# PAS times

Phoenix Astronomical Society
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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948


# New Horizons Explores the Kuiper Belt

By Bruce Kosaveach, Lowell Observatory

Come help welcome Dr. Will Grundy at the April 4 PAS meeting. You are invited to attend an outstanding presentation by Dr. Grundy, astronomer at Lowell Observatory, at Paradise Valley Community College main campus on **April 4th in room KSC-1000A** (see flier for this event on page 6 ).

Dr. Grundy is the Lead Investigator for Surface Composition of NASA's New Horizons flyby of Ultima Thule and will be presenting "New Horizons Explores the Kuiper Belt". The latest received images will be shown plus up to date research from the NASA team.

From ASU's page: Dr. Will Grundy's research involves icy outer Solar System planets, satellites, and Kuiper belt objects, using a broad variety of observational, theoretical, laboratory, and space-based techniques. He is involved in projects to discover Kuiper belt binaries and to determine their mutual orbits and masses, using Hubble Space Telescope, as well as laser guide star adaptive optics techniques at Keck and Gemini. His inventory of Kuiper belt binaries can be found at: http://www2.lowell.edu/~grundy/tnbs/. Grundy does spectroscopic, thermal, and imaging observations of outer Solar System bodies using numerous large ground- and space-based telescopes including Hubble, Spitzer, Herschel, Keck, Gemini, VLT, DCT, IRTF, and MMT. Targets of these observations include icy satellites and Kuiper belt objects. Some of the larger bodies like Pluto, Triton, Eris, and Makemake have volatile surface ices that seasonally interact with their thin atmospheres, leading to a variety of complex and interesting phenomena. To support his observational work, Grundy also studies cryogenic ices and ice mixtures in the laboratory, most recently in a new facility located in the Physics and Astronomy Department at Northern Arizona University. Optical constants from some of these laboratory studies are available here. He is also a co-investigator on NASA's New Horizons mission that encountered the Pluto system in 2015. He heads the mission's surface composition science theme team. Grundy is an editor for Icarus, the leading scientific journal for solar system studies, and also serves on a variety of national scientific advisory bodies, most recently NASA's Small Bodies Assessment Group. This data was borrowed from the ASU page about Dr. Grundy and there is more info to be found on this page if you wish to learn more about our fantastic guest speaker. Please visit this site: https://lowell.edu/staff-member/will-grundy/ .

*More info on pages 6 & 7.*

*Dr. Will Grundy is the Guest Speaker of the April PAS Meeting. Photo borrowed from the ASU webpage about Dr. Grundy. Please see article for link to that page.*

# Meeting Review March 6

By Terri, Event Manager

The PAS Meeting of Wednesday March 6 was a very nice meeting. It started with a meet and greet dinner prior to the meeting, attended by three PAS members in addition to the guest speaker Jim Renn, and his wife.

The meeting opened with a few brief announcements by President Mike at 7:30pm. About 7:40pm, Jim took the floor and told us all about the history of the Vatican Observatory and showed us some great photos of the telescopes at that location.

At the conclusion of Jim's very interesting and informative presentation, there was a short ten minute break while he departed. A few dedicated members stayed to hear about upcoming events and to participate in voting for two positions within PAS.

Eric Steinberg attended the meeting and was voted in as Treasurer.

*(Continued on page 3)*

*Jim Renn at the March PAS Meeting providing a very enlightening presentation. Photo by Don.*

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# PAS Upcoming Events for April 2019

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

**Apr 4**: PAS Meeting at PVCC Main Campus in **KSC 1000A** at 7pm. More details: http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2741&day=2019-4-4&c=1 Please see exciting flier on page 6 &more info no page 7.

**Apr 6**: Public Star Party at South Mountain. Please see flier on page 12. Event is from 5:30pm to 9pm.

**Apr 11**: FREE Telescope Workshop at PVCC Main Campus 7pm to 9:30pm in G-147. Bring your telescope and accessories. This is an indoor/outdoor event (weather permitting) and RSVP is required with Terri. No public RSVP's could cancel this event. More details are here: http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2733&day=2019-4-11&c=1

**Apr 14**: Free Telescope Workshop at Bookmans from 3:30pm to 5:30pm. Bookmans is at 19th Ave & Northern in Phoenix. RSVP required with Terri. More details at this link: http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2737&day=2019-4-14&c=1

**Apr 18**: Awards Ceremony & Pizza Party for PAS Members (Private) 7pm to 10pm. More details are in the Private Calendar here: http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2763&day=2019-4-18 RSVP is Required.

**Apr 19 + 20**: Star Party at the Double Tree at Metro Center Mall for Leprecon Convention. PAS will be there both nights with telescopes set up 7:30pm to 9:30pm. http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2877&day=2019-4-19&c=1

**Apr 25**: Huge Public Star Party at Black Mountain Campus of PVCC from 7pm to 9:30pm. More details: http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2719&day=2019-4-25&c=1

**Apr 27**: Tonto National Monument Public Star Party 7pm to 9pm. See flier on page 7 for more details.

At the time of completion of this issue of the newsletter, several more events were in the planning stages and could not be listed as "Scheduled" until they are definitely happening. Please see our online calendar for the events that didn't make it into this list, the list is at the top of this article.

# PAS Awards Ceremony April 18, 2019

By Terri, Event Manager

For the last several years, PAS has held an Awards Ceremony to thank those PAS members who go above and beyond by helping to provide Public Outreach and share the night sky with everyone. This year our Pizza Party will be on April 18. You must RSVP here: http://www.pasaz.org/forums/calendar.php?do=getinfo&e=2763&day=2019-4-18&c=2 with the first name of everyone in your party, plus their pizza preference, if they have one. I will be ordering the pizza for this party and I want to be sure there is plenty for everyone attending.

