PAStimes

Phoenix Astronomical Society

www.pasaz.org

December 2022

Volume 74 Issue 4

PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Dr. David Williams at Dec 1st Meeting

"New Visions, New Voyages: Planetary Exploration in the Next Decade 2023-2032"

Over the last three years the US National Academy of Sciences, NASA, and the US planetary science community met repeatedly to plot out a strategy to continue Solar System Exploration into the next decade. The result is the new Astrobiology and Planetary Science Decadal Survey, titled "Origins, Worlds, and Life". What are the science goals and what are the planetary destinations to be visited as part of this new decadal plan? Join Professor David Williams of ASU's School of Earth and Space Exploration to discuss this new plan and the new voyages to places in our Solar System.

Dr. David A. Williams is a Research Professor in the School of Earth and Space Exploration at Arizona State University, Tempe, Arizona. Dr. Williams is the Director of the Ronald Greeley Center for Planetary Studies, the NASA planetary data center at ASU. He is also the Director of the NASA Planetary Aeolian Laboratory, which administers wind tunnels at the Ames Research Center in California. David is currently performing research in volcanology and planetary geology, with a focus on planetary mapping, geochemical, and remote sensing studies. His research has included computer modeling of seismic wave propagation through planetary interiors, visible and near-infrared spectroscopy of the lunar surface, planetary geologic mapping of the satellites of Jupiter and Saturn, the planet Mars, the asteroid Vesta and the dwarf planets Ceres and Pluto, computer modeling of the physical and geochemical evolution of lava flows in a variety of planetary environments, and petrologic study of lava samples from Mount St Helens. He was involved with NASA's Magellan Mission to Venus, Galileo Mission to Jupiter, and Dawn Mission to asteroid Vesta and dwarf planet

See "New Visions, New Voyages" at top of page 4.

Dr. David Williams is a favorite Guest Speaker of PAS. He brings the most recent findings from the ASU School of Earth and Space Exploration. Dr. Williams will be presenting to PAS for the PAS Meeting of Dec 1. We are all looking forward to what he will share with us. Bring a friend!

Zero Gravity Pizza

A Lecture by Ted Blank

Review by Stu Brackney, President PAS

Ted oh Ted you have once again entertained us, enlightened us and yes taught us things about life in space we never thought of before until your lecture.

The United States was dedicated to space travel, but had no idea all the issues involved, because no one had done it before until the Russian cosmonaut Yuri Alekseyevich Gagarin took flight on 12 April 1961 for his one orbit around the earth. On his Volstok 1 capsule he had some food. Ok not food as you know it, it was a paste in a tube. A Russian specialty, borscht, made with red beetroots.

Thus began the quest for meals in space. Ted's lecture with photos, videos and of course, his excellent narrative covered the early development of dehydrated meals in the early days on board the space station.

Today they literally can make pizza, but not on regular breaded dough, because bread/dough crumbs in the station air cause major problems for the astronauts and their air filtration system. They use tortillas as their major bread supplement. A big day on the space station is the arrival of new food supplies, which always contain everyone's favorite, fresh fruits, and vegetables.

So, if you want to know more about the history of food in space, tune in to our website, www.pasaz.org. On the left side of the opening page under PAS Monthly Meetings, click the down arrow and you will find a link to this recorded lecture and many others.

Pass the mustard please.

At the PAS Meeting, Ted shared "Zero Gravity Pizza" with the attendees in LS-205 and those attendees through Zoom. It was a fascinating meeting. We hope to have Ted back for another exciting talk! Photo taken by William Finch with Stu Brackney's phone and given to me by Stu for this newsletter.

President	Stu Brackney	480-221-5711	President@pasaz.org
Vice President	Paul Facuna	602-246-1554	VicePresident@pasaz.org
Webmaster	Pete Turner		Webmaster@pasaz.org
Acting Secretary	Stu Brackney	602 789-6556	Secretary@pasaz.org
Treasurer	Richard Sauerbrun		Treasurer@pasaz.org
Event Manager	Terri Finch	602-561-5398	Events@pasaz.org
Membership Manager	Joe Sandy		Membership@pasaz.org
Newsletter Editor	Don K. Boyd		Editor@pasaz.org
PAS Host	Bob Ewing		
Member at Large	Jenny Neujoy	602-787-6818	
Member at Large/Equipment Manager	Bruce Wurst	602-909-8024	mal1@pasaz.org
Phoenix Astronomical Society 3241 E Shea Blvd #249 Phoenix AZ 85028-3365			

Table of Contents

Past PAS Recored Programs

By Terri Finch, Event Manager

Did you miss a PAS Meeting and wish you could see it? You can get to the link of Past Recorded PAS Meetings with Guest Speakers any time by going to the left hand navigation tool on the PASaz.org website and clicking on "PAS Monthly Meetings." From there a drop down item will appear and please click on "Videos of Speaker Presentations." You will then find recordings of Past PAS Meetings for your viewing pleasure. The collection is in oldest to newest order. Please work your way to the bottom of the collection to find the most recently recorded PAS Guest Speaker Presentation.

As long as PAS can record the PAS Meetings, PAS will continue to add more recordings to this page. Here is the direct link to the recorded PAS Meetings collection: https://www.pasaz.org/pas-monthly-meetings/videos-of-speaker-presentations. Enjoy!

What's Up For December

Name	Date	Rise	Set
Mercury	**12-15-22**	**08:56**	**18:37**
Venus	**12-15-22**	**08:28**	**18:15**
Mars	**12-15-22**	**16:22**	**06:52**
Jupiter	**12-15-22**	**12:52**	**00:52**
Saturn	**12-15-22**	**11:06**	**23:44**
Uranus	12-15-22	14:56	04:32
Neptune	**12-15-22**	**12:34**	**00:20**
Pluto	**12-15-22**	**09:52**	**19:47**

