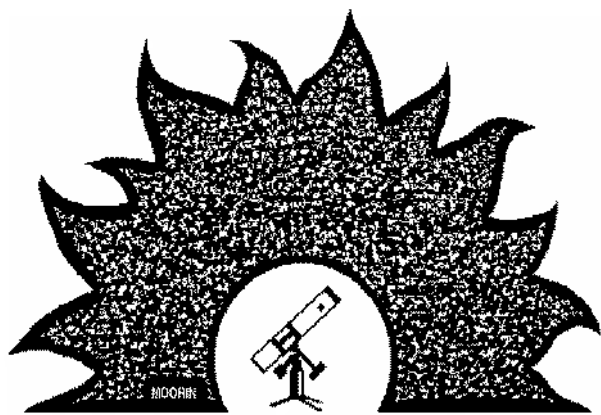




PAStimes

Phoenix Astronomical Society

www.pasaz.org

April 2016

Volume 67 Issue 8

PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Elliott Rachlin to Speak at Apr 7 Meeting

Data provided by Elliott

Usefulness of A Telescope Mounted On The International Space Station?

Elliott Rachlin is an Engineering Fellow who has been working at Honeywell for 36 years, with stints in Commercial Aviation, Process Control, Corporate Research, Space Systems, and the Global Architecture Team. Elliott writes: "I am neither an astronomer nor an orbital mechanics person. However, I have learned a lot about both of these topics over the course of this project." That project was to convince NASA to allow (and to pay!) Honeywell to mount a telescope on the truss structure of the International Space Station. Our argument was that it was much

easier to perform maintenance on a mounted telescope than on a free-floating telescope. It's the difference between a relatively simple EVA and an entire mission! On the other hand, a mounted telescope has a somewhat impaired view because of its proximity to the ISS. Our challenge was, and the topic of this talk is, to perform an analysis of the difference between the "uninterrupted stare time" of a station-mounted telescope and that of a free-flying telescope – and to present that result in a human-readable and easily appreciated way.

Bring a friend to this meeting and a snack to share. Bottled water is provided by the PAS Snack Fund - if you don't bring a snack, please donate to the PAS Snack Fund to help next month's case of water. Doors open 7pm. Elliott will take the floor

a few minutes after 7:30pm, after a few quick announcements. We hope to see you there!



Photo of Elliott Rachlin, provided by Elliott.

PAS Meeting Mar 3

By Terri, Event Manager

Dr. David Williams, a long time friend of PAS and mine, did a super presentation on the New Horizons mission to Pluto. The new images he shared with the attendees were spectacular, exciting and full of information. David's presentation started after a brief introduction of new attendees and the PAS Officers. It was nice to see Leah Sapir and Andrew Lewton again. The presentation lasted until about 8:20 pm at which time David took time to answer a large number of questions. After the presentation, he gave away some great posters he had brought. Thank you David! Here are some things we learned from him: The New Horizons Mission was a quick fly-by past Pluto and its moons. It had all of its photog-

raphy targets picked out ahead of time and captured them all within a few hours. The craft is still sending back the images it took and will continue to do so until June 2016. The mission will now continue out to the Kuiper belt and in 2019 have a flyby with another object.

Some other good news is that

See Meeting Mar 3 on page 3



Dr. David Williams did a wonderful presentation at the March 2016 Meeting.

Photo by Don.

Phoenix Astronomical Society Contact Info

President	Sam Insana	602-315-4750	President@pasaz.org
Past President/Equipment Manager	Bruce Wurst	602-971-3555	PastPresident@pasaz.org
Vice President	Howard Moneta		VicePresident@pasaz.org
Secretary	Kevin Witts		Secretary@pasaz.org
Event Manager	Terri Finch	602-561-5398	Events@pasaz.org
Treasurer	Eric Steinberg		Treasurer@pasaz.org
Newsletter Editor	Don K. Boyd		Editor@pasaz.org
PAS Host	Rodney Fong	602-486-5547	
Librarian	Rod Sutter		Librarian@pasaz.org
Member at Large	Jenny Weitz	602-787-6818	jennifer.weitz@paradisevalley.edu
Member at Large	Alex Vrenios	602 789-6556	axv@cox.net
Webmaster	Chris Johnson		Webmaster@pasaz.org
Phoenix Astronomical Society	3039 W Peoria Ave	#102-188	Phoenix AZ 85029

April 2016 Upcoming Events

By Terri, Event Manager

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

Apr 7: PAS Meeting at PVCC in Room LS 204. Come enjoy a wonderful presentation by Elliott Rachlin. 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=1752&day=2016-47&c=1>

Apr 8: School Star Party (Private) PAStimes Star Tour members Only <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1868&day=2016-48>

Apr 9: Night Sky Training Session (Private) - PAS Members only.