It would be awesome to have several members also bring dessert, and bottled water will be provided by Bruce Wurst. If you want something other than bottled water, please BYO, but be sure it is in a container with a closable lid so we do not have any spillage in the classroom. To know what room we are in, please use the above link which takes you to the Private Calendar where by only current PAS members can access the party info.

The room opens at 7pm. I hope to have the pizza there and hot right at 7pm. Please do not be late if you want hot pizza. Then about 7:30pm we will begin the Awards Ceremony. Some of you will still be eating, and that's fine. About 9pm we should be done (if not before) with the Awards part of the evening and then we will take a brief bathroom break, let those who are not interested in the next portion of the night - leave… and then we are having a PAS Meeting of the Minds - this is the business portion of PAS. This meeting will last about an hour. We have to depart from the room by 10pm. This is a Members Only event. A PAS member is anyone living in the same household as family or extended family, under one roof, to the listed PAS member on the PAS Roster. We hope to see you there, and you must RSVP your attendance to help me accurately order enough pizza for everyone.

# Mar 6 Meeting

*(Continued from page 1)*

The other position that needed to be filled was Meeting Host. Stu Brackney is the newly appointed Meeting Host, and he will replace or assist Rodney Fong, who hasn't been present at meetings for over three months. If Rodney comes to a meeting, he may take his position for the night.

Thank you Eric and Stu for accepting the positions you now hold.

Many thanks to Rick Cunningham who performed the duties of both Treasurer and Secretary for several months.

I thank Sam Insana for helping me by being the Meeting Host for the February meeting, and Stu Brackney for being Meeting Host at the March meeting.

Thank you to all who brought snacks to this meeting. The bottled water was provided by Bruce Wurst, in his absence.

Looking forward to the next meeting which is on Thursday, April 4. Please note the change in room to **KSC-1000A**. See you there!

# LepreCon Star Party April 19 & 20

By Terri, Event Manager

What is LepreCon? This site says it all… https://www.leprecon.org/

Taken from this website: "LepreCon is a general science fiction/fantasy convention that was first held in 1975. Since LepreCon 7, it has had a special focus on art. Our history is long and full of memorable guests and events. We plan to live up to that legacy with a strong LepreCon 45 in 2019."

PAS was at LepreCon last year and provided a PAS Table with handouts, information about the club, and upcoming events lists, to attendees of the LepreCon event. It's a convention and so PAS was there all day from 10am to sometimes beyond 10pm. We set up a PAS table during the day, and then moved the table outdoors to enjoy a star party in which Don Boyd, Rick Cunningham and Paul Facuna assisted William and Terri Finch in sharing the night sky with everyone who wanted to see through our telescopes. PAS is doing this event again this year at the Double Tree at Metro Center Mall. Would love to see you there. The Convention has an admission. It's a fun convention. See the above link for more details.

# Moon Valley High School S.T.E.A.M. February 21

By Sam Insana

The Moon Valley High School S.T.E.A.M. event took place Thursday night, February 21st. It was a very cold, cloudy, rainy night, so PAS did not bring the telescopes. Meteorite Mike wanted to be there but the washes were flowing where he lives and so he was trapped at home. Therefore, I brought 20 meteorites and 3 tektites to show the approximately 100 students, parents, and siblings who attended. Over a dozen presentations set up in the cafeteria and it was a fun night. A senior student was assigned to help out at my table, stamp the students' cards showing what presentations they attended, and also keep an eye on the meteorites to make sure none wandered off during the night. Kim Thomas, the teacher who asked PAS to attend, was very grateful for having us out there during such miserable weather.

# What's Up For April?

By Don K. Boyd, PAStimes Editor

| Name | Date | Rise | Set |
|---|---|---|---|
| Mercury | 04-15-19 | 04:57 | 16:45 |
| Venus | 04-15-19 | 04:42 | 16:26 |
| **Mars** | **04.-15-19** | **08:20** | **22:34** |
| Jupiter | 04-15-19 | 23:28 | 09:28 |
| Saturn | 04-15-19 | 01:20 | 11:28 |
| **Uranus** | **04-15-19** | **06:20** | **19:27** |
| Neptune | 04-15-19 | 04:23 | 15:56 |
| Pluto | 04-15-19 | 01:34 | 11:36 |

All Times Arizona Time
Bold means the object is "visible" in the evening

# April 15, 2019

**Sunrise: 02:58**
**Sunset: 18:59**

**New: April 6**

**Q1: April 12**

**Full: April 19**

**Q3: April 26**

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

# Desert Botanical Garden Luminaria December 2018

By Various Attendees of this event - Review 3 of 6

Part 1 of this event review can be found in the February 2019 Newsletter issue on pages 2 & 3, and Part 2 is in the March 2019 issue on page 4 .

Las Noches de las Luminarias of December 2018 at the Desert Botanical Garden (DBG) had the PAS telescope team of four Telescopes and one presenter each clear night, with variations on cloudy nights that consisted of these wonderful Lumi Team members: Pete Turner, Mark Johnston, Rick Cunningham, Roger Anzini, Ted Blank, Mike Marron, Bruce Wurst, Don Boyd, Sam Insana, Storm Moon, William Finch, and Terri Finch, with additional help from Vera Stiesmeyer, Ofelia Waters and Jake Von Ruhr. This event is exhausting but rewarding and requires additional helpers for so many nights in a row.

**Dec 5**, Wednesday, began with two of the Telescope Team members dealing with dead batteries in their vehicles. Storm and I barely made it to DBG in my vehicle, and Ted had a dead battery as well.