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

December 15, 2022

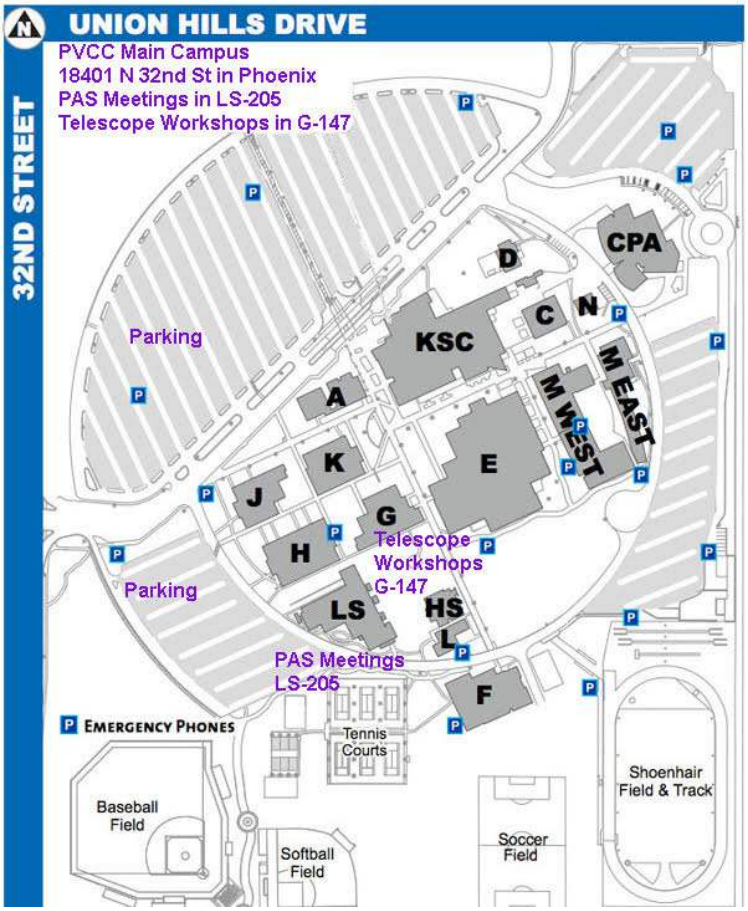
Sunrise: 07:25
Sunset: 17:22

Full: December 7

Q3: December 16

New: December 23

Q1: December 29



2023 PAS Guest Speakers at Hybrid Meetings

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

All PAS Meetings with a Guest Speaker held at PVCC can be attended in-person as well as via Zoom at the same time in a hybrid meeting. Those of you wishing to attend the meeting in person, please meet in LS-205 at PVCC Main Campus (map to the left of this article). If you wish to watch the meeting via Zoom, that option is available. For the 2022-2023 school year, PAS is using the same Zoom Meeting Link: https://us02web.zoom.us/j/81193628193?pwd=NlBZN2llU204VnVySk5SZXhtZWc2UT09 Please visit the PAS calendar at www.PASaz.org to find out more about these upcoming meetings and guest speakers. For a complete list of guest speakers visit: https://docs.google.com/document/d/1OO-UpaYNvw3p7JCRXCKSjDcbsK60DnvWOoifbqPrNp8/edit?usp=sharing

Do you have an idea for a guest speaker? Email the details and contact info for the possible guest speaker to Paul Facuna at VicePresident@pasaz.org.

Here are the next scheduled guest speakers at PAS:

Jan 19, 2023: Rogier Windhorst, Topic: TBA

Feb 2: Dr. Alex Vrenios, "The Astronomical League"

Mar 2: Tom Klare "Photographing Stars Using a Digital Camera"

Rocket Launch of Oct 27 2022 from Phoenix

By Terri Finch

Wiliam and I were getting food at a drive through (food wasn't good enough to share the location) and William noticed the rocket out my window (passenger side). So, I started grabbing video and photos of the launch and sending phone texts to friends I thought would enjoy seeing it. It was a spectacular thing for me to see as I have never seen it this clear. The whole thing lasted for no more than ten minutes. We were just East of I-17 on Thunderbird Rd in Phoenix.

We saw what looked like a leading piece of the rocket, and then another piece, trailing behind the main rocket. It looked like a stage of the rocket was being left behind. Later, I researched this rocket launch and saw that the stage of the rocket I saw was being brought safely to the Earth's surface by controlled landing. That is really impressive!

Then the rocket flew by the Moon. We first saw the initial rocket launch in the West, looking towards the sunset glow, and followed it until it disappeared in the Southern skies. It was a new experience for me to see it fly for so long across the sky, and not have clouds in the way. I've seen other rocket launches, only catching glimpses of the rocket as clouds were in the way, making viewing the rocket launch not so enjoyable.

The moon can be seen below the rocket as it speeds from West to South across the sky. Photo by Terri Finch.

Here's the rocket with a beautiful Stingray effect of a trail behind it. You can see the stage of the rocket that is falling back to Earth. Photo by Terri.

A newer PAS member, Mason Klenklen provided this awesome photo of the rocket trails left by the rocket as it soared up into the sky.

(Continued from page 1.)

New Visions, New Voyages

European Space Agency's Mars Express orbiter mission. He is also a Co-Investigator and Deputy Lead for the multispectral imager on NASA's Psyche Mission. In 2014 David was elected a Fellow of the Geological Society of America, and asteroid 10,46Dawilliams was named in his honor. He was the Secretary of the Planetary Sciences Section of the American Geophysical Union in 2019-2020.

December 1st PAS Meeting

By Terri, Event Manager

Zoom Meeting Link: https://us02web.zoom.us/j/81193628193?pwd=NlBZN2llU204VnVySk5SZXhtZWc2UT09

Please join us in welcoming back one of PAS's favorite Guest Speakers, Dr. David Williams from ASU. The meeting doors, and Zoom meeting will open about for set up and socializing. At 7:30pm, President Stu will open the meeting with a few very brief announcements and then turn the floor over to Dr. Williams. We hope you can attend and enjoy this meeting with us.

Dr. Williams has given many presentations for PAS. Since the Covid-19 pandemic, PAS has been able to record some of those meetings. We would love for you to check out past meetings with Dr. Williams from these dates:

Dec 2, 2021 "Rockey, Gasey, Icey & Dwarf Planets"

Dec 3, 2020 "Titan: The Past & Future Exploration of Saturn's Largest Moon"

We would love to have you attend and enjoy this presentation!

December Upcoming Events

By Terri Finch, Event Manager

December is the slow month of the year for events due to the holidays. There are two events you will want to make note of for December 2022.

Dec 1: PAS Meeting 7:00 to 9:30 pm - Hybrid via Zoom and in person in G-147 with a Wonderful Guest Speaker.

Dec 8: Free Telescope Workshop 7:30 to 9:30 pm in room G-147. RSVP is required to attend.

The rest of December will be spent enjoying family and friends during the holidays and PAS will see you in 2023!

Save $5: Renew your membership today!

By Terri, Accounts Receivable

Yes, you read that right. At the end of 2022, the price of the yearly dues to belong to PAS is going from $25 to $30. If you wish to save $5 on your 2023 membership renewal, pay those membership dues today. You can do this through the new online Paypal / Credit / Debit Card option at this link: https://www.pasaz.org/join-our-club Renew today and SAVE!

October 27th Board Meeting Summary

by Alex Vrenios, PAS Secretary

President Stu Brackney opened the meeting at 7:04 pm with Board Members Paul Facuna, Vice President, Alex Vrenios, Secretary, Richard Sauerbrun, Treasurer, Don Boyd, Editor, and guests Terri Finch, Assistant Editor, Pete Turner, Webmaster, William Finch and Joe Sandy PAS Members present. We had a quorum (5 board members).

Alex read the minutes from the last meeting and they were approved as written. Richard gave a financial report and it was also approved as read. Stu gave us an update on the progress being made toward the scholarship we intend to award a worthy PVCC student. We defined the qualifications we would seek and agreed to liaise with Jenny Neujoy, our Member-at-Large and PVCC point of contact in the matter.

We discussed recruitment for the three open Manager positions, Membership, Events, and Star Tours, and decided to continue adding notices about these to our "all members" email, and try to reach even more of our membership through direct emails devoted to that topic. It was noted that nearly two dozen new members have joined, and new people are often anxious to get involved with club business.

The topics continued along the lines of Star Tours booking fees, purchasing new name badges, and a new website feature allowing members to make general donations, pay fees for other than membership, and the to-be-determined PAS "swag," like tee and polo shirts, hoodies, ball caps, and other items embroidered with the PAS logo.

Stu added a request that all Bylaws changes be formally described and ready for presentation to the Membership during the next general Business Meeting.

With that, Stu closed the Board meeting at 9:24 pm.

Cow Track Ranch Oct 22

By Mike Marron

The last Cow Track Ranch star party Oct 22nd had about 15 people show up. Paul Facuna, Bob Ewing, and the families and friends of Kay Freeman, Mason Klenklen, Amy Easthan, Indira Keshav, Liza Parrington, Michael Spandau and Tia Braun. One bright meteor had a very long, glowing trail. Everyone had a chance to see it fall.