Apr 14: PAS Awards Ceremony (Private) - PAS Members only. This is a party, bring a snack to share. More details: <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1920&day=2016-414&c=2>

Apr 17: 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=1920&day=2016-414&c=21>

Apr 21: 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=1894&day=2016-421&c=1>

Apr 23: FREE Sidewalk Astronomy Event at Bookmans - Public Stargazing. Come to Bookmans Entertainment Exchange at 8034 N. 19th Ave. Phoenix, AZ 85021. PAS will have telescopes set up from 7pm to 10pm for your viewing enjoyment of Jupiter (visible 7:25 pm) and the

Moon (visible 9 pm), possibly along with some other bright evening objects. This is a free event, open to the public. PAS will have an information table set up outside. Kids can do Q&A with Terri and win a prize for answering questions. RSVP is requested with Terri Events@pasaz.org - in case the weather (high winds, rain, or clouds) cancels this event. We ask that you do not touch the telescopes. More details: <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1942&day=2016-423&c=1>

Apr 28: 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. We ask that you do not touch the telescopes. More details: <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1763&day=2016-428&c=1>

Apr 29: School Star Party (Private)- PAStimes Star Tour members Only <http://www.pasaz.org/forums/calendar.php?do=getinfo&e=1879&day=2016-4>

2016 Officer Elections on May 5

By Terri, Event Manager

At our May 5th meeting, we will hold elections for our officers. Please plan to attend. Bring a snack to share and come join in the fun of picking the officers who will manage PAS in the next year! See you there!

Meeting Mar 3

From page 1

David has agreed to return to PAS for the November 3rd, 2016 meeting and share with us the Dawn Mission to Vesta and Ceres. Save the date - David's presentations are always educational and exciting.

Afterward, President Sam took the floor and spoke about the article he had put in the March 2016 issue of the PAStimes newsletter which had to do with a "night sky objects list" he is compiling. If you haven't read this article, please look for the "President's Corner" on page 3 and send a reply to Sam with your favorite object list.

Sam then announced the Mar 5th PAS trip to Antennas with a weather update.

Terri Finch, Event Manager then talked about some upcoming events for March and April. And we had the raffle drawing. Leah Sapir won and donated it back to PAS.

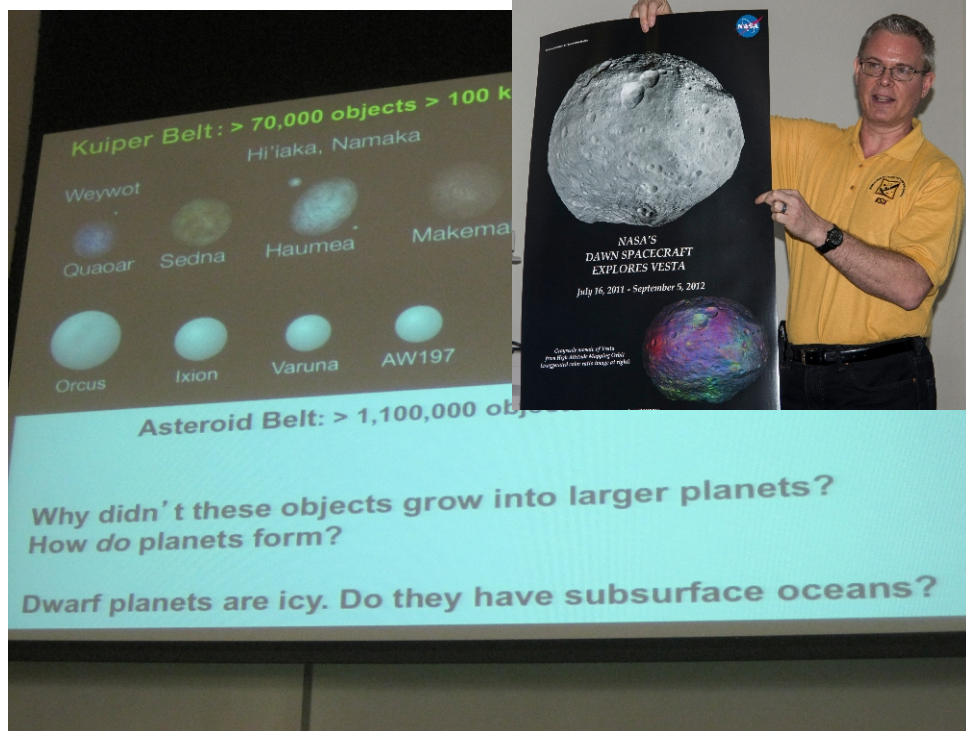
We hope to see you at the next meeting at which will have Elliott Rachlin doing a talk on the "ISS Telescope System." Hope to see you there!

Paul Facuna writes: David Williams presentation yesterday evening was excellent. I enjoyed it and I looking forward to his presentation on the Dawn mission to

Vesta and Ceres.

Dewell Howell writes: You're right, Paul - it was a great talk last night.

David Williams shares the poster he is giving away at the March PAS Meeting. Photo by Don Boyd.



This is one of the slides from David's presentation. David always brings interesting, entertaining fun to the meeting. Photo by Don.

PAS Meeting Feb 25

By Terri Finch, Event Manager

At the public February 25th PAS meeting, we had a turnout of 15 PAS Members. Our guest speaker, Greg Schwimer is a PAS member and came to us to enthusiastically share his topic: "Beyond the eye - Electronically Assisted Observation." We all learned some new things about astrophotography from this interesting talk. Many thanks to Greg - everyone enjoyed it!

After the main presentation, we dismissed anyone who didn't want to stay around for the MOM's and asked PAS

Members to stay. We had a discussion about the upcoming Awards Ceremony, the Star Tours rotation list, parking and scope loading/unloading issues at the upcoming Black Mountain Campus star party and a few other brief topics. Many thanks to those who provided snacks. The PAS Snack fund paid for the case of water. Thanks to all who attended and supported Greg's presentation. See you at the next meeting!