The night, however, progressed with cloud hopping. What is Cloud Hopping? That's when there are clouds in the sky, and you, as the astronomer, find an object to share with the public and before you know it, a cloud has covered your object. There are two options for you at that point, either wait for the cloud to move out of the way, or find another object to show. But, with all the clouds in the sky on this night, it was easier to stay on the object, let the scope keep it in view, and then as a cloud moved out of the way, say to the patrons "The cloud has moved off of Orion Nebula. Quick, come take a look before the clouds take it away again." That gets the patrons moving quickly to come see the object your telescope is aimed at. This went on for the whole night, but somehow, in spite of the clouds that kept getting in the way, Storm was able to show E.T. Open Cluster. I never saw Saturn (dark clouds in that direction), or Albireo (white thick clouds in that direction), but I was able to catch the Orion Nebula for about 1.5 hours between the clouds.

The evening started very cold and damp, and so I asked for the provided heater to be turned on. Once it was on, Storm and I weren't as cold, and at that time, the sky overhead was clear. But, to the West, dark clouds covered Saturn. Then, the whole sky became clouded over, with thick white clouds we could not see through, and that's when the temperature became more pleasant. From that point on, which was about 7:15pm, until we packed up at 9:30pm, Storm and I were comfortable with the temperature.

Ted was able to show Saturn for a few minutes and an entertaining thing happened. As the patrons came around the corner from Ted and Roger's scopes to find Storm and I with our telescopes, I asked them what they had seen through the other two scopes. One gentleman shared that he saw Saturn and Jupiter.

About half way through the event, I took my break and on the way back to my scope I stopped to visit Ted to see how he was doing and told him about this gentleman who saw Jupiter. Ted replied, "That guy must have had really good vision to see Jupiter through the Earth!" We both got a good laugh out of

*On Dec 16, the sunset was so beautiful. Terri Finch captured Bruce setting up his telescope at the Water Tower Overlook location.*

*A fantastic sunset is seen as a wonderful intro to a fun time at the Desert Botanical Gardens Luminaria event of 2018. Bruce Wurst is set up at the Water Tower Overlook with his 12" SCT. Photo by Terri.*

Mike Marron is seen in his natural habitat, set up at the gate location just outside of the Wildflower Garden at DBG with his meteorites. The patrons gather around Mike's table and enjoy what Mike is sharing with them…stories, facts, and more info about meteorites.
Photo taken by William Finch on Dec 3, 2018.

that.

**Roger** writes: Many guests...perhaps 30% knew about the InSight Mars landing this past Monday, December 3rd. However, they were almost all unaware that InSight is a stationary platform and that it will never move again until we go up there and move it.

**Terri** writes: Dec 6 was rained out. All of the Lumi event was cancelled - this included the bands and other performers as well.

**Friday, Dec 7** was wet from the rain the night before, and it continued to rain in the morning hours. This night was interesting. The threatening dark clouds were upon us before the beginning of the event, but after about an hour, the skies were totally clear. This was great, as I was able to show Saturn and Storm grabbed E.T. Then, from out of nowhere, another batch of clouds came up and took away the view of Albireo, but I still had it in my telescope, which impressed many people who couldn't see it naked eye in the night sky with the clouds covering it, but were able to see it in the telescope. I moved to Orion Nebula the moment I could grab it and that was about 8:30pm when the air also became very wet with dew. It was amazing that anything could be seen through this thick wet dew, but Storm maintained E.T. The evening wrapped up with Ted and his smaller telescope with a 'both objects in the same eyepiece' view of Mars and Neptune. This was of interest to the patrons. By the time we departed, all our equipment and jackets were drenched with dew.

**Saturday Dec 8**, Skies were clear this evening. Totally clear, and cold, even though the temperature was not supposed to be as cold as the night before. But, the night went well. We had a Sold Out Event which means 2,400 patrons. It was busy, went by fast, and we had a great time.

I was able to grab the very slim sliver of the moon in the night sky in my telescope while William captured a beautiful photo of it with his cell phone camera. I showed it for a while and was seeing a lot of bubbling in the atmosphere, then showed Saturn with the same results. I finally figured out our heater was causing the disturbance of the night sky. I didn't figure this out until Saturn had set, and I moved over to Albireo and the eyepiece that previously had the blurry view was now clear as a bell. For the rest of the evening I showed Orion Nebula. We all learn something new at the events and my new thing was not to point the heater in such a way that it blurs the image of what I am showing through my telescope.

**Don** writes: I was able to show both Mars and Neptune in the same field of view tonight Dec 8th. So I stayed on that all night. It has been possible only twice (for me), in 18 years to show two planets in an eyepiece at the same time. The other time was about 10 years ago when Jupiter and Saturn were that close together in the night sky.

**Terri** writes: Dec 9 Sunday was really nice. Not too cold, and super clear skies all night long. I started out showing the moon, then I showed Saturn. Saturn set, so i decided to show Albireo, but my scope wasn't aligned yet, so I aligned it and then the moon was still up, so after showing Albireo for a bit, I went back to the moon, which thrilled everyone. When the moon left the sky, I went back to Albireo for a little while as it got lost in one of the nearby trees. Then, I decided to hunt down Orion through a bush and got it, but it wasn't the greatest of views for about 20 minutes. Once it cleared the bush by the water fountain, the view was super wonderful.

During this night, Storm would announce "Would you like to see E.T.?" to the patrons who were walking by. And I would immediately say, right after her "I have the Orion Nebula, come see through my scope." And without fail, the patrons would walk up to the scope and say "What do you have in your scope?"

**Dec 10 Monday** was cloudy. PAS Provided Mike and Sam as Presenters and Roger was their runner. No telescopes attended on this night.