Stu's Views

December 2022

By President Stu Brackney,

The holidays have arrived and so has the wonderful northern night sky. All of your friends are up there, the Orion Nebula, the Pleiades star cluster and of course the Andromeda Galaxy waiting to say hello. So grab your binoculars or telescope and find a dark sky nearby and enjoy. This monthly newsletter always provides you a map of the current night sky so take a look up and as they say, "clear skies".

Two hot messages for everyone. Your Board of Directors, these past months, have decided to update some parts of the club bylaws. These suggested changes require your attention and vote. The Board Members will be sending you emails regarding the suggested changes with info on how and when to vote. Please keep an eye out for emails regarding these important changes. We will be voting "online" as we did in the May 2022 PAS Election. Yep, we are getting oh so modern!

The second hot message is we are still looking for two volunteers to chair: the Membership Chair position and the Events Chair position. Both positions are of course volunteer jobs. The Events Chairperson coordinates events such as star parties, telescope workshops and monthly lecture events while the membership position requires mostly data entry into simple computer files listing members information and processing new applications. Both positions are critical to the smooth efficient operation of our all-volunteer organization. Please seriously consider applying. For more information contact me: stuartbrackney@pasaz.org.

By the way, from your busy Board of Directors, we wish all of you a fabulous holiday season and clear skies!

Meet Our Board Members

Paul Facuna is the current Vice President of PAS. He is in charge of arranging for the fantastic Guest Speakers we enjoy each month at the General PAS Meeting (usually on the 1st Thursday of the month). Paul has brought some wonderful talks to PAS! Photo provided by Paul.

Paul Facuna – Vice President PAS

No, he was not born with a telescope in his hand nor has he discovered scores of comets, but don't let this quiet unassuming man fool you. He has found a passion in astronomy.

He was born and raised in the Chicago metropolitan area. As a young man in grade school, he found his way to the Adler Planetarium, a public museum dedicated to astronomy and astrophysics. It was founded in 1930 by Chicago businessman Max Adler. "This place caught my attention" he recalls, but he was kept busy with his studies and after college finding himself a job as an analytical chemist. His career took a turn into business programming. Since his retirement he decided that astronomy would be a fun hobby. Paul has dedicated his time to PAS and as its Vice President, keeps busy with securing speakers for our monthly lecture series. Paul makes a difference in PAS, so next time you see him, say hi..

Pete Turner, current PAS Webmaster designed and implemented the current website and updates it as needed. Photo provided by Pete.

Pete Turner – PAS Webmaster

Pete is the tall guy who has too many talents to list here today, however his story is like so many in our organization.

Born in London, England, raised in the eastern part of the US, he recalls that while in college he learned of a fun activity…astronomy. Like others he was committed to his curriculum obtaining a BS degree in Economics from Santa Clara University, in California. By the way, Santa Clara University is the oldest institution of higher learning in California, established in 1851.

Currently retired, Pete spent over thirty years in the computer industry (mostly software) after which he ran his own business with his wife. Pete recalls that after being exposed to astronomy in college, upon retiring he found himself hypnotized by the Science Channel and some very interesting magazines such as Astronomy, Sky & Telescope and of course Scientific American.

Naturally, he got hooked, purchased a telescope, and then realized he needed help with it. He reached out to PAS and has been here for over ten years. Next time you visit the PAS website at pasaz.org, remember the kid from England is making it work!

Free Telescope Workshops

Terri, Event Manager

Telescope Workshops are held at PVCC Main Campus 32nd street and Union Hills Road in Phoenix in Room G-147 and are FREE to attend.

RSVP is required as seating is limited and this event is weather dependent. Bad weather or NO Public RSVP's cancels this event, so be sure you drop an RSVP to Events@pasaz.org with the Make and Model of your telescope you need help with, and the number in your party. If you don't own a telescope yet, and are seeking to find out what type of telescope to purchase, come for advice, and in your RSVP mention you want to know what scope to buy.

PAS has nothing to sell to you at these FREE Telescope Workshops. The classes are 7:30pm to 9:30pm on these dates: Dec 8, 2022, Feb 16, 2023, Mar 16, 2023, Apr 13, 2023. Get your RSVP in soon as you know you can attend so you get a seat and get the advice you are seeking. There are no telescope workshops during May, June, July, Aug, and September. Hope to see you soon!

January PAS Meeting

By Terri, Event Manager

Each January, the PAS General Meeting with Guest Speaker is held on the third Thursday of the month due to the location of our meeting on the PVCC campus not being open on the first Thursday. Please make a note that for the January 2023 PAS Meeting, the date will be January 19, 2023. We hope to see you there.

This also affects when the PAStimes Newsletter for January is due to post to the site. The rule of thumb is that the Sunday before the next PAS meeting is when you should look for the Newsletter to be live and ready for you to download and enjoy. The deadline for the January issue falls on January 15th. Most likely our Editor Don Boyd will have the Newsletter ready before then, but BY Jan 15th, you should be looking for the January issue. Thank you for your patience and understanding. See you at the January 19th PAS Meeting!

Introduction to Amateur Astronomy

By Richard Pipkin, PAS Member

Here's something that might be of interest to PAS members and the general public:

During the pandemic, the Kalamazoo Astronomical Society produced a 5-part Zoom series entitled, "Introduction to Amateur Astronomy". I watched the series (and even got my name mentioned in the "Congratulations Graduates" video) and found them entertaining and often informative. Links to the series are available on KAS's YouTube channel here:

Part 1, "Our Place Among the Infinities"

https//www.youtube.com/watch?v=a7n5GUcO1Ko

Part 2, "Discovering the Night Sky"

https//www.youtube.com/watch?v=GJmpuV7m494

Part 3, "Binocular Basics"

https//www.youtube.com/watch?v=tWhrykE8WZE

Part 4, "Telescope Tutorial"

https//www.youtube.com/watch?v=p_ZPiCLmepY

Part 5, "The Art of Astrophotography"

https//www.youtube.com/watch?v=LQOMW1Q5jOE

The series is also presented in PDF documents. Enjoy!

December Meeting Swap Meet

By Terri, Event Manager

PAS would like to hold the annual PAS Swap Meet again this year. To do that, we have two types of tables to set up along the sides of the room.

Down the left side, when you walk in, we will have the Garage Sale set up. If you have an item you would like to just get a few dollars for, stick a price on it, be ready for the attending folk to talk you down on the price, as that is what happens at garage sales, and then sell it off. So, to be prepared for this side of the room, price your items and put them together, all yours, in one location along the left wall of the room.

Down the right side of the room we will have the Silent Auction / Swap Meet. Bring your item and its accessories. Bring a piece of paper and a pencil and on the page write down what the item is, all its accessories that go with it, and your starting bid. Leave room for others to bid. During the evening, those interested can walk over to your items and counter bid. They put their bid plus their initials, or first name and last initial next to their bid. Highest bid gets the item.

I will try to remember to bring paper and pencils for those who forget, so everyone can get bids on their items. At the end of the meeting, usually about 9:30pm, the sales begin with the idea of everyone being done with swapping money for purchased items by 9:45pm.

Come prepared with cash to do your trades. Sell off things you don't want to keep any more, so you have money to spend on new stuff. In the past, this has been a great way to help those of you who have equipment you don't use, get it into the hands of people who would appreciate using it. Anything and everything used or new that is astronomy-related is able to be in this swap meet.