Greg Schwimer "Beyond the eye - Electronically Assisted Observation" at the Feb 25 PAS Meeting. This was a super presentation! Photo by Don Boyd

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 terrific planetarium shows for free 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 shows are on the weekends - seating is limited and there are no bathroom facilities. I have heard however, that this is a rewarding way to spend an hour or more engulfed in an 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.

PRESIDENT'S CORNER

By Sam Insana

Your amateur astronomy experience can be enhanced by keeping track of objects you have seen over the years with your telescope. A simple note pad, spiral notebook, a word document on your computer, or the memo pad in your smartphone can be used to keep track of the date and location of your observing and the object you saw. Most of us will be enjoying this avocation for years to come and having a record can help you in planning observing sessions for

yourself, for an outreach program or for recommending objects to fellow observers. Your life list is also something to be proud of when looking back on your efforts.

Birders have life lists consisting of the hundreds or even thousands of species of birds over the years. Why not start your list tonight! Remember, it isn't just the number of celestial objects you have been able to see, but the various types: galaxies, double stars, nebulae, open clusters, globular clus-

ters, planetary nebulae, planets, the sun, the moon, comets, etc..... Remember to enjoy observing the object and spend several minutes marveling at the details - don't just rush through to increase your total numbers. Also, when doing a long night of observing at a dark location, don't just try for all new objects, but mix in some favorite old ones to enjoy them in the conditions that show them really well.

Bookmans Sidewalk Astronomy Events 2016

By Terri, Event Manager

PAS will be hosting 4 Sidewalk Events at the Phoenix Bookmans at 19th Ave and Northern on these dates: **Apr. 23, June 11, July 9 and Aug. 20.** Times of events 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 at <http://www.pasaz.org/forums/calendar.php> to be sure you have the correct start time.

We will be viewing, weather permitting, Jupiter, Saturn, Mars and the Moon at these events, though not all events have all those objects available. Everyone is welcome, regardless of age to look through our high powered telescopes. PAS members should RSVP their attendance. We have 2 rules about viewing through our telescopes: 1) have fun and 2) please do not touch the

telescopes. So you are sure that the events are happening, an auto-message will be sent to you if you send an email to Events@pasaz.org. We will provide the weather forecast and let you know if the event is on or off for that night. The auto-email will be set up by NOON the day of the event. We hope to see you at these fun events!

PVCC Telescope Workshop Jan 21

By Sam Insana, President

I met with several customers at the Thursday night telescope workshop at PVCC on January 21st. The first 2 were Colin and his daughter Paris with their brand new 3 inch newtonian telescope.

They knew nothing about telescopes and wanted me to go over everything. For an hour I showed them how to use the battery powered finder scope, how to collimate the mirrors, how to find objects with sky charts, how to use the different eyepieces and calculate magnification and went over the kinds of objects that would look good in the scope. I took Paris outside to look at the moon with her scope and she liked what she saw. Afterwards, Paris had a great time looking at Mike's meteorites. I

gave them my card if they had questions in the future.

The final 2 customers had a very very old newtonian. It had setting circles so I went over polar aligning the scope, and how to use declination and right ascension to find various objects in the night sky. I also went over the focal length and eyepiece mm numbers to calculate power. I also told them the kind of objects they could see in their scope and introduced them to star charts. Unfortunately the scope was so old and had so many defects it might cost more than it was worth to try to fix the various parts. They thanked me for the help and will come out to the February 11th star party to see various scopes and objects at

PVCC Black Mountain. I gave them my card and asked them to contact me if they had further questions.

Terri Finch, Event Manager adds: In attendance from PAS were Sam Insana, Alex Vrenios, William and Terri Finch, Rodney Fong, Mike Marron, Howard Moneta, Pete Turner and George Sabo. Thank you all for attending and helping out.

From the public we had Lindsey Zocco (new PAS Member), Paris Galileo, Brash and Bruce (they each brought a scope), and Jay Binder. It was a very successful telescope workshop.

Scopes for Sale:

Like new! Questar 3.5" Standard telescope with Pyrex mirror, broadband and low reflection coatings. Model #10214. \$3,850.00 Contact seller at: cancourt77@gmail.com More details about this scope can be seen at this link: <https://www.dropbox.com/s/0d7s3c72vhk71st/Scope%20for%20Sale%20Questar%2010214.pdf?dl=0>

Nexstar 9.25 carbon fiber; Fastar Compatible. Asking price is \$1,500 for the package which includes: Eyepieces: 4mm, 6mm, 9mm, 15mm, 32mm, 40mm, a 2x Barlow lens; Filters: No. 21 orange, No. 25 red, No. 12 yellow, No. 80a light blue, No. 58a dark green, No. 56 light green. Also included is a red clip on light. Please contact: Terry at Tmranger86@Gmail.com or (602)-703-3772. All photos can be seen here: <https://www.dropbox.com/sh/19ak53vbwijupu/AABr2UwkkbaPxIRaJsEQyUMYA?dl=0>

Rocket Riot at Bookmans Nov 21

By Terri, Event Manager

Katy from Bookman's invited us to enhance her indoor kids' event with solar viewing. It was a very nice clear day, so we set up from 1pm to 4pm outside with scopes and handouts; Rodney and Paul were there to assist and we set up a canopy for the team to "hide" under. Mike brought his Meteorites and set up next to the PAS Table, while William and I worked opposite ends of the PAS Table. William showed the Moon for the last hour of the event and also ran our PST, which wasn't working until well into the event when Bruce took a look at it and got it fixed. Thanks, Bruce.