**Dec 11 Tuesday** wasn't as cloudy as Monday, so PAS provided two presenters and two telescopes. The weather prediction said that clouds would be present all night, but not super thick clouds, so it was thought that the moon and Mars could be seen through the clouds. Around 8pm, the sky cleared 100% and it was a fantastic observing night. What I am learning from doing these events is that the weather during December can be very unpredictable, and it is a challenge to know how many telescopes and presenters to send to the event each night. Next year, we are going to have four telescopes and one presenter or three scopes and two presenters every night, unless it is actually raining. Even if the telescope team has nothing to show due to clouds, they can share how their telescopes work and talk to the patrons about astronomy.

But wait, there's more. This review is to be continued in future newsletter issues - October, November and December of 2019.

# Sonoran Trails MS Star Party February 13

By Roger Anzini

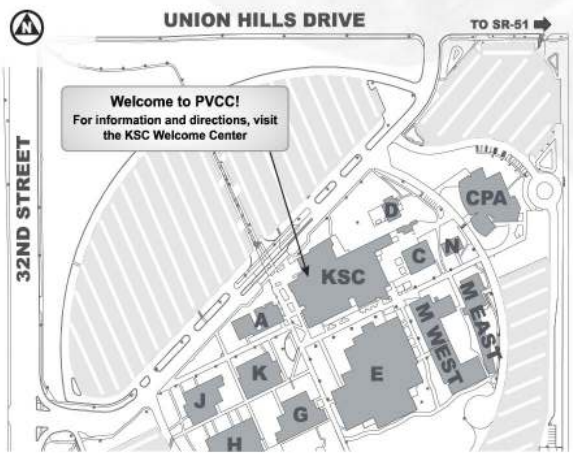
Wednesday February 13th PAS sent Pete Turner and Roger Anzini with telescopes and Mike Marron with a table of cool meteorites out to Sonoran Trails Middle School. Our plan was to give some 400 students a wonderful look at the Orion Nebula, the Beehive Cluster, star clusters of Cassiopeia and a 62% Moon. However, Mother Nature had her own plans that night, she sent us a custom package of her very best mid-level clouds reaching in every direction with rain in the forecast.

Under conditions like this we usually just stay home with our telescopes. But, a fantastic dynamo of a science teacher was calling the shots at this event, her name is Ashley Fauss. Ashley simply said bring those telescopes into the gym and show the kids how they work. So, the telescopes were set up near the crowd around Mike's meteorite table. Pete displayed his new 127mm refractor and I setup my 16 inch DOB. You need to be a little bit creative trying to describe what the kids would have seen in those scopes but with Ashley's encouragement Pete and I dove headlong into the teaching part of the thing, using photos on Pete's Apple iPad and enjoying it almost as much as showing the real objects in the sky.

We hope the kids enjoyed our three-pronged indoor presentation as much as all the other wonderful science related displays encircling the gymnasium floor that evening. Students and parents seemed quite pleased with the evening and Ashley was all smiles as well. Many thanks to a great bunch of kids at Sonoran Trails Middle School; they are blessed to have Ashley Fauss at the science helm.


# NEW HORIZONS EXPLORES THE KUIPER BELT

An AstroChat with Dr. Will Grundy




## APRIL 4, 2019 | 7PM

Dr. Will Grundy is the Lead Investigator for Surface Composition of NASA's New Horizons flyby of Ultima Thule. He will be presenting "New Horizons Explores the Kuiper Belt" showing the latest images and discussing what has been found so far.

**Paradise Valley Community College | Room KSC-1000**
18401 N 32nd St
Phoenix, AZ 85032

**RSVP by April 1 to Bruce Kosaveach**
bkosaveach@lowell.edu | 602.501.9876

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# Tonto National Monument "Park After Dark" April 27, 2019

Extracted from the "Park After Dark" Press Release


Roosevelt, AZ – Explore the wonders of the night with Tonto National Monument at the "Park After Dark" 2018-2019 Event Series. Night sky events will include star gazing, interpretive astronomy programs, telescope viewing with astronomers from the Phoenix Astronomical Society, and Junior Ranger Night Explorer activities. Night hike events will include a guided interpretive hike to the Lower Cliff Dwelling after dark.

Bring water and snacks, a flashlight or headlamp (preferably with a red light or red gel filter for better night sky observation), warm clothing, and closed-toed shoes. These events are free and open to the public. Join us at the Visitor Center parking lot.

**Saturday, April 27, 2019 – Black Holes and Beyond – 7:00-9:00 p.m.**

Discover some of the mystery behind black holes and the depths of the universe. Join astronomers from the Phoenix Astronomical Society and park rangers after the program for telescope viewing and constellation tours.

No camping is available at Tonto National Monument. The nearest camping is available at Windy Hill Campground in Tonto National Forest. For more information on camping visit http://www.fs.usda.gov/tonto/

For more information contact: (928)467-2241 and tont_information@nps.gov

# Dr. Grundy at Apr 4th PAS Meeting

By Dr. Will Grundy

Dr. Grundy provides this info about his upcoming presentation: In addition to about what new discoveries we made, and what the scientific implications are, I'll also talk about the engineering and planning that made it possible, and how the mission team worked behind-the-scenes to get from new data arriving at Earth to putting people in front of the world's press to tell a story.

I'm a co-investigator on the New Horizons team, and the leader of the Composition Science Theme team. I've been at Lowell since 1997, and did my PhD at University of Arizona in Tucson and undergrad degree at Yale.