Items to consider selling include a stool you use for observing, a table that folds up small, star charts, scopes, eyepieces, filters, green lasers, red flashlights, observing hats, t-shirts in decent condition, and more. Bring it, put it in either the garage sale side or the silent auction side of the room, and get it sold. Everyone has something new they are seeking to purchase and this little bit of a sale could help you get what you want. Doors open at 7pm. We will start the sales about 7:30pm to allow everyone to get there before the first sale. See you there! Good luck with your sale!

Lunacy

By Dr. Alex Vrenios, PAS Secretary and Newsletter Proofing Team

There is never anything worth watching on Friday night TV. Even the public television stations seem to air the least interesting stuff they've got when I want more than anything to just sit and be entertained for a couple of hours. The sky was clear earlier. Maybe I'll go outside and see what's up.

I roll the 8-inch out onto the observation pad, plug it in, level it, and point it roughly south. I flip the ON switch, step back, and watch it do a little dance while it auto-aligns itself. Technology.

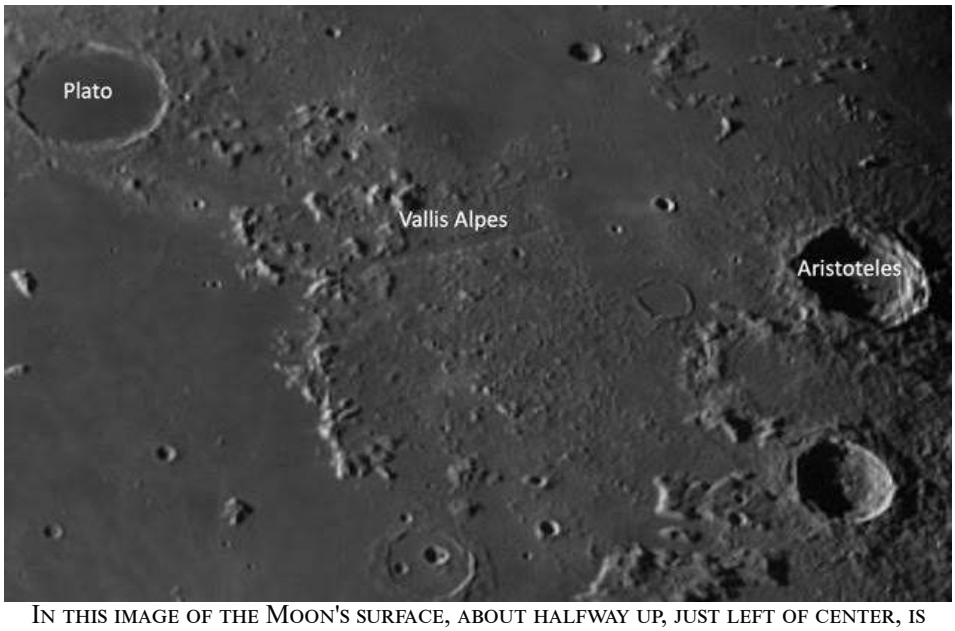
There's a fairly well-lit Moon up tonight, washing out most of the interesting stellar objects. Maybe the Moon itself has something to show me – why not have a look?

It's almost uncomfortably bright tonight, but I've got a lunar filter out here somewhere. With that in place I can relax and enjoy the view. There are lots of interesting features on the Moon, but a mountain range in the northeast, between Plato and Aristoteles, always catches my eye. There is an unnatural looking valley, over a hundred miles long, that cuts right through it. I imagined that it was the result of a grazing blow from a meteor, but the books say it's a stress fracture. My explanation may be wrong, but I think it's a much more interesting story.

I try to imagine what it might look like if I were up there on the lunar surface. I think about that a lot, actually. When NASA published the first photographs taken by our lunar astronauts, I tried to match their views to what my Moon atlas showed. What a magnificent landscape!

From there I scan a little to the southwest until I see the majestic crater Archimedes. I imagine landing just north of that crater. Montes Spitzbergen is just west of me, and craters Aristillus and Autolycus lie to the east. Beyond them I can see a huge gap between two mountain ranges, a pathway between Mares Imbrium and Serenitatis.

Mare Imbrium has two old landing sites. Straight west of me, near the southern edge of Sinus Iridum, is where Russia's Luna 17 may still be found. This was an unmanned mission that launched the first robotic rover on the Moon's surface, back in 1970. Halfway back and up north a bit, is where a more recent lander rests. China's Chang'e 3 was launched in December 2013. I know how impossible it is to see either of them from here, but I look anyway. How interesting it would be to walk around and inspect their remains. But it's getting late.



In this image of the Moon's surface, about halfway up, just left of center, is Alpine Valley, the unnatural feature referred to in this article. The crater in the upper left corner is Plato and, to the far right, halfway up is Aristoteles. (Below that is Eudoxus, but it is not mentioned.) Photo and caption provided by Dr. Alex Vrenios.

By Cheryl White, PAS Member and Newsletter Proofing Team

Alex, I loved your article above about rolling your 8-inch to the observation pad, looking at the moon, and pondering lunar debris - it sounded amazing. As I read it, I could not help but think if I wrote a similar article it would be something like this: It was a clear, cool night. I should be asleep but I carried my decrepit 100mm second-hand refractor across the gravel to a spot between my house and the neighbor's house and added some tape to the as-usual-collapsing tripod-leg. No need to level or align to the north, I just manually swung the scope in the direction of Jupiter, now a few degrees above the neighbor's roof, air disturbance not too bad, found Jupiter in the eyepiece and enjoyed the view, manually tweaking the alt-az knobs every 30 seconds or so. Hello moons! Damn! I love the night sky!

Thanks to Newsletter Team

By Secretary Richard Sauerbrun

Congratulations on another GREAT newsletter (referring to the November 2022 issue)! I just wanted you to know how much I appreciate your hard work. This newsletter is one of the key values we offer our members. Well done (again).

By Terri Finch, Assistant Editor

I wish to take a moment to thank the current Newsletter Team. Without the whole team, the club newsletters would not be as great as they are. We have two article and caption proofers: Alex Vrenios and Cheryl White, and we have Don Boyd who is the Editor and assembles the newsletter, and then I do the formatting, and layout proofing, and all of this takes about three weeks to successfully happen each month. But it can't be done without the whole team. Thank you Newsletter Team!

Free Music Lessons

By Terri Finch on behalf of Ed Wurst

What does music have to do with Astronomy? Just before Covid-19 hit the world, PAS had a yearly music jam at the PAS Social held in January each year. Many of the musicians passed away during Covid, not just from Covid, and so our Music Jams have dwindled to very few in attendance.

My Dad, Ed Wurst is offering FREE Music Lessons for anyone wanting to learn how to plan an instrument. The only thing you have to do to take these lessons is own the instrument you wish to learn to play, attend music lessons as frequently as you can (up to 1 time a week but it can be every other week if that frequency doesn't fit your schedule) and practice what you are taught. As long as you have a desire to learn and you put what you are taught into your daily practice of your instrument, lessons can continue for free.

You also have to drive to Dad as he isn't driving much these days. He just celebrated his 91st birthday. The location of the lessons will be near 28th Street and Cactus Rd in Phoenix. It's just down the street from PVCC Main Campus. Reach out to Dad to find out if he is offering your instrument for lessons at 602-971-3355. Leave a message with your name, the instrument you wish to learn, and your phone number so he can call you back if he isn't near the phone at the time you call. Then, join the PAS Music Jam usually held in January, after the Holiday rush is over.