Also with scopes, we had Rick with his 8", and Sam with his PST and Bruce with his PST.

It was a great event - We talked to at least 200 people. I look forward to the next solar or sidewalk astronomy event at Bookmans. Thank you Solar Team!



(L to R) William, Rick, Rodney, Joe Aquavella, Paul Facuna and Sam chatting while they wait for the public to wander over to their Solar viewing set up at Bookmans. Photo by Terri.



Rodney Fong & Sam Insana chatting while viewing through Sam's PST at Rocket Riot. Photo by Terri.



Bruce Wurst & William Finch at the PAS Table working the Bruce's PST Solar Scope on Nov 21 at Rocket Riot at Bookmans Solar Viewing event. Photo taken by Terri Finch.



Mike Marron with his Meteorites outside of Bookmans by the PAS Table for the Rocket Riot Solar Viewing event of Nov 21. Photo by Terri.



A gentleman & his son at Rick Cunningham's Scope in the parking lot of Bookmans for the Rocket Riot event. Photo by Terri.



A lady views the Moon through William's Moon scope on the PAS Table with Bruce, Joe, William and Mike chatting off to the side. Photo by Terri.

Black Mountain Campus Feb 11

By Terri, Event Manager

This event was the first one at the new Aquila Building Observation Deck (which is actually a slab of concrete with electrical outlets and a mostly level location to set up telescopes). In attendance from PAS were Sam Insana with his 8" scope, Pete Turner with his 9.25" scope, Christine Mintzmyer

with her 10" scope, Howard Moneta with his 8" scope and Mark Johnston with his 5.5" scope. Paul Facuna and William and Terri Finch attended to help out; Mike Marron brought his meteorites. It was a beautiful night; once the "choreography" of loading and unloading equipment was tak-

en care of, the event went really smoothly.

We had about 75 public in attendance. Everyone seemed to enjoy the evening and the views. Many thanks to Loretta for having us at this event. We look forward to the big STEM event at BMC on March 10.

Bookmans Telescope Workshop Jan 24

By President Sam Insana & other attendees

I met with Mickey and Paul. Paul (Santa) gave his wife Mickey a new Celestron Astromaster 114 EQ newtonian scope for Christmas because she was a good girl all year.

She had studied astronomy as a girl scout and always wanted a telescope. I went over the eyepieces and magnification calculations, how to adjust the finder scope, how to polar align the scope, how to use the setting circles, and went over star charts to show the kinds of objects best seen in her new telescope and how to obtain coordinate numbers. It took about an hour to go over everything and they were very happy with all the information. I gave them my card and asked them to call me or email me in the future if they had any questions.

Alex Vrenios writes: Sunday afternoon at Bookman's, January 24: I've been told lots of times that the PAS Telescope Workshops are a zoo right after Christmas. Lots of people got telescopes for Christmas this year, but this year it looks like they all got theirs from the same Santa!

Celestron makes a small Newtonian called an AstroMaster 114, meaning 114 millimeters or about 4 1/2 inches in aperture. It's a wonderful first scope, and three totally unrelated families brought theirs to the workshop this time. I'd never seen one before, but I've worked with Newtonian

telescopes and with equatorial mounts, so I joined in to help.

Sam Hawkins and his wife had little experience with astronomy but their eagerness to learn was quite evident. I tried to reduce some of the overwhelming complexity by pointing out that the tripod, the mount and the optical tubes were separate, and that the tripod was the trivial part. We switched our focus to just the optical tube assembly and worked out the initialization process: aim and focus the tube at something far away, like a distant tree or mountain peak, then adjust the finder scope so that object was centered. Now, when they saw something in the night sky centered in the finder, it would probably also be visible at the eyepiece.

Next came the mount. We set the head at our local latitude, at about 33 and a half degrees. Bruce helped me figure out why the head was still loose afterward. (Yet another thing to tighten down!) I gave them a quick rundown on how the stars in the night sky rotate about a central point and recommended that they buy a good beginner's book on astronomy. I showed them how they could polar align the scope (they had seen this described in the manual, but it wasn't very clearly explained) and then point the scope at whatever they wanted to view (like the rings of Saturn, the moons of Jupiter, and the craters of our Moon), turn

on the clock drive, and just enjoy the view. (A bit over optimistic perhaps, but that's me.)

Sam restated everything I said back to me in his own words so he was sure he understood. I told him about our club, the star parties and how helpful it can be to discuss any problems he may be having with a more experienced observer. He thanked me and started packing up his new toy, hopefully headed for somewhere dark.

Terri Finch writes: In attendance from PAS was: Bette, Ed Wurst, & Past President Bruce Wurst, President Sam Insana, Editor Don Boyd, Event Manager (that's me) and William Finch, Rodney Fong, Member-at-Large Alex Vrenios, and Pete Turner. From the public, attending as students, we had Judy & Sam Hawkins with their Celestron Astromaster 114EQ who Don, Alex and Rodney assisted. Paul & Nikki Hering with the same scope, which Sam assisted, Teresa Anderson with a Travel Scope who was assisted by Pete, and Robert & Al. While there, John and Ken were walk-ins. It was a super successful event. After the event, Rodney, William, Terri, Sam, Frank Insana, Vera Stiesmeyer, & Alex & Diane Vrenios enjoyed dinner together at Carlos O'Briens Mexican. Many thanks to my awesome Telescope Team for all the help they provided.

