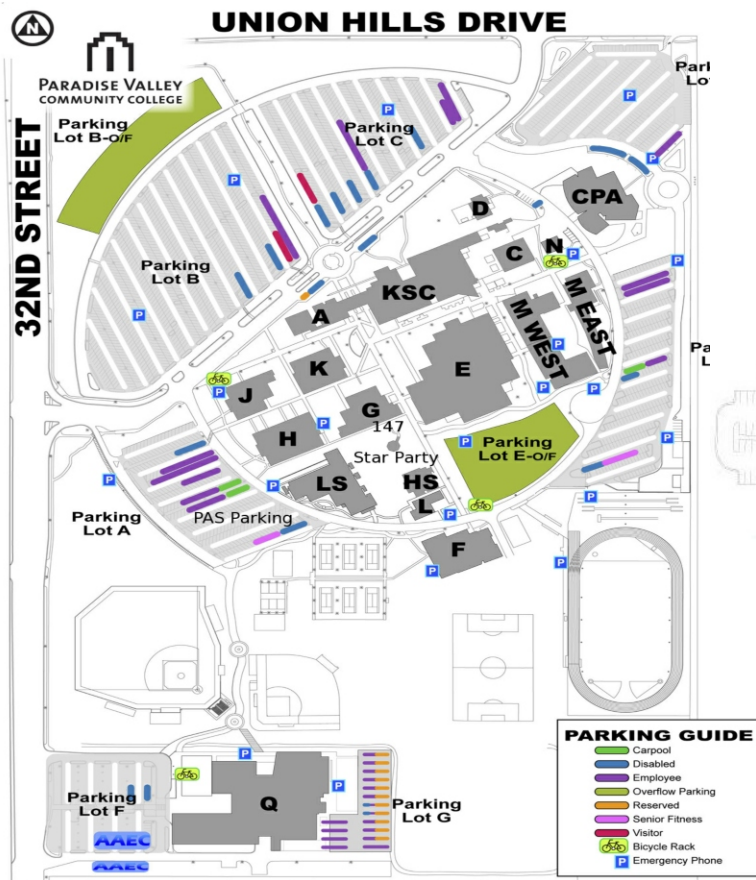
New: January 16



Q1: January 24

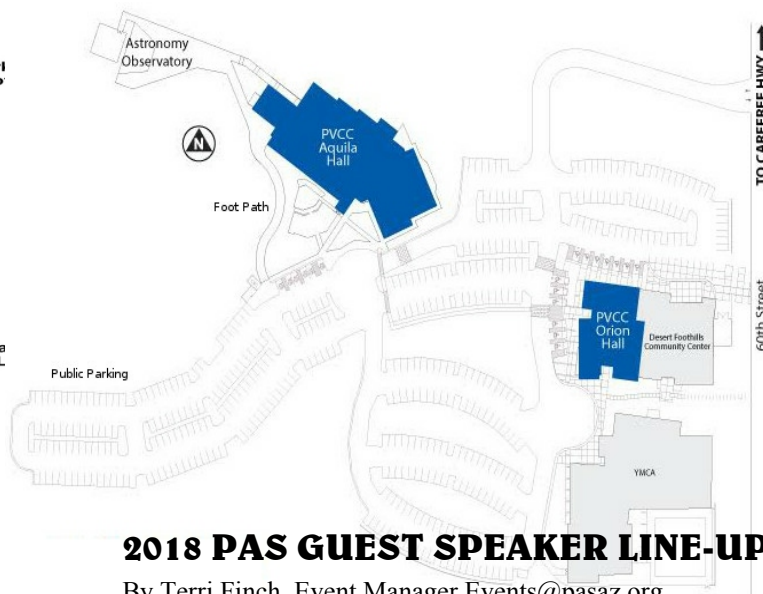
Map of PVCC Main Location

18401 N. 32nd Street | Phoenix, AZ 85032



Map of PVCC Black Mountain

34250 N. 60th Street | Scottsdale, AZ 85266



2018 PAS GUEST SPEAKER LINE-UP

By Terri Finch, Event Manager Events@pasaz.org

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

Feb 1: Emilie Dunham "All about Meteorites"

Mar 1: Andy Odell "Binary Stars"

Apr 5: TBA

May 10: Tom Polakis "CCD Photometry from Inside the Light Dome"

January 2018

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7 Telescope Workshop	8	9	10	11 School Star Party (Private)	12	13 Tonto Star Party
14	15	16	17 PAS Meeting	18 School Star Party (Private)	19 School Star Party (Private)	20
21	22	23	24	25 Telescope Workshop	26	27 PAS Social (Private)
28	29	30	31			