PAS Needs a Meeting Host

By Terri, Event Manager

At the December PAS Meeting, Bob Ewing will be serving as PAS Meeting Host for the last time. PAS will then be without a Meeting Host starting with the January 2023 PAS Meeting. If you would like to fill the shoes of this position, it would be greatly appreciated for you to be Acting Meeting Host until a time when President Stu can appoint you officially. Please reach out to Stu at his email above, to express your interest.

What does the Meeting Host do? For in-person meetings only, so this is a once a month obligation, as Meeting Host you would greet everyone who comes to the in-person meetings at PVCC Main Campus LS-205 each month for Jan, Feb, Mar, Apr, and May 2023. Greet them, make them feel welcome, have them sign in on the sign-in sheet if they are new to PAS with just their name and email address. Then, after the meeting, send the collected names and emails to the Board and Terri so a PAS officer can reach out to those new attendees with a "Nice to have met you at the meeting" email. This is an easy duty to complete once a month.

For additional duties of the PAS Meeting host, you would be expected to attend all Board Meetings to be on hand to put in your vote as to how the club functions. Board Meetings or Meeting of the Minds, as we call them, are club business meetings and do not coincide with the main PAS Meetings with Guest Speakers, usually. So, other Thursdays, besides the main PAS Meeting, you may be requested to attend an additional meeting, most likely through Zoom, to help decide club business. We'd love to have you be part of the PAS Board by being our PAS Meeting Host.

Place your Astronomy Equipment Ad in this Newsletter

Do you have some astronomy-related items you'd like to sell? Prepare an ad and send it my way so that Don and I can help you sell it through the club newsletter. Items you may wish to sell: Books, Star Charts, Telescopes, Eyepieces, Finder Scopes, and more. As long as it is astronomy-related, I will happily add it to the newsletter. Please include all items you wish to sell, and what is included with those items. Price them, and provide contact info for the way you wish to be notified, such as email or phone number. I await your submissions. Send them to Editor@pasaz.org.

Ads for items for sale listed in PAStimes Newsletter are written by the seller. PAS is not responsible for the ads and does not guarantee the quality of the items for sale. PAS reminds everyone, you purchase at your own risk, so do your research beforehand.

Ads in PAStimes run for one month and may be renewed on a month-to-month basis, space permitting, as long as the request to run the ad again is submitted by deadline (10th of month). Ads in PAStimes are FREE for PAS members. Non-members are asked to make a small donation to PAS. Non-members may email Terri, Assistant Editor at Starstuff@gmail.com to place their ad and get details on where to send a donation, via check or money order, made out to Phoenix Astronomical Society.

The deadline for the next issue will be the 10th of the month. These items and more can also be seen with photos on the PASaz.org website here: https://www.pasaz.org/items-for-sale

***Brand new, unused,(Cost $249 preTax currently, online.) Celestron 24mm Ultra Flat Field eyepiece $150, 1.25" eyepiece mounting barrel is able to accept standard 1.25" filters and adapters and is compatible with 1.25" star diagonals and focusers. Beautiful 65 degree field of view, Multi-coated 8-element lens design for enhanced light transmission, 29mm eye relief and fold-down rubber eyeguard. Huetech IDAS LPS-D1 Light Pollution clip-in Filter for Canon EOS APC, I'll sell for $100, another good deal. Hardly used, as I bought a QHY 268 camera. Contact Greg gmeyer28@cox.net.

***Meade 3X Telenegative Multi-Coated Barlow Lens 1.25 Telescope $35 barely used

Celestron Focus Motor for SCT, EdgeHD & RASA $175 used, but in excellent working condition

Contact Richard at 480-766-2814 or richard@sauerbrun.com

***Losmandy G-11 mount -- Hardware upgrades + Digital Drive + Nexus II Digital Setting Circles + 311,296 steps encoders

QHY PoleMaster EQ Mount Polar Alignment Camera + mount for G-11 + generic mount

Sky-Watcher EvoGuide 50ED APO Guide Scope Astrograph + Parallax pings + Losmandy plate

Lots of small stuff, adapters, plates, electronics, etc.

Contact Chris westland@uic.edu or 312-860-0587.

Solstice Shadows

By David Prosper

Solstices mark the changing of seasons, occurring twice a year, and feature the year's shortest and longest daylight hours - depending on your hemisphere. These extremes in the length of day and night make solstice days more noticeable to many observers than the subtle equality of day and night experienced during equinoxes. Solstices were some of our earliest astronomical observations, celebrated throughout history via many summer and winter celebrations.

Solstices occur twice yearly, and in 2022 they arrive on June 21 at 5:13 am EDT (9:13 UTC), and December 21 at 4:48pm EST (21:48 UTC). The June solstice marks the moment when the Sun is at its northernmost position in relation to Earth's equator, and the December solstice marks its southernmost position. The summer solstice occurs on the day when the Sun reaches its highest point at solar noon for regions outside of the tropics, and those observers experience the longest amount of daylight for the year. Conversely, during the winter solstice, the Sun is at its lowest point at solar noon for the year and observers outside of the tropics experience the least amount of daylight – and the and the longest night – of the year. The June solstice marks the beginning of summer for folks in the Northern Hemisphere and winter for Southern Hemisphere folks, and in December the opposite is true, as a result of the tilt of Earth's axis of rotation. For example, this means that the Northern Hemisphere receives more direct light from the Sun than the Southern Hemisphere during the June solstice. Earth's tilt is enough that northern polar regions experience 24-hour sunlight during the June solstice, while southern polar regions experience 24-hour night, deep in Earth's shadow. That same tilt means that the Earth's polar regions also experience a reversal of light and shadow half a year later in December, with 24 hours of night in the north and 24 hours of daylight in the south. Depending on how close you are to the poles, these extreme lighting conditions can last for many months, their duration lengthening the closer you are to the poles.

While solstice days are very noticeable to observers in mid-to-high latitudes, that's not the case for observers in the tropics – areas of Earth found between the Tropic of Cancer and the Tropic of Capricorn. Instead, individuals experience two "zero shadow" days per year. On these days, with the sun directly overhead, at solar noon, objects cast a minimal shadow compared to the rest of the year. If you want to see your own shadow at that moment, you have to jump! The exact date for zero shadow days depends on latitude; observers on the Tropic of Cancer (23.5° north of the equator) experience a zero shadow day on the June solstice, and observers on the Tropic of Capricorn (23.5° south of the equator) get their zero shadow day on December's solstice. Observers on the equator experience two zero shadow days, being exactly in between these two lines of latitude; equatorial zero shadow days fall on the March and September equinoxes.

There is some serious science that can be done by carefully observing solstice shadows. In approximately 200 BC, Eratosthenes is said to have observed sunlight shining straight down the shaft of a well during high noon on the solstice, near the modern-day Egyptian city of Aswan. Inspired, he compared measurements of solstice shadows between that location and measurements taken north, in the city of Alexandria. By calculating the difference in the lengths of these shadows, along with the distance between the two cities, Eratosthenes calculated a rough early estimate for the circumference of Earth – and also provided further evidence that the Earth is a sphere!

Are you having difficulty visualizing solstice lighting and geometry? You can build a "Suntrack" model that helps demonstrate the path the Sun takes through the sky during the seasons; find instructions at stanford.io/3FY4mBm. You can find more fun activities and resources like this model on NASA Wavelength: science.nasa.gov/learners/wavelength. And of course, discover the latest NASA science at nasa.gov.