Anthem School Star Party Jan 28

By Roger Anzini, PAS Member

Don Boyd and I arrived at Anthem school about 4:30 PM. After a brief chat with Sujata, our lovely hostess for the evening, Don and I got set up around 5:30.

Once it got dark, Capella was the first star on the scene followed quickly by enough stars to begin the evening of viewing. People who had visited us before dark suddenly appeared at our telescopes - excited kids, parents and teachers toured The Pleiades as Don's scope precisely tracked the Seven Sisters throughout the evening. While over at my DOB they were given my laser and eyepiece tour of the wonders of Orion.

Our guests came in little groups of eight or ten, then a minute or two and another group would arrive, this was perfect, for it gave time enough to make sure everyone heard and saw everything from

both stations.

About 8:30 our young astronomers began to drift away and we were now alone. At that time our handy friend Phil who had unlocked the gates for us and helped move equipment (many thanks, Phil), arrived to see if he could help with anything. Phil confessed he'd never looked through a telescope in his life. He said he'd just moved here from New York where no stars were really visible.

I said "how about taking a look now Phil", and I led him over to the 16" DOB. I picked up my laser, pointing out Orion's head, shoulders, belt, sword, feet and bow.....the golden/red of Betelgeuse and the blue/white of Rigel. Then I beckoned him to to the eyepiece where the Great Nebula was waiting for him. Quite a large man, Phil turned to me saying, "I don't want

to break your ladder". I just pointed at the eyepiece and said "it's OK you go up there and take a look." A minute later Phil stepped down shaking his head and clearly stunned - he could not believe what he had just seen, some 1350 light years distant.

Later after everything was loaded into the cars I turned back to see Phil's extra large frame hunkered down with one knee on the ground. His smiling eyes were looking skyward, gazing directly at Orion. I walked over beside him and said "Orion is yours now Phil, yours forever". He slowly shook his head from side to side and said with a smile, "This is so amazing, I never knew, I never knew".

As I headed toward home I whispered to myself "Happy Orion to all.....and to all a good night".



Gravitational Wave Astronomy Will Be The Next Great Scientific Frontier

Imagine a world very different from our own: permanently shrouded in clouds, where the sky was never seen. Never had anyone see the Sun, the Moon, the stars or planets, until one night, a single bright object shone through. Imagine that you saw not only a bright point of light against a dark backdrop of sky, but that you could see a banded structure, a ringed system around it and perhaps even a bright satellite: a moon. That's the magnitude of what LIGO (the Laser Interferometer Gravitational-wave Observatory) saw, when it directly detected gravitational waves for the first time.

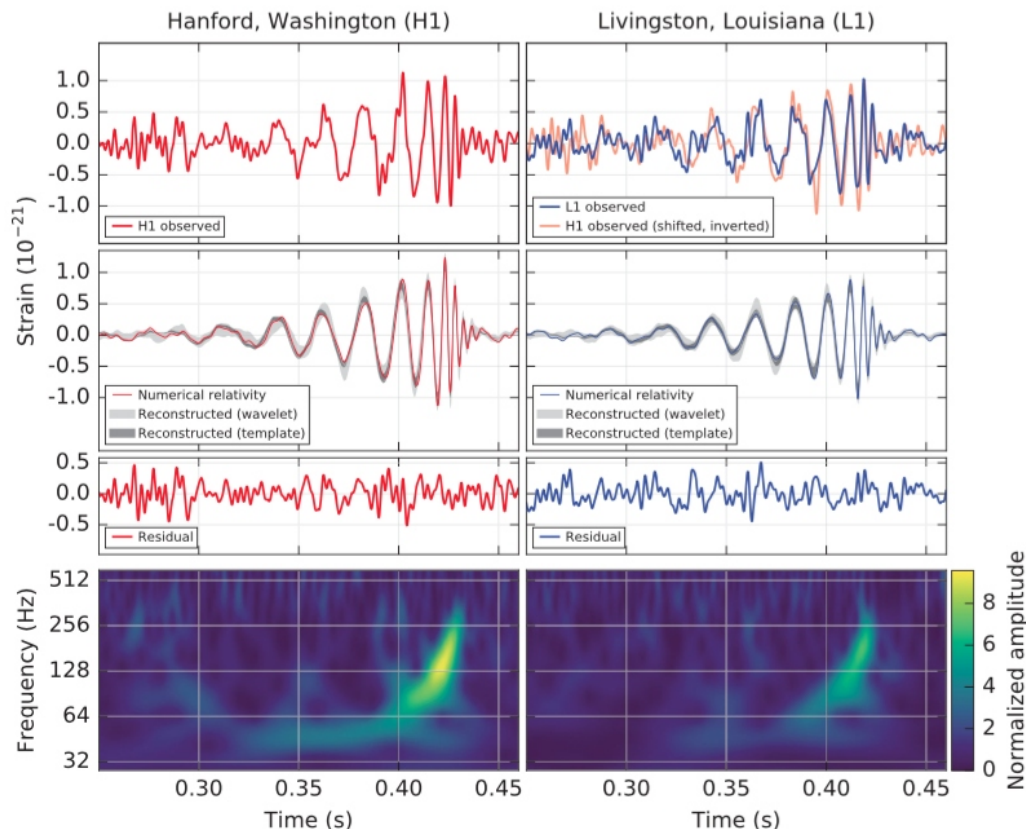
An unavoidable prediction of Einstein's General Relativity, gravitational waves emerge whenever a mass gets accelerated. For most systems -- like Earth orbiting the Sun -- the waves are so weak that it would take many times the age of the Universe to notice. But when very massive objects orbit at very short distances, the orbits decay noticeably and rapidly, producing potentially observable gravitational waves. Systems such as the binary pulsar