The Science behind this discovery: this is the first close look at a planetesimal that hasn't been completely reshaped by subsequent impact cratering. So the shape of the object bears the imprint of how planetesimals form. What are planetesimals? They are the first large bodies that form in the protoplanetary nebula. Most of them eventually get merged together into much larger planets, but there are a few leftover reservoirs of planetesimals available to study. The asteroids are the easiest to get to, but they're pretty badly battered. The Kuiper belt has much better preserved planetesimals since it's so cold out there, and collisions are relatively rare

# Measuring the Movement of Water on Earth

By Teagan Wall

As far as we know, water is essential for every form of life. It's a simple molecule, and we know a lot about it. Water has two hydrogen atoms and one oxygen atom. It boils at 212° Fahrenheit (100° Celsius) and freezes at 32° Fahrenheit (0° Celsius). The Earth's surface is more than 70 percent covered in water.

On our planet, we find water at every stage: liquid, solid (ice), and gas (steam and vapor). Our bodies are mostly water. We use it to drink, bathe, clean, grow crops, make energy, and more. With everything it does, measuring where the water on Earth is, and how it moves, is no easy task.

The world's oceans, lakes, rivers and streams are water. However, there's also water frozen in the ice caps, glaciers, and icebergs. There's water held in the tiny spaces between rocks and soils deep underground. With so much water all over the planet—including some of it hidden where we can't see—NASA scientists have to get creative to study it all. One way that NASA will measure where all that water is and how it moves, is by launching a set of spacecraft this spring called GRACE-FO.

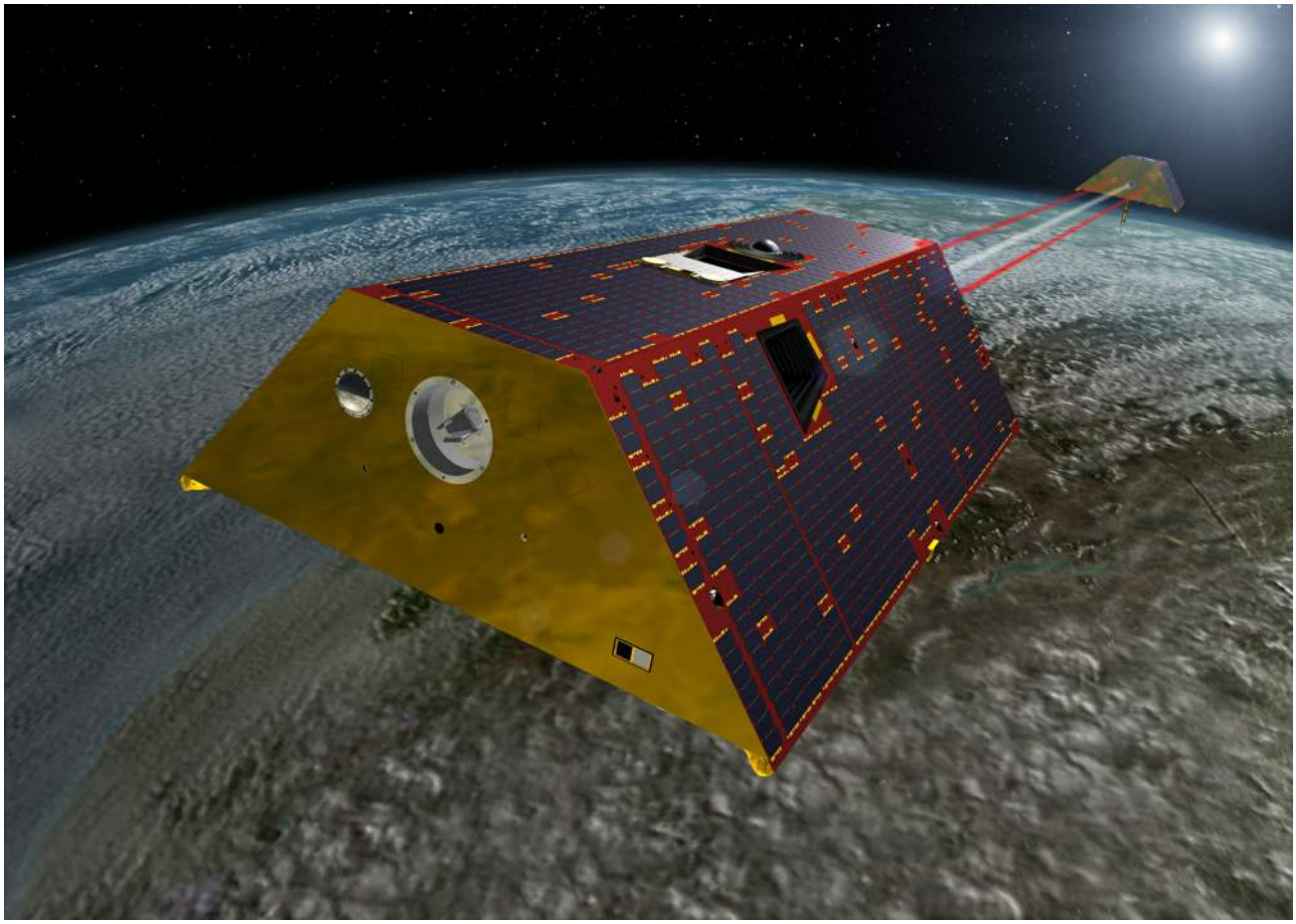
GRACE-FO stands for the "Gravity Recovery and Climate Experiment Follow-on." "Follow-on" means it's the second satellite mission like this—a follow-up to the original GRACE mission. GRACE-FO will use two satellites. One satellite will be about 137 miles (220 km) behind the other as they orbit the Earth. As the satellites move, the gravity of the Earth will pull on them.