This article is distributed by NASA's Night Sky Network (NSN). The NSN supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

These images from NASA's DSCOVR mission shows the Sun-facing side of Earth during the December 2018 solstice (left) and June 2019 solstice (right). Notice how much of each hemisphere is visible in each photo; December's solstice heavily favors the Southern Hemisphere and shows all of South America and much of Antarctica and the South Pole, but only some of North America. June's solstice, in contrast, heavily favors the Northern Hemisphere and shows the North Pole and the entirety of North America, but only some of South America. Credit: NASA/DSCOVR EPIC Source: https://www.nasa.gov/image-feature/goddard/2021/summer-solstice-in-the-northern-hemisphere

A presenter from the San Antonio Astronomy Club in Puerto Rico demonstrating some Earth-Sun geometry to a group during a "Zero Shadow Day" event. As Puerto Rico lies a few degrees south of the Tropic of Cancer, their two zero shadow days arrive just a few weeks before and after the June solstice. Globes are a handy and practical way to help visualize solstices and equinoxes for large outdoor groups, especially outdoors during sunny days! Credit & Source: Juan Velázquez / San Antonio Astronomy Club

Boy Scouts Star Party Oct 14th

By Terri Finch, Event Manager

Andy Weflen was our contact for a Boy Scout troop that met at St. Thomas the Apostle School for an amazing star party that involved Mike Marron and his collection of meteorites, and Ted Blank, who wow'd the scouts with the many objects they viewed that night.

By Ted Blank, Solar System Ambassador

Thanks, Andy! I really enjoyed hearing all the oohs and aahs of the kids. I explained to them how far away Saturn was and why we could see it at all. The younger the kids, the more of Jupiter' moons they could see, the record was 5. I could see two. :-) Jupiter's moons were also a hit. I had a line of kids from 7:15 pm right until 9:00 pm when you called lights out for the campers. The scouts were also very helpful carrying my equipment to and from the center of the field, so please thank them for that.

By Andy Weflen

We had our star party and it was great! Mike and Ted did such an awesome job and I heard from many parents about how cool it was that their kids got to see Jupiter and Saturn and check out meteorites! I attached a couple photos of some of the kids checking out Mike's space rocks Thank you all so much for putting on a great event!

Mike's Meteorites and some curious gatherers around Mike's table. Photo provided to PAS by Andy Weflen.

The table is FULL of meteorites, and the crowd has become more numerous around Mike's Meteorite table. Photo by Andy Weflen.

Telescope Workshop of Oct 20th

By Terri Finch, Event Manager

It was a clear-ish night. The temperature was comfortable, the people who attended this event were marvelous and I think everyone was happy with the help they received.

For PAS Telescope Teachers we had: Richard Sauerbrun, William and Terri Finch, Richard Pipkin, Bruce and Ed Wurst and Stu Brackney. All my teachers arrived on time and helped in any way they could. Thank you all.

For Students at this class we had: Ritz and Alexis wanting to know what telescope to purchase, Jean Jenkins with a SoloMark F700700EQ and Tim and Richard P. assisted Jean, Amelie, Arun, Lisa and Ronan had brought Amielie's Celestron Inspire 100AZ and Richard S. assisted them. Mason brought his CPC 1100 with Wedge and Power Align, and a Star Finder that needs to have a clutch repaired. Bruce assisted Mason the whole night. And Jill Ormand, a PAS Member, came to find out what telescope to purchase. William and I did the "What telescope to purchase" part of this event but Tim Clapp, Stu, and Ed gave input, and advice was asked of Bruce as well. I'd like to greatly thank those students who made the RSVP and attended.

We had three scopes that did not show up. I do hope they will join us for the next Telescope Workshop on December 8th. There is no Telescope Workshop for November, it just didn't work in the time available for a classroom at PVCC and for PAS's schedule.

By President Stu Brackney

Nice job last night everyone. Special thanks goes to Jennifer Neujoy for ensuring our classroom was open for us and the security guy who unlocked the door, Karl Bathel. Karl stopped in for a little while just to see what was going on and listen.

Although a telescope or two didn't show up we had a very good group of enthusiastic students (adults and family members) with our PAS members as the Teachers to share. That's what it is all about. Have a rewarding weekend everyone.

Girl Scout Star Party Oct 21

By Terri Finch, Event Manager

It was a perfect day for a star party at Mike's home in Carefree. The girl scout group managed by Amy Vynalek met with PAS at Mike Marron's home for a very wonderful star party.

Amy had three other adults with her and nine kids - eight girl scouts and her son. There were a total of thirteen in attendance from the Girl Scout group, and Mike Marron hosted the party, Terri Finch and William Finch, and Ted Blank attended. This provided two telescopes and four astronomers a chance to have a great time with a bunch of really nice scouts.

The evening started with parking the vehicles at the front of Mike's home such that if the scouts wanted to leave before the end of the event at 9pm, they could do so without disturbing the rest of the viewing going on at the back of the house. No one left early. While the parking was happening a family of three deer visited Mike's house. Mike, William and I were watching the deer before the scouts' cars arrived. The kids just loved seeing the deer.

Steve and Debbie, who just flew in from Florida, arrived to do astrophotography. They hadn't even gone to their hotel room before coming straight to Mike's house with their telescope that they brought with them on the airplane. Mike set them up separate from the girl scout event. They seemed to enjoy the evening as well.

So, it got dark. The girl scouts started out, before 7:00 pm, in Mike's house looking at the many meteorites Mike had in his home. Twenty minutes later, they came outside, and since Jupiter and Saturn were the brightest items in the sky, I showed Jupiter, and Ted showed Saturn. The adults were in AWE. The kids liked it but didn't seem to be as excited. It wasn't dark enough yet, so while their eyes adjusted, Ted did a sky tour with his Green Laser. This was about ten minutes long and he did it so well. I was very intrigued by what he shared with the girl scouts and how INTO his presentation the girls were.

Then we went over to my table and I explained the game we were going to play and what prizes they would receive if they played the game with me. We were doing a Space Safari as one part. Each object viewed and listed in the proper square is 1 point. Three winners for that game listed what objects they saw through the telescope, in the correct boxes finding a planet, a nebula, a galaxy, etc.

The second game we were playing at the same time as the first game was to put the objects they see in the night sky onto their star chart and count how many they were able to see on this night, 1 point for each correctly logged object. Again, the top three scores won a prize. This was done on the honor system. One girl claimed to get 22 points on each page. If anyone won both games, they were asked to share the winnings with others in their group, such that the winner would only get one poster, and one red flashlight, but give to the rest of the girls who didn't get a high score on the game. Ted had offered more prizes so everyone there got one sticker and one set of Solar System Trading Cards provided by Ted. From me, I provided six posters and seven red flashlights as prizes for the top winners. There were only eight girls, so everyone left with several prizes.

The games began. After Jupiter, I showed the Pleiades naked eye, the Perseus Double Cluster and the girls kept asking me questions so I spent a lot of time working with them at my table, rather than showing objects.

Ted was wonderful. The girls told me they saw Hercules Globular Cluster, the Ring Nebula, Saturn and more. Some of the girls memorized the names of four of the moons of Saturn that they could see, and the four moons of Jupiter I was showing.

It was a very fun evening. Then the girls started getting tired, so they found their jackets, had snacks, and started winding down. They thanked us for a fun night and left. Shortly after, Ted and I took down our equipment and headed home as well. I noticed about that same time Steve and Debbie also packed up and left.