PSR B1913+16 [the subtlety here is that binary pulsars may contain a single neutron star, so it's best to be specific], where two neutron stars orbit one another at very short distances, had previously shown this phenomenon of orbital decay, but gravitational waves had never been directly detected until now.

When a gravitational wave passes through an objects, it simultaneously stretches and compresses space along mutually perpendicular directions: first horizontally, then vertically, in an oscillating fashion. The LIGO detectors work by splitting a laser beam into perpendicular "arms," letting the beams reflect back and forth in each arm hundreds of times (for an effective path lengths of hundreds of km), and then recombining them at a photodetector. The interference pattern seen there will shift, predictably, if gravitational waves pass through and change the effective path lengths of the arms. Over a span of 20 milliseconds on September 14, 2015, both LIGO detectors (in Louisiana and Washington) saw identical stretching-and-com-

pressing patterns. From that tiny amount of data, scientists were able to conclude that two black holes, of 36 and 29 solar masses apiece, merged together, emitting 5% of their total mass into gravitational wave energy, via Einstein's $E = mc^2$.

During that event, more energy was emitted in gravitational waves than by all the stars in the observable Universe combined. The entire Earth was compressed by less than the width of a proton during this event, yet thanks to LIGO's incredible precision, we were able to detect it. At least a handful of these events are expected every year. In the future, different observatories, such as NANOGrav (which uses radiotelescopes to the delay caused by gravitational waves on pulsar radiation) and the space mission LISA will detect gravitational waves from supermassive black holes and many other sources. We've just seen our first event using a new type of astronomy, and can now test black holes and gravity like never before.



Observation of Gravitational Waves from a Binary Black Hole Merger B. P. Abbott et al., (LIGO Scientific Collaboration and Virgo Collaboration), *Physical Review Letters* 116, 061102 (2016). This figure shows the data (top panels) at the Washington and Louisiana LIGO stations, the predicted signal from Einstein's theory (middle panels), and the inferred signals (bottom panels). The signals matched perfectly in both detectors.

Desert Sage School Jan 28

By President Sam Insana

Earl DeLong, Pete Turner and I showed the night sky to children and parents at the Desert Sage school in Glendale. It was a STEM night with dozens of exhibits inside the school, showing fire science, herpetology, science fair projects ... and of course meteorites by Mike Marron along with more meteorites and planet globe displays by Kevin Witts.

The start time was 5pm, so we showed sunspots and solar flares for 30 minutes. Then we waited one hour before we showed the Orion nebula, Gamma Andromeda Double star, and other delights. It ended at 7:30 pm, so the night sky viewing only lasted one hour.



Earl at his telescope. Photo by Sam.



Earl DeLong at Desert Sage School on Jan 28 assisting a future Astronomer! Photo by Sam Insana.



Sam Insana set up at Desert Sage School on Jan 28. Photo provided by Sam.



Pete Turner at Desert Sage School, sharing a beautiful view through his massive telescope. Photo by Sam Insana.



Kevin Witts & Mike Marron, each with their Meteorite display at Desert Sage School. Photo by Sam.

Moya Elementary Feb 5

By Sam Insana, PAS President

Mike Marron and his meteorites, Earl DeLong, Don Boyd, Howard Moneta, Rick Cunningham and I, with our telescopes did a star party for Moya Elementary and 2 sister schools: Alta E. Butler and Morris K. Udall. The party started at 5:30pm, 30 minutes earlier than they had contracted, but 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 have left many people without a chance to view. As RSVP, I then arranged for us to

stay another 20 minutes so that everyone could view at least one object.



Rick Cunningham at Moya Elementary on Feb 5 2016. Photo by Sam Insana.

Phoenix Marriott Mesa Star Party Feb 19

By Terri, Event Manager

On Feb 19, PAS, "Jack & Nora" asked PAS to do a star party for about 50 people the night before their son's wedding. Bruce Wurst and Terri Finch provided the two needed scopes for a fun, successful event. They provided food, drink and a great col-

lection of people interested in looking through our telescopes. The weather was cooperative and the location was reasonable for viewing. In about 2 hours long event, we observed the Moon, Jupiter, Andromeda Galaxy, Perseus Double Cluster,

ET open cluster, and two Messier objects that Bruce showed. Thank you Jack, for having us at your awesome event!

Jack writes: You and Bruce were great! We totally enjoyed having you!

Arizona Sky: The Planets This Month

By Leah Sapir

The big news this month is Mercury! Elusive Mercury will be easily visible as an evening star this month, and will even be staying up after dark for a while in the middle of the month. Mercury will be highest in the west from around April 12 to 25, when it sets around 8:30 pm.