Gravity isn't the same everywhere on Earth. Areas with more mass—like big mountains—have a stronger gravitational pull than areas with less mass. When the GRACE-FO satellites fly towards an area with stronger gravitational pull, the first satellite will be pulled a little faster. When the second GRACE-FO satellite reaches the stronger gravity area, it will be pulled faster, and catch up.

Scientists combine this distance between the two satellites with lots of other information to create a map of Earth's gravity field each month. The changes in that map will tell them how land and water move on our planet. For example, a melting glacier will have less water, and so less mass, as it melts. Less mass means less gravitational pull, so the GRACE-FO satellites will have less distance between them. That data can be used to help scientists figure out if the glacier is melting.

GRACE-FO will also be able to look at how Earth's overall weather changes from year to year. For example, the satellite can monitor certain regions to help us figure out how severe a drought is. These satellites will help us keep track of one of the most important things to all life on this planet: water.

You can learn more about our planet's most important molecule here: https://spaceplace.nasa.gov/water



*An artist's rendering of the twin GRACE-FO spacecraft in orbit around Earth. Credit: NASA*

# Mesquite HS Star Party of February 9

By Terri, Event Manager

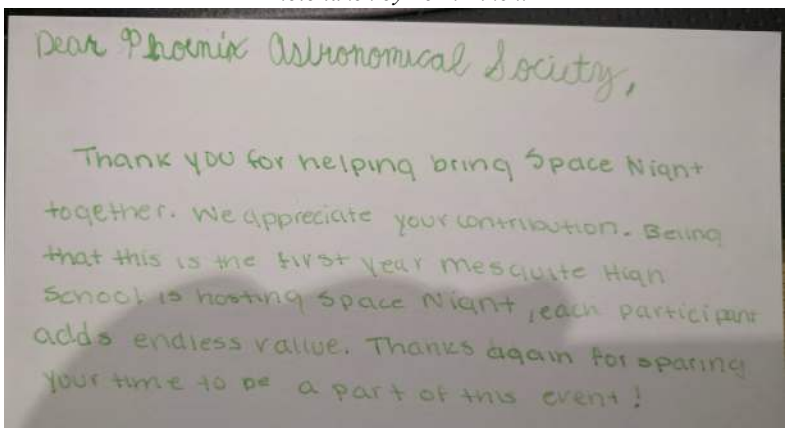
This event was a huge star party! Our contact at the school was Mark Jordan and he put together a spectacular event for his school. This school is in Gilbert and Mark had asked for ten telescopes and a presenter from PAS, plus he invited EVAC members to attend. PAS provided nine telescopes and Mike Marron with his meteorites.

Mike set up indoors with his meteorites along with about forty other tables of demonstrations, activities, and promotions. Outdoors, Mark had a few more activities for the kids and the one I loved the most was the mini rocket launches. There were also food trucks. The PAS Telescope Team present included Don Boyd with is 8" scope and Paul Facuna as his helper, Pete Turner and his 12" Dobsonian, Ted Blank with a 9.25" SCT, Sam Insana with his 8" scope, Roger Anzini with his 16" Dobsonian. I had brought my 8" SCT, and with me was Storm Moon and her 8" SCT. We also had the team assistance of Dennis Young, who brought his amazing 28" Dobsonian plus a bino viewer, and he had a crowd around him well past the time we were scheduled leave. Dennis Young is an honorary member of PAS and the President of his astronomy club in Sedona, "Serius Lookers." It was awesome to have Dennis join us at this event. EVAC had one telescope at this event, plus, a parent of one of the students at the school brought his 12" SCT and joined the star party!

The evening started with super cloudy skies. I consulted many sources, and the forecast said skies would clear by 7pm. It was expected to be a good observing night. The event was arranged with a 6pm set up and 7pm to 9pm star party. The activities started on the school grounds right at 6pm. Storm, myself, and several members had arrived around 5:15pm anticipating lots of traffic on the drive down, plus vehicles in the way, unloading telescopes for this event.

Once there, Mark provided meal tickets for everyone from PAS (Dennis was included in this event as part of PAS), and the food trucks started arriving about 5:30pm. The arrival of the food trucks during setup for the event made it difficult to eat before the crowd came to our telescopes. Fortunately, we found time to eat in between guests who wandered out to view through the telescopes. The skies were nearly overcast from the time we arrived to 9pm, but there were so many activities indoors, I do not think everyone visited the telescopes. Sunset was at 6pm and it was awesome! Many telescope team members took photos of it. The sunset on this night was so intense!

*This is a fantastic sunset at this school in Gilbert. It was like the sky was on fire. Photo taken by Terri Finch.*




In a small bag given to me – as Manager of the PAS telescope team - this was the thank you card I received. Photo by Terri.

From 7pm to 9pm, several scopes were able to capture, especially Dennis with his Cannon scope, the moon sneaking through the thick clouds. Don had put his scope on the moon as well. I put my scope on the moon with a red filter, and even through the moon was bright, at 20% lit, the red filter was too dark to see the moon each time the clouds took it away. So, I used my purple filter and the people loved the view because I was able to brighten the moon and show some craters through the thinner clouds.

About 8pm, the EVAC telescope packed up and disappeared,

*Storm Moon provided this fantastic picture of the Sunset behind her telescope.*

probably predicting clouds through the night. At that time, I would have agreed and done the same, but PAS was scheduled to stay until 9pm and so we did. At 9pm I sent a phone text to Mark to ask if we should take down our telescopes. The Telescope Team was thinking of departing, but just as we were discussing the option of packing up, the sky cleared. It totally cleared, so I asked my Telescope Team to stick around for an extra 30 minutes, in order to let attendees who had stayed for the whole evening enjoy a clear view. I sent a phone text to Mark, and he announced to everyone still on the school campus that the sky had cleared, and all were welcome to go outside and view through the telescopes. Roger and I teamed up to show Orion, and sent people from one scope to the next. Storm had E.T., Ted said he had Perseus Double Cluster, and I heard that Don had found the moon. The excitement of finding something awesome to show before everyone went home was addictive! We had about 80-90 attendees come look through our telescopes from 9-9:30pm. With the exception of Storm, myself and Dennis, the Telescope Team was packed up and gone by 10pm.

Once the skies had cleared, Dennis wanted to share as many objects as possible with the group of high school students that remained. Dennis showed the Owl Nebula through night vision bino viewers through his 28" scope, as well as the moon through his homemade 18" bino viewers, and the views were spectacular!

Storm and I found it was easier to load our vehicle right by the fence to the grassy area, rather than hauling our equipment to one of the parking spaces. Storm and I packed up, and it was 10:30 or 11pm before Dennis started to pack up his equipment. We left the school about 11:30pm that night.

I wish to thank my telescope team, including Dennis, for being at this event and making it a success. I am hoping Mark will want PAS to return next year for this event. The attending parents and students of this school were so nice, and the event was so well planned, I would love to do it again! Thank you Mark for having PAS at your event!

# Black Mountain Campus Star Party February 28

By Terri Finch, Event Manager

PAS had over 75 RSVP's for this event. The afternoon of February 28, I sent back emails to all who RSVP'd to let them know the event was ON!

I had arrived at BMC at 4:45pm for a set up of 5pm, a start of 6pm, and an ending time of 9:45pm. The Star Party was scheduled to begin at 6:30pm, but there wasn't anything to show until about 7pm. The public was asked to go indoors, inside the Aquila Building, and wait until 7pm to come down to the observing deck.

While the public waited inside, the Telescope Team on the Observing Deck set up their scopes, and Mike and I were indoors for the whole event.

I was set up at the PAS Table by 5:40pm. The public started showing up about 6:15pm. Mike Marron arrived at 6:30pm with his meteorites and set up at the table next to the PAS Table. At the PAS table, I had the Q&A and Treasure Hunt ready for those aged 0-17 years old. This evening, only five youngsters did the Treasure Hunt and were awarded a prize. They each also won a prize for Q&A. For this event, the Q&A was about what they saw through the telescopes.

Several public attendees came indoors first, which is what we prefer you do when you come to this event. They visited the PAS table, the Handouts table, and Mike's meteorite table, and then they went down to the observing deck to view through the telescopes. When they finished, many of them drifted back indoors to use the facilities before driving home, and I was able to ask them what they saw and if they enjoyed it. One lady mentioned that at other public star parties she and her husband had attended, that were put on by other astronomy clubs, the telescopes are pointed at different objects throughout the night. I explained to her that the telescopes were staying on certain objects on this night for the purpose of the Treasure Hunt. The scopes could be moved to any object they wished after all the kids have seen the objects they need to in order to get a prize for doing the Treasure Hunt. The guest then understood why the scopes stayed on one object for so long.

I wish to welcome our newest member to PAS: Jake O'Riley who joined PAS last night at this event.

Outside, these PAS Members were set up with their viewing equipment (not all were telescopes)... Pete Turner brought his scope, but my Runners didn't tell me which scope he brought, Roger Anzini had his 16" Dobsonian, Ray Adams had an 8" scope and some cameras hooked up to it. I also heard the Ray had his computer and was allowing the attendees to find objects within Stellarium on his computer. Sam Insana brought his 8" scope and was able to capture Mercury before it set. Calvin Vance had his telescope, Mike Cawley brought an 8" scope and Frank Otsuka had his 8" scope and binoculars.

I wish to thank my Runners (helpers) for the evening. I had the privilege, company and help of Diane Hakala, Stu Brackney, and Skip Miller. Thank you to Skip, who took notes for me as to which telescope was on what object.

I also wish to thank a few additional helpers and attendees at this event: Bob Ewing, Jenny Weitz who was in the Telescope Dome, and Ron Walker. I estimate, from what I heard and saw, about 150 people in attendance (not including PAS members listed in this review).

PAS is looking forward to the rest of the Spring 2019 BMC star parties and hoping for cooperative weather for March 7 (STEAM event), March 28, April 25, and May 2. Hope to see you there!

**Sam** adds: I showed M81 and M82 galaxies, M45 Pleiades open cluster, M42 Orion nebula, Gamma Andromeda which is a blue and gold double star, and the Planet Mercury. Ron Walker helped out a lot by guiding cars on and off the observation deck and showing me where Mercury was. Ron also tried to get the lights turned off on the observation deck, however, but couldn't get anyone to help.

I tried for a comet without any luck. About 40 people enjoyed looking through my 8-inch Newtonian reflector.


# Tonto National Park Star Party March 3

By Sam Insana, PAS member

Sunday night, March 3rd, I handled a PAS star party at Tonto National Forest in a large parking lot. I set up about 50 feet west of the Southeast corner of the lot, which kept me at a reasonable distance from the main road where there was a lot of traffic and dirt in the air. The event was supposed to start at 7:30 pm but the guests did not arrive until about 5 minutes before 8 pm. By then, clouds were rolling in. I spent 30 minutes showing Andromeda Galaxy, Gamma Andromeda double star, Orion Nebula, the Pleiades, and the Perseus double cluster. I also discussed my background, PAS activities, and used a green laser to point out some constellations. The guests were a family from Pittsburgh, a mother, father, and 3 teenage sons. They asked great questions and it was a fun time. However, the clouds covered everything by 8:30 pm, so I took out some meteorites I had brought with me just for such a situation. They loved the meteorite presentation, and the event ended about 9 pm. If the guests had arrived at 7:30 pm, I could have shown several more objects with the telescope before the clouds took over. Also, there was a yellow fireball meteor about 7:45 pm that lasted 5 seconds going from SE to NW, that they missed. It was a very successful event.

# Science and Stars Extravaganza at South Mountain

## Saturday:
## March 2 and April 6
## 5:30 – 9 p.m.

Celebrate science with telescope viewings, live animals, astronomy chats, local science experts, and hands-on activities for all ages!

The park gate will be open until 8 p.m. for this event.

*Donation of $5 per group suggested.*

**Telescopes provided by Phoenix Astronomical Society and South Mountain Astronomy Club, weather dependent.**

*Partnership made possible by*

*Owner*

City of Phoenix
PARKS AND RECREATION DEPARTMENT
Building healthy communities through parks, programs, and partnerships

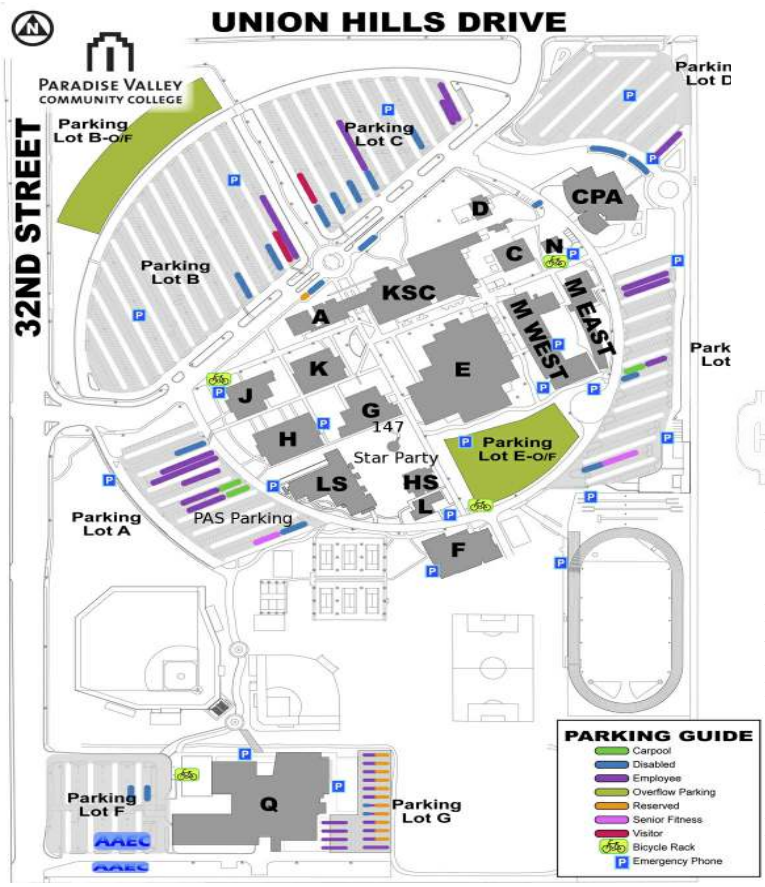
*Operator*

ARIZONA CENTER *for* NATURE CONSERVATION
at South Mountain Park

**10409 South Central Avenue | Phoenix, AZ 85042 | smeec.org | 623.334.7880**

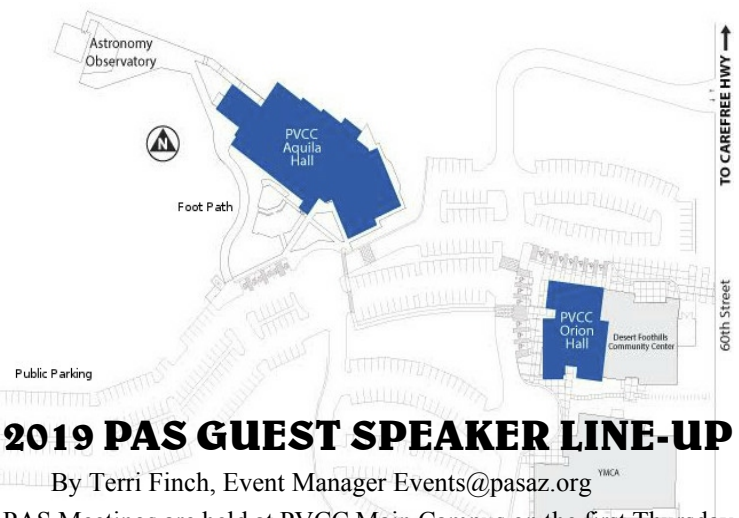
# Map of PVCC Main Location

**18401 N. 32nd Street | Phoenix, AZ 85032**




# Map of PVCC Black Mountain

**34250 N. 60th Street | Scottsdale, AZ 85266**




## 2019 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 Finch, Paul Facuna, or Mike Marron the details (their email addresses are at the top of page 2 in this newsletter).

Here are the next scheduled guest speakers at PAS:

**May 9:** David Lee Summers "Surveying the Universe"

--- Summer Break ---

**Sept 5:** TBA

**Oct 3:** TBA

More information at:

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

## April 2019

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 PAS Meeting KSC 1000A | 5 | 6 *South Mtn Public Star Party* |
| 7 | 8 | 9 | 10 | 11 *Free Telescope Workshop* | 12 | 13 |
| 14 *Free Telescope Workshop* | 15 | 16 | 17 | 18 *Awards Ceremony (Private)* | 19 *Leprecon Star Party* | 20 *Leprecon Star Party* |
| 21 Easter Sunday | 22 | 23 | 24 | 25 *BMC Public Star Party* | 26 | 27 *Tonto Public Star Party* |
| 28 | 29 | 30 | | | | |