While waiting for the Girl Scouts to arrive for the star party at Mike's home in Carefree, we were visited by a very hungry deer who enjoyed the bird seed outside of Mike's living room window. Photo by Terri Finch.

Many thanks to Amy and her wonderful scouts and the adults who helped out with keeping the kids together.

Many thanks to Mike for hosting the party. It was a beautiful night for a star party and everyone seemed to totally enjoy the evening. And many thanks to Ted for saving the day with more prizes to give so everyone involved left with something to remember the event by.

Ted Blank adds: Hi Terri, it was fun last night. We looked at nebulae (Ring Nebula), globular clusters (M13), double stars (Albireo), planets (Jupiter and Saturn), galaxies (M81 and M82), open clusters (Double cluster in Perseus), and a few other things. The scouts were well behaved and asked a lot of good questions.

"Good Night Oppy"

By Terri Finch, Event Manager

On Sept 30 and Oct 1st, the Arizona Science Center (ASC) invited PAS members to come promote PAS and Astronomy for their Astronomy Weekend at the Arizona Science Center.

This happened on Friday, Sept 30 which was Family Astronomy Night and Saturday Oct 1st for PAS. It continued to Sunday Oct 2nd at the science center but PAS did not participate past 2 exhausting days.

Mike Marron, William & Terri Finch, Don Boyd, Ted & Peggy Blank, and Mark Johnston promoted astronomy that weekend on Friday evening & all day Saturday. If you wish to read about it, check out the review of the event in the November 2022 PAStimes issue on page 8. It was a fun event!

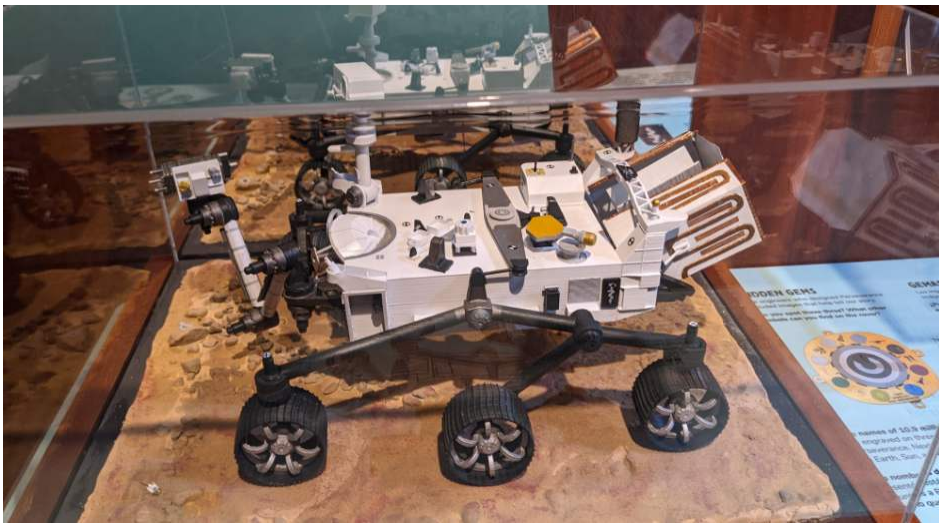
PAS members who did the event at ASC on Astronomy Weekend were treated to a preview on October 22, of an Amazon Prime documentary that doesn't get shown to the public until Nov 8, 2022. It was called "Good Night Oppy."

The documentary was about 1.5 hours long and really tugged on the heart strings, very emotional but well planned out. It's a story worth seeing about 2 rovers on Mars who outlived their expected 90 days of life, Spirit and Opportunity. If you get the chance to see it on Amazon Prime, I highly recommend it.

I wish to thank the science Center for inviting PAS Members to see this film in their large screen theater. Many thanks goes to Evelyn Madden who is in charge of the Space Science department of ASC.

After the movie, William, Don and I walked around the Science center until it closed at 4pm checking out the new interactive displays.

At the Arizona Science Center there is an interactive display of the Opportunity Rover on the surface of Mars that one can try to program to get from where it is to a designated location on the surface of Mars as seen in this photo. It wasn't as easy as it looks. But it was fun to try. Photo by Terri Finch.



This is a model of the Opportunity Rover in a display case. Photo by Terri.

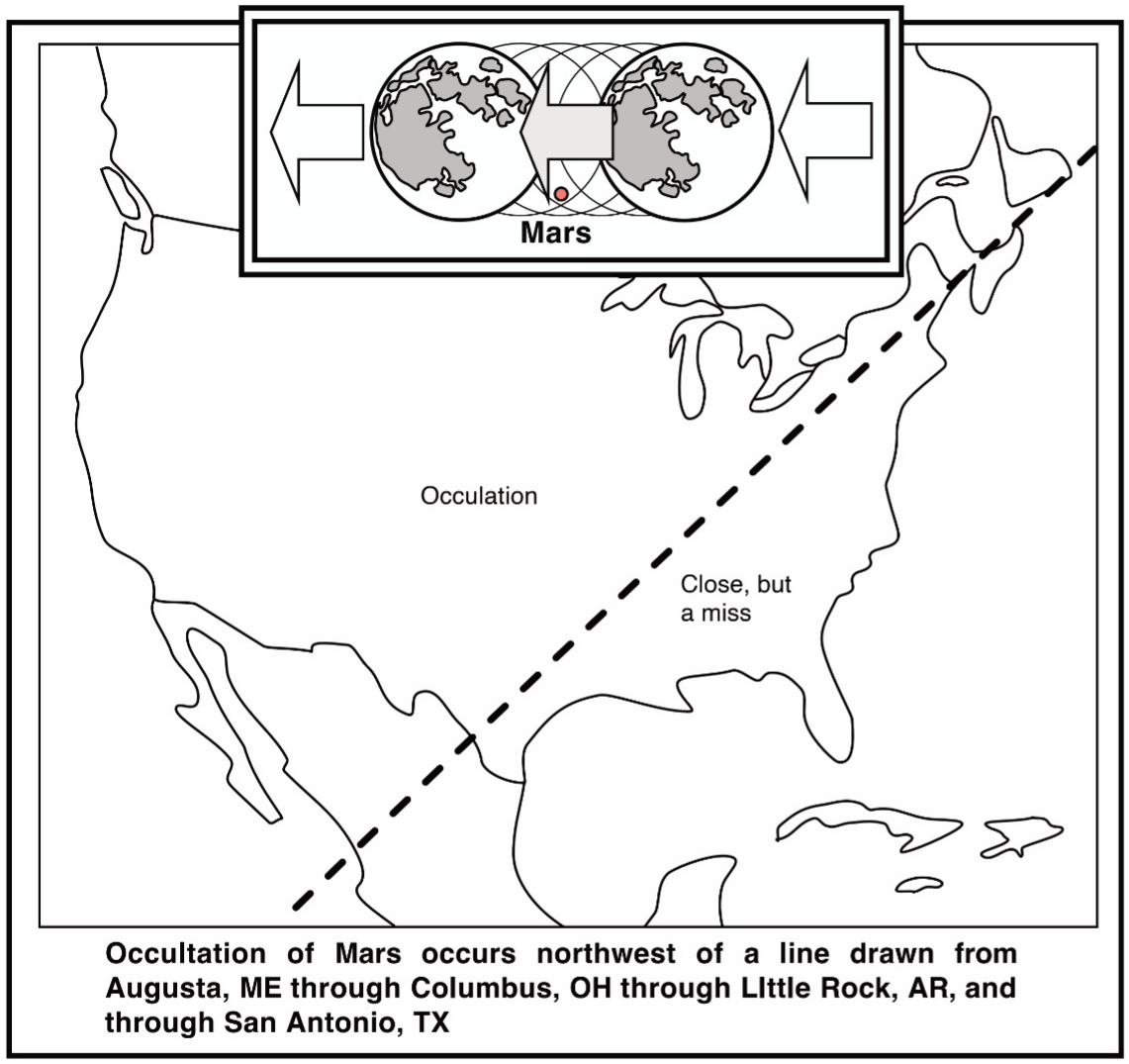
PAS Secretary Position is Open

By Terri Finch, Event Manager

It is sad to say that our current Secretary, Alex Vrenios, needs to step down from the position that he has performed so very well for the club. Because of this, the position of PAS Secretary is available to anyone wishing to volunteer to be the next Secretary of PAS.