Jupiter is still putting on a good show. It is only a few weeks past opposition, so it is high in the east after sunset, and is up till almost dawn.

In the meantime, Saturn and Mars are finally returning to our evening sky. They are still late risers at the beginning of April, becoming visible in the east only after 11 pm; but by the end of the month Mars will be rising around 9:15, and Saturn about half an hour later. The two planets, while not exactly in conjunction, will be only around 7 degrees apart all month, and they will also be close to Antares, the bright red giant in Scorpius whose name means "rival of Mars". But it is really no contest. While

Antares shines at magnitude 1.06, Mars begins the month at magnitude 0.5, and reaches 1.5 by the end of the month. Even Saturn is brighter than Antares, at a magnitude of 0.2 to 0.3 all month.

This increase in magnitude for Mars heralds a general improvement in visibility, as Mars approaches opposition. Mars is about 70 million miles away at the beginning of April, and 50 million miles away by the end of the month. Its visual diameter increases from 12 to 16 arc seconds in the course of the month. But when it reaches opposition at the end of May, Mars will be only 46 million miles away, with a visual diameter of 19 arc seconds and a magnitude of 2.

As usual, though, the big winner (literally) of the brightness contest is Jupiter, with a magnitude of 2.4 to 2.2, the result of its large size and high albedo, despite its greater distance.

The only major planet missing from

our lineup this month is Venus, currently hidden in morning twilight. Venus will start to be visible again in June, when it will be an evening star.

Uranus is also not visible this month, and Neptune begins the month in morning twilight, but will be rising around 3 am by the end of April.

Mercury will make a nice appearance to the right of the crescent moon after sunset on April 8. The moon will be near the Hyades in the west on April 10 till 11 pm, and near the Beehive Cluster on April 14-15 till around 1:30 am. On April 17-18, the moon will accompany Jupiter across the sky from south to west, till both set at around 3:30 am. The moon will make a nice triangle with Mars and Saturn on April 24-25, and the three will be in a straight line on April 25-26.

The new moon will be on April 7, and the full moon on April 21.

CTCA Feb 10

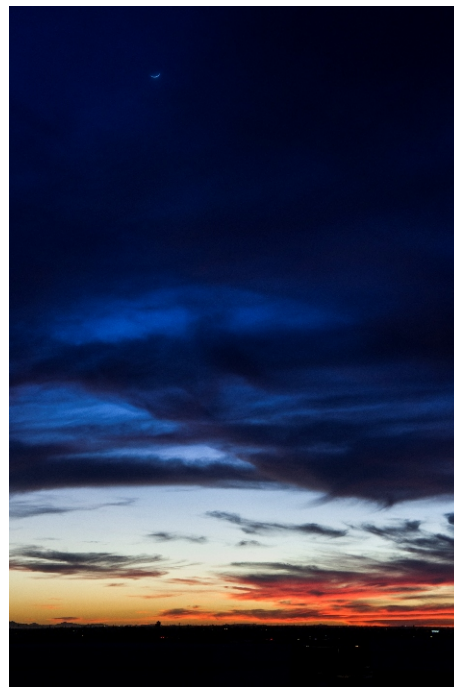
By Terri, Event Manager

At this CTCA event, we had groups of 3 and 4 CTCA patrons who visited and stayed most of the night on the roof with us. In attendance from PAS were Terry Dancer, Terri Finch, Mike Marron, Ofelia Waters and Don Boyd. We had 3 scopes and Meteorites for everyone to enjoy. The sky wasn't all that cooperative, but we got some great photos of the sunset. Many thanks to CTCA for having us at this event. Looking forward to the next event in May 2016.



Mike Marron and Ofelia Waters at Mike's Meteorite Table at CTCA on Feb 5.

Photo by Terri.



This is the Sunset from the 5th story roof of CTCA & the clouds that visited on this evening. It was a very successful, busy event with 12 attendees who came to the roof and stuck around to chat with us for most of the event time. A very pleasant evening. Photo by Don.



In this photo, at CTCA, we have Terri Finch, Ofelia Waters & Mike Marron. Then we have a wonderful couple who chatted with us about Meteorites & PAS Events for a long time.

Photo by Don Boyd.



Don Boyd setting up to do the CTCA Star Party on the 5th story roof. Photo by Terri Finch.

Grand Opening of Aquila Building at PVCC BMC Jan 29

By Sam Insana, President of PAS

On January 29th, from 10:00 am to 11:30 am PAS had a solar viewing event at PVCC Black Mountain Campus for the dedication of the new Science Building called "Aquila". There were dignitaries, speeches, cameras, balloons, food and guided tours. The highlight was Paul Facuna, Don Boyd, Earl DeLong, Mark Johnston, Sam Insana and Mike Marron showing sunspots, solar flares, and meteorites to the dignitaries and guests. We used the new concrete deck on the north side of the Aquila building where there are numerous constellations carved into the cement, including the building's namesake, Aquila, the Eagle.

It was great to see Jenny Weitz with her new baby and Dave Hellman, who is installing a new 14 inch telescope and observatory dome onto the new deck within the next few months. This location will make the parking lot lights less troublesome during our night star parties.

Terri, Event Manager adds: I wish to thank my telescope team for doing such a fine job at this event in my absence. I was not feeling well and couldn't move comfortably enough to attend this event. Thank you to Diana Manjon for inviting PAS to be part of this celebration and dedication of the new Aquila Building. We look forward to enjoying and using the new observation deck at BMC.



The PAS / PVCC Liaison, Jenny Weitz, and her newest baby. Photo by Sam.



Earl standing by his telescope. Photo by Don



The Dedication of the New Science Building, Aquila, at Black Mountain Campus of PVCC. PAS set up Solar Viewing for the public at this event on Jan 29. Photo provided by Sam Insana.



Mike with a crowd around him. Photo by Don.



The Dedication Ceremony. Photo by Don.



Mark Johnson, Earl DeLong & Dave Hellman were seen at this event. Photo by Sam.



Mike Marron was seen at this event, sharing his meteorites with everyone. Photo by Sam.



Paul Facuna peeking over Sam's telescope. Photo by Sam.



Sam Insana & Don Boyd standing with the Landscape Artist at this event. Photo by Sam.

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:

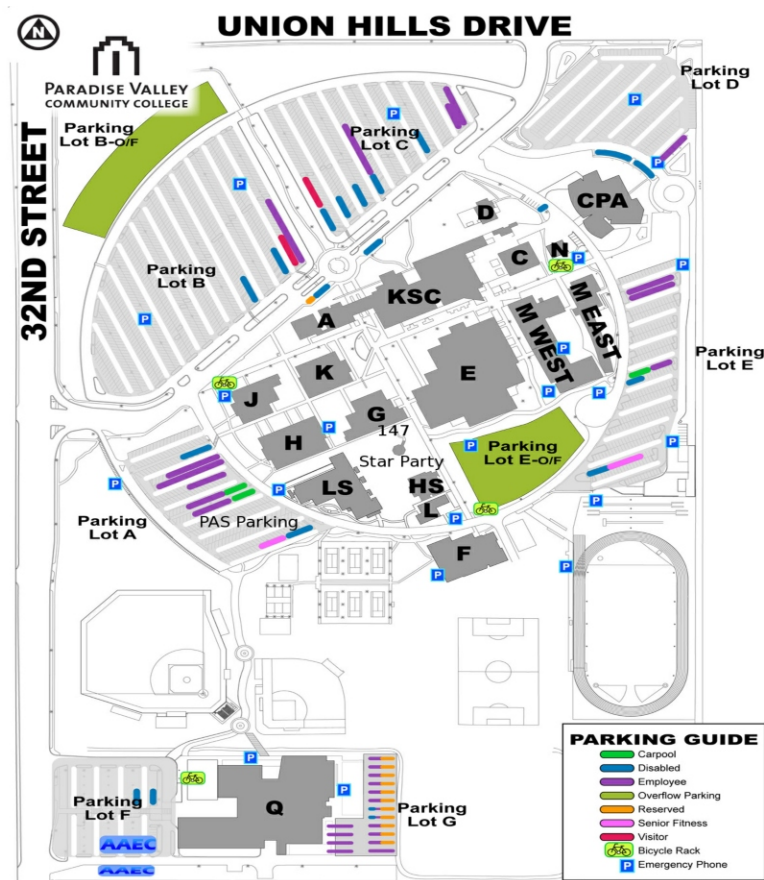
<http://www.pasaz.org/index.php?pageid=meetings>

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. Earl DeLong "Eyepieces," plus Alex Vrenios and Sam Insana "2017 Total Solar Eclipse PAS Field Trip Update"

Oct 6: Rogier Windhorst "James Webb Telescope"



What's Up For April?

By Rod Sutter, PAS Past President

Planets

Name	Date	Rise	Set
Mercury	04-15-16	06:46	20:34
Venus	04-15-16	05:28	17:50
Mars	04-15-16	10:14	08:232
Jupiter	04-15-16	15:31	04:18
Saturn	04-15-16	10:44	08:56
Uranus	04-15-15	05:46	06:30
Neptune	04-15-16	04:02	15:23
Pluto	04-15-16	01:03	11:11

All Times Arizona Time

April 2016

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

Carl Hayden High School Star Party Feb 12

By Sam Insana, PAS President

Mike Marron and Ophelia Waters showed meteorites to students and faculty of Carl Hayden High School at their S.T.E.M. night. Vera Stiesmeyer and Sam showed the sun, then the moon, and finally the Orion Nebula with Sam's 8 inch Newtonian reflector and PST. Frank Insana would

have loved to have seen Fredi Lajvardi, his former Marine Biology teacher and head of the famous Robotics program that beat MIT, and Lorenzo, one of his classmates who had been on that famous robotics team, but Frank had to work at the Grand Canyon that night.

The highlight of the evening was when Mike and his meteorites were attacked by a bird who dropped little bombs from a shade tree. Other than that, it was a beautiful afternoon and evening.



Mike Marron and Ofelia Waters at Mike's Meteorite Table at Carl Hayden School on Feb 12. Photo by Sam Insana.



Vera Stiesmeyer assisting with Sam Insana's scope at Carl Hayden School on Feb 12. Photo by Sam.

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

Map of PVCC Black Mountain

34250 N. 60th Street | Scottsdale, AZ 85266



April 15 2015

Sunrise: 5:57

Sunset: 19:00

New: April 7

Q1: April 14

Full: April 22

Q3: April 30