What does the Secretary do? The Secretary takes the Minutes of the Meetings, and should be at all PAS Business Meetings (called Meeting of the Minds) and PAS Board Meetings (in person or virtually) to record the minutes of those meetings. The Secretary also makes and sends out the PAS Press Releases to announce upcoming PUBLIC events to the various sources that have been used and collected through the years for promoting these types of events. The Secretary is an Officer Position and has Voting Rights to help make decisions about how PAS, as a club, functions. This is not a time-intensive position, but it is very necessary to the club and if you wish to be Secretary, please contact President Stu at President@pasaz.org. PAS would appreciate your help.

If you can see only one celestial event this December, see this one.



Occultation of Mars occurs northwest of a line drawn from Augusta, ME through Columbus, OH through LIttle Rock, AR, and through San Antonio, TX

Full Moon occults Bright Mars

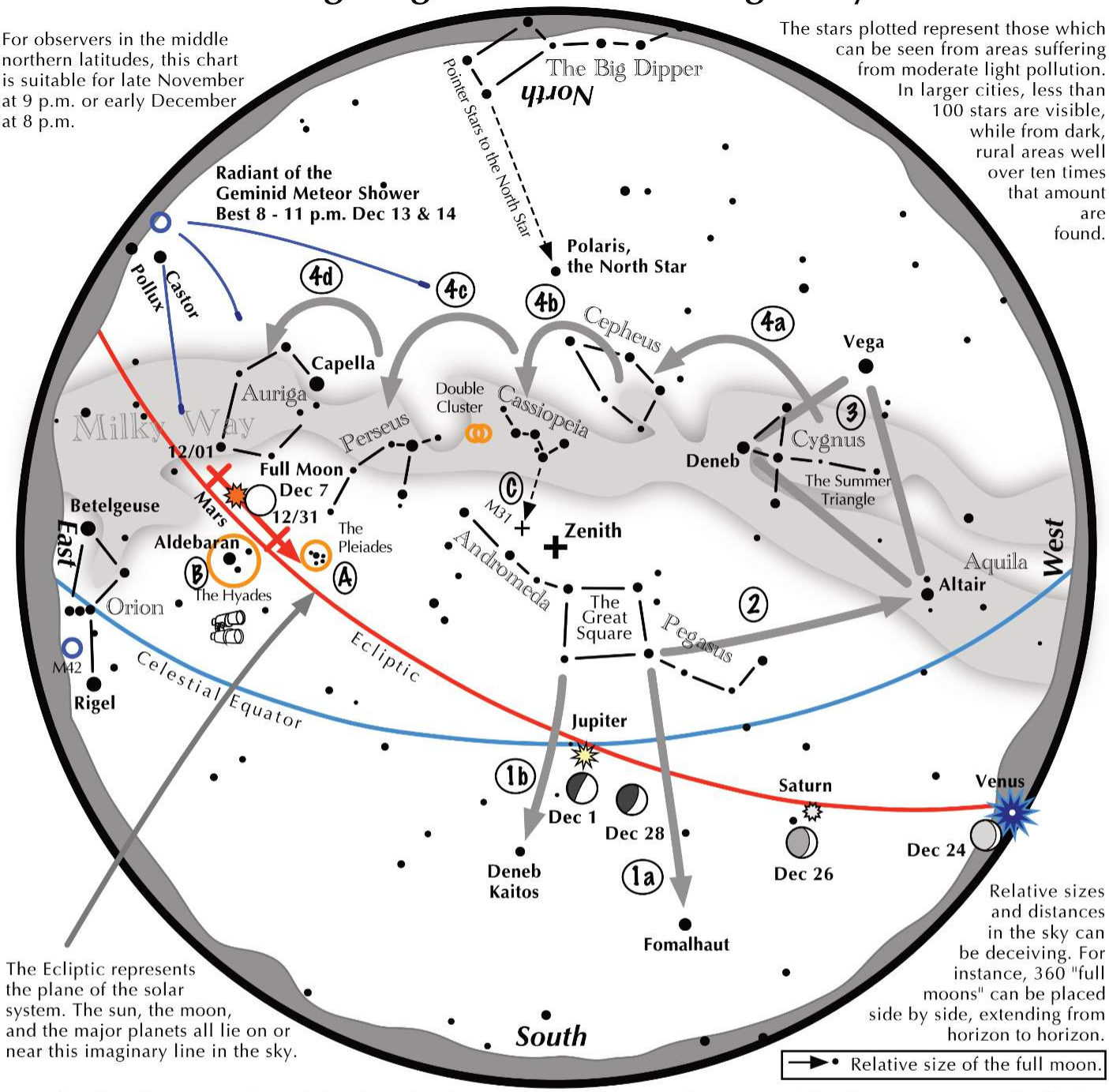
In the evening hours of **Dec. 7**, the brilliant full moon passes in front of bright Mars, which is at opposition, for viewers west of a line drawn from August, ME through San Antonio, TX. It may not be easy to see because of the moon's bright glare!

Approximate local times of disappearance and reappearance. Begin viewing a few minutes before listed disappearance time. Mars' time and position of reappearance is hard to judge since the planet lies concealed behind the moon beforehand.

City	Disappearance	Reappearance
Augusta	10:57	11:25
Austin	8:58	9:12
Buffalo	10:32	11:13
Chicago	9:10	10:04
Columbus	10:26	10:56
Denver	7:45	8:47
Indianapolis	10:16	10:56
Kansas City	8:57	9:51
Little Rock	9:06	9:32
Los Angeles	6:31	7:30
Phoenix	7:32	8:30
Salt Lake City	7:42	8:45
San Antonio	8:59	9:07
San Francisco	6:36	7:35
Seattle	6:53	7:50

Occultations demonstrate the moon's eastward orbital motion as Earth's rotation causes it to move in a westward arc across the night sky.

Navigating the December Night Sky



Navigating the December night sky: Simply start with what you know or with what you can easily find.

1. Face south. Almost overhead is the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend an imaginary line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the southwest. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second bright star in the south.
2. Draw another line, this time westward following the southern edge of the Square. It strikes Altair, part of the "Summer Triangle."
3. Locate Vega and Deneb, the other two stars of the "Summer Triangle. Vega is its brightest member while Deneb sits in the middle of the Milky Way.
4. Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, to Perseus, and finally to Auriga with its bright star Capella.

Binocular Highlights
A and B: Examine the stars of the Pleiades and Hyades, two naked eye star clusters.
C: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.
D: Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas.