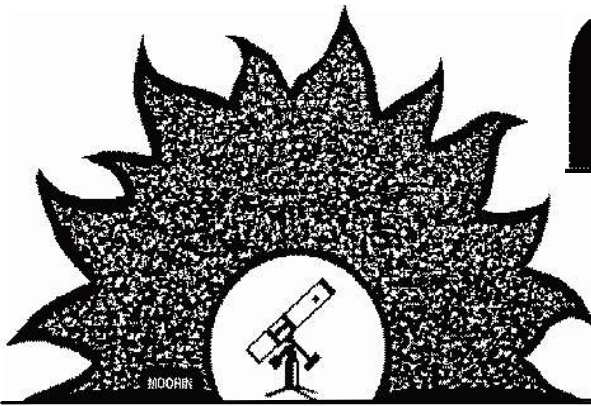




PAStimes

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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

A HALF CENTURY OF ASTRONOMICAL PHOTOGRAPHY

By Klaus Brasch

For nearly two centuries now, photography has been a major tool in the arsenal of astronomers. Since the first daguerreotype of the Moon in 1839, photography, first film based and now digitally, has contributed greatly to our understanding of the universe and to fully appreciate its complexity and extraordinary beauty. I was fortunate to discover that over 50 years ago as a teenager with my first modest telescope to this day with far larger and better optical equipment and the power of digital

technology. I invite you to join me on this journey.

Klaus Brasch is a retired biomedical scientist with a life-long interest in astronomy. He served as a volunteer in the public program at Lowell Observatory and has made presentations ranging from astrophotography to life in the universe. He has authored and co-authored numerous articles, most recently in *Sky & Telescope* (Nov 2021) and *Astronomy magazine* (Aug 2022). Asteroid 25226 Brasch-1998 was named for his work at Lowell Observatory.



Klaus Brasch will enlighten your evening with his presentation. Photo provided to PAStimes NL by Klaus.

OCTOBER 6 PAS MEETING

By Terri, Event Manager

Klaus Brasch has agreed to give a presentation titled "A Half Century of Astronomical Photography" to the Phoenix Astronomical Society on Thursday October 6, 2022. He has requested that he give his presentation remotely through Zoom.

Klaus has given PAS two previous presentations: Sept 3, 2020 "The

Photographic Legacy of Lowell's Great Refractor" and November 4, 2021 "The Search for Life in the Universe." Both were informative and excellent presentations.

Come in person or through Zoom to the October PAS Meeting to enjoy the presentation by Klaus Brasch. It will be spectacular! PAS is anticipating a huge turnout for this presentation. You don't

want to miss it. Bring your family and friends to learn more about this exciting topic. Meeting doors open 7pm and the Guest Speaker begins after some brief announcements about 7:30pm.

Here is the Zoom link for this meeting: <https://us02web.zoom.us/j/81193628193?pwd=NIBZN2IU204VnVySk5SZXhtZWc2UT09>.

A RECAP OF OUR SEPTEMBER 8, 2022 MEETING OF THE MINDS

by Alex Vrenios, PAS Secretary

A Meeting of the Minds, or MOM as we like to call it, is for PAS members only. When the Board creates a set of recommendations that must be approved by the membership, we announce a MOM so members can attend our presentation, and vote to accept or reject them. In this case, amendments to our Bylaws.

We compiled three sets of changes: classes of membership, terms of office, and the definition of a quorum for Board meetings and MOMs. Changes to our

Bylaws require a 2/3 majority of the members present to pass. While ordinary policy changes require a simple majority, we take any changes to our Bylaws seriously.

President Stuart Brackney opened the meeting at 7 pm.

The classes of membership amendment focused on dropping the Family Membership option from the Regular Membership class. The Board decided that Single, Student, and Lifetime membership options were enough, and

that if a spouse, for example, were sufficiently interested in PAS business meetings and holding office, they would opt for a traditional Single Membership.

A spouse, or any family member for that matter, is welcome at all PAS events. Even members-only events like star parties, socials, etc., are usually designated "members and their guests." But there was considerable opposition to the change and it was voted down.

The Terms of Office changes focused on the day that a newly elected officer
See "Sept 8 MOM" on page 4.

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Member at Large	Jenny Neujoy	602-787-6818	
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Phoenix Astronomical Society 3241 E Shea Blvd #249 Phoenix AZ 85028-3365			

PAST PAS RECORDED PRESENTATIONS

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!

ASTRONOMY WEEKEND AT ARIZONA SCIENCE CENTER SEPT 30 STAR PARTY, OCT 1 SOLAR VIEWING

By Terri, Event Manager

The Arizona Science Center has requested PAS attend to promote Astronomy for Astronomy Weekend. They will be having a bunch of great things going on over this three day weekend of Sept 30, Oct 1 and Oct 2.

PAS is sending 3 of its members down to ASC to help share Astronomy with the public on Friday & Saturday. Mike Marron and Don Boyd will be outdoors with Don's telescope on Sept 30 from 6:30pm to 9:30pm. Mark Johnston will be there doing a very awesome Solar viewing activity outdoors from 11am to 2pm on Saturday Oct 1 and Mike & Don will be indoors all day Saturday from 10:30am to 4pm with Mike's awesome Meteorites.

You don't want to miss this! No RSVP needed, just go have a good time at the Arizona Science Center and stop by and visit the PAS Telescope Team.

WHAT'S UP FOR OCTOBER

By DON K. BOYD, PASTIMES EDITOR

Name	Date	Rise	Set
Mercury	10-15-22	05:20	17:19
Venus	10-15-22	06:26	17:53
Mars	10-15-22	21:16	11:34
Jupiter	10-15-22	16:57	05:00
Saturn	10-15-22	14:59	01:37
Uranus	10-15-22	19:03	08:43
Neptune	10-15-21	16:35	04:23
Pluto	10-15-22	13:48	11:42

All Times Arizona Time

Bold means the object is "visible" in the evening

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

OCTOBER 15, 2022

Sunrise: 06:33

Sunset: 17:54



Q1: October 2 & October 31



Full: October 09



Q3: October 17



New: October 25



FALL 2022 PAS GUEST SPEAKERS

PAS has decided to do In-Person Meetings! It was discovered that ALL PAS Meetings with Guest Speaker held at PVCC can be In Person as well as Via Zoom in a HYBRID Meeting at the same time. Those of you wishing to attend the meeting In Person, please meet in LS-205 at PVCC Main Campus (map to left of this article). If you wish to watch the meeting via Zoom, that option is available and a Zoom link for each meeting shall be added to the website calendar, and the link will be in each newsletter in the article about the next PAS meeting on page 1. Please visit the PAS calendar at [PASaz.org](https://pasaz.org) to find out more about these upcoming meetings and guest speakers. For a complete list of guest speakers & the Zoom meeting link, visit: <https://docs.google.com/document/d/100-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:

Nov 3: Ted Blank, "Zero Gravity Pizza"

Dec 1: David Williams, Topic: TBA

Jan 19, 2023: TBA

More Details & More Events at [PASaz.org](https://pasaz.org)

(Continued from page 1)

should begin his or her responsibilities. Originally, the begin time was the first meeting after the summer break, in September. If you recall last month's PAStimes newsletter article, Board members were all summer. The Board decided to set the starting date to immediately after the vote was certified, at the May annual business meeting. This was well received and passed easily.

A quorum is one of those Latin words that has no simple English equivalent. It the number of members that must be present at a meeting in order to conduct PAS business. The original definition was something like "the number of members

SEPT 8TH MOM

present." Perhaps the current political climate had an undo influence on it, but it was pointed out that any one person could declare a meeting and do serious harm to our club! No one doubted how unlikely such an occurrence was, but... This also passed pretty easily.

Now for the fun stuff. Pete Turner, our webmaster and technical guru, gave us a demonstration of our new automated membership webpage. To join or renew, you type in your name, address, etc., into the form, select your membership type and method of payment, and you're done – simple as that. You will receive an email from us affirming your elections, and one

from PayPal, a receipt of payment. (Ordinary debit or credit cards are accepted, but they are all processed through PayPal.) The email you receive from PAS will include your New Membership Kit including a list of your options and instructions on how to make them work for you.

Everyone was favorably impressed with Pete's presentation. The webpage is available now, in a pared down format, but is expected to be fully operational soon.

Stu, our President, made a few final comments and adjourned the meeting at 9:04 pm.

FREE TELESCOPE WORKSHOPS

NEXT CLASS IS OCT 20TH

By Terri, Event Manager

PAS hosts a bunch of events throughout the year but this is the most In-Demand event. Let's say you just bought a new telescope. How do you work it? How do you set it up? The directions are a whole new learning curve. It would be easier if you could talk to someone and ask questions, right? Well, that's where PAS comes in.

PAS hosts a nearly monthly Free Telescope Workshop. It costs you nothing but some of your time one evening, at PVCC Main Campus in G-147, from 7:30 to 9:30pm. That's right! It's free!

So, RSVP your attendance now! Provide the Make and Model of the

telescope you have, and then plan to bring the telescope and all your accessories to the class. Bring something to take notes on and with, and you will be set up with a Telescope Teacher who knows how to operate your type of scope. Scopes are like cars. You wouldn't jump into a Semi Truck and expect it to drive as nice and easy as a Honda Civic, as an example.

The other option is to attend the Free Telescope Workshop to find out what type of scope fits your needs. Scopes are very personal. One telescope could be great at astrophotography but not so great for ground based observing of distant galaxies. Come chat with PAS and let's talk about what type of telescope matches what you want to get out of it. We want

you to buy a telescope you will use, instead of having you stick it in a closet and forget about it.

RSVP to Events@pasaz.org and mention the date of the telescope workshop you wish to attend. This is a great way to buy a scope that fits your needs so you aren't making the mistakes most of us have made already. If there are no RSVPs for a telescope workshop, or if the weather is bad, the event will be canceled.

The next several Telescope Workshops hosted by PAS are currently scheduled for: Oct 20, 2022, Dec 8, 2022, Feb 16, 2023, Mar 16, 2023, and Apr 13, 2023.

NIGHT SKY TRAINING SESSION OCT 22

By Terri Finch, Event Manager

The Night Sky Training Session of October 22, 2022 is being scheduled. It will be a Members only event in which a group of knowledgeable PAS members will get together with those who want to attend this "Class" and show and tell on various topics. First, we will all set up our telescopes. If a class member can not do this or is not sure if they have set up their scope correctly, they can ask for help. Once everyone is set up, then we will begin the class. The Class will last a few hours. I will lead the class as to what we do next.

We will begin possibly talking about things that can be discussed in dusk, rather than when it is nearly dark such as: Laser Pointer Safety, eyepieces, binoculars, etc. Then, as it becomes dark, we might pull out our star chart (provided by the

teachers at this event) and pencil and find out where the object we are putting our scope onto is in the night sky, then find it together. Everyone points their scope, for example, at Saturn. Once found, we can compare telescope views as well as eyepieces, filters, etc. The idea is to go from scope to scope, take notes along the way, ask questions of what the telescopes teachers are using in their scope, etc.

Then we might move to our next object and as a group, we all go to Jupiter (example, again.)

The goal for the class is always the same. Help those who need help to learn how to Star Hop around the sky to find interesting objects using their telescope. To learn about eyepieces, filters, and other accessories that could make viewing through one's scope that much more enjoyable. And spend an evening learning

from each other.

If this type of class interests you, you must be a PAS member by the evening before the event, then send your RSVP to Events@pasaz.org. A telescope or binoculars is not a requirement to attend this class. Your RSVP should include the Make and Model of the telescope you will be bringing and using at the event, or the size and model of the binoculars, if you don't have a telescope. All PAS members and their immediate family members are welcome to attend. BYO Chairs, snacks, drinks, jackets, and all the equipment you need to have a successful observing evening. This event is FREE for PAS Members. A lack of RSVP's, or bad weather, will cancel this event. Hope to see you there! The next NSTS after this one is scheduled to be on Mar 18, 2023.

STU'S VIEWS PRESIDENT'S CORNER



By Stu Brackney, President of PAS

Hello everyone. The Phoenix skies have been filled with clouds lately, giving us overdue rain but of course preventing some of us from viewing the cosmos. The

good news is your PAS board of directors has been busy. For those of you who view our website pasaz.org you now know we have added a "new member application procedure" which will allow current members and new members to join PAS online. This is the work of your board, specifically Pete Turner, Richard Sauerbrun and Terri Finch. Nice job everyone!

We are now holding our monthly meetings on the campus of Paradise Valley Community College, 18401 N 32nd St, Phoenix, AZ 85032 (currently) in classroom LS 205. The good news is not only are we conducting these meetings in the

classroom but broadcasting them online via ZOOM. So keep an eye out on our website for speaker information and the ZOOM links.

Finally we are in need of two volunteers to help out with the administrative responsibilities of our nonprofit organization:

Membership chairperson: If chosen for this position, you would be in charge of making sure all membership info is maintained in the database.

Events chairperson: If chosen for this position, you would start out assisting the current Event Manager to learn the ropes and eventually take over for managing all the events happening in PAS.

Have a good month everyone and see you at our next meeting.

TERRI FINCH, EVENT MANAGER

By President Stu,

All of you have seen this name attached to PAS for years. She has worn many leadership hats as well. We asked her to share with us a little about her background and how she got involved in astronomy. Read on as she shares her story.

By Terri,

I was born in New York. But at the age of 9 my family moved to Arizona. With the exception of living in Idaho for about 5.5 years, I've lived mostly in Phoenix. But I have traveled & seen a lot of the U.S., Canada & some of Mexico.

I am a private music instructor. I currently play 16 instruments and I teach 8 of them. I've been teaching since I was

13, with my first Flute student.

When I was in 4th grade, my teacher introduced me to Astronomy. I fell in love with the Solar System. I learned all the Moons and planets names. I could tell you their orbital period and rotation period by memory. This is proof that a good teacher inspires their students.

I estimated that I joined PAS in 1989. I was Editor of the PAS newsletter for 14 years, then President for 2 years, then Vice President for 4 more years, then in 2008 I became Event Manager and it is a labor of love. I do it because I like to do it.

I am, however, looking to retire from managing the club and do more traveling to see the world, and so PAS is on the hunt for a new Event Manager.



Terri Finch, Event Manager, seen here at the Desert Botanical Garden set up with her telescope, Dr. Who. Photo taken by William Finch.

PAS OUTREACH PROGRAM

The Phoenix Astronomical Society has an outreach program that includes a group of astronomers who promote the club, share the night sky, educate, and entertain the public, and get paid to do so. That program is called Star Tours.

PAS is seeking outgoing, friendly, knowledgeable PAS members who have telescope equipment and a sense of professionalism to become a Star Tours presenter.

Star Tours presenters go out to various locations where they have been hired to provide a tour of the night sky. Most of the time, the hiring organization asks for 2+ telescopes to do these events, but occasionally, it might be a 1 telescope event.

The hiring organization pays PAS, and then PAS pays the presenters an agreed upon fee for their services and to cover their travel expenses

There is a dress code and a code of conduct as the presenters will be representing PAS while doing these events.

Knowledge of the night sky, public speaking ability, going to the event prepared with everything needed, and a sense of professional excitement are what PAS needs in our public outreach program

To find out more about the Star Tours program, email the Event Manager with your questions at events@pasaz.org.



ARTEMIS 1: A TRIP AROUND THE MOON-AND BACK!

By David Prosper

We are returning to the Moon - and beyond! Later this summer, NASA's Artemis 1 mission will launch the first uncrewed flight test of both the Space Launch System (SLS) and Orion spacecraft on a multi-week mission. Orion will journey thousands of miles beyond the Moon, briefly entering a retrograde lunar orbit before heading back to a splashdown on Earth.

The massive rocket will launch from Launch Complex 39B at the Kennedy Space Center in Florida. The location's technical capabilities, along with its storied history, mark it as a perfect spot to launch our return to the Moon. The complex's first mission was Apollo 10 in 1968, which appropriately also served as a test for a heavy-lift launch vehicle (the Saturn V rocket) and lunar spacecraft: the Apollo Command and Service Modules joined with the Lunar Module. The Apollo 10 mission profile included testing the Lunar Module while in orbit around the Moon before returning to the Earth. In its "Block-1" configuration, Artemis 1's SLS rocket will take off with 8.8 million pounds of maximum thrust, even greater than the 7.6 millions pounds of thrust generated by the legendary Saturn V, making it the most powerful rocket in the world!

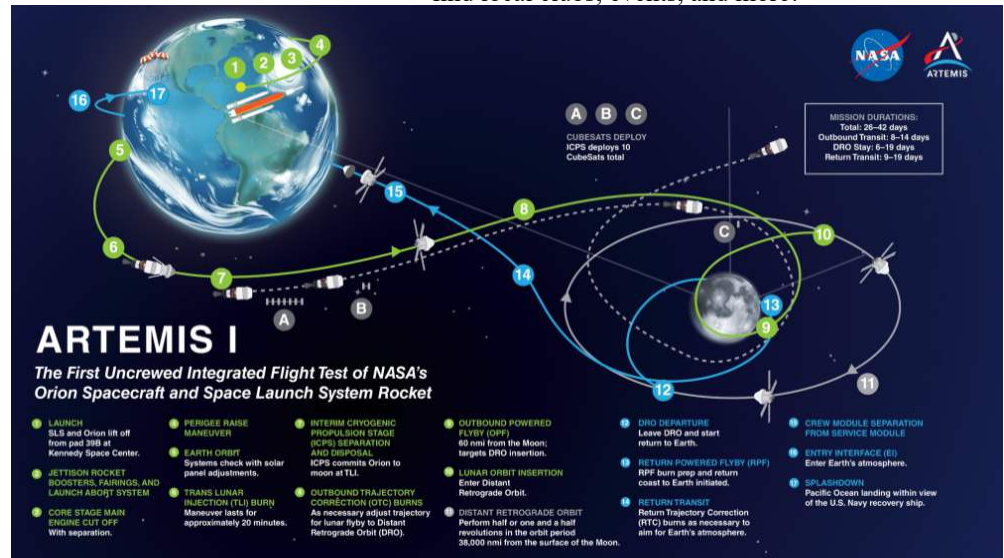
Artemis 1 will serve not only as a test of the SLS and the Orion hardware, but also as a test of the integration of ground systems and support personnel that will ensure the success of this and future Artemis missions. While uncrewed, Artemis-1 will still have passengers of a sort: two human torso models designed to test radiation levels during the mission, and "Commander Moonikin Campos," a mannequin named by the public. The specialized mannequin will also monitor radiation levels, along with vibration and acceleration data from inside its mission uniform: the Orion Crew Survival Suit, the spacesuit that future Artemis astronauts will wear. The "Moonikin" is named after Arturo Campos, a NASA electrical engineer who played an essential role in bringing Apollo 13's crew back to Earth after a near-fatal disaster in space.

The mission also contains other valuable cargo for its journey around the Moon and back, including CubeSats, several space science badges from the Girl Scouts, and microchips etched with 30,000 names of workers who made the Artemis-1 mission possible. A total of 10 CubeSats will be deployed from the Orion Stage Adapter, the ring that connects the Orion spacecraft to the SLS, at several segments along the mission's path to the Moon. The power of SLS allows engineers to attach many secondary "ride-along" mission hardware like these CubeSats, whose various missions will study plasma propulsion, radiation effects on microorganisms, solar sails, Earth's radiation environment, space weather, and of course, missions to study the Moon and even the Orion spacecraft and its Interim Cryogenic Propulsion Stage (ICPS)!

If you want to explore more of the science and stories behind both our Moon and our history of lunar exploration, the Night Sky Network's Apollo 11 at 50 Toolkit covers a ton of regolith: bit.ly/nsnmoon! NASA also works with people and organizations around the world coordinating International Observe the Moon Night, with 2022's edition scheduled for Saturday, October 1: moon.nasa.gov/observe. Of course, you can follow the latest news

and updates on Artemis 1 and our return to the Moon at nasa.gov/artemis-1

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



Follow along as Artemis 1 journeys to the Moon and back! A larger version of this infographic is available from NASA at: nasa.gov/image-feature/artemis-i-map



Full Moon over Artemis-1 on July 14, 2022, as the integrated Space Launch System and Orion spacecraft await testing. Photo credit: NASA/Cory Huston Source: <https://www.nasa.gov/image-feature/a-full-moon-over-artemis/>

GRAYHAWK SCHOOL SOLAR EVENT MAY 18

By Mark Johnston, Solar System Ambassador

On May 18th, I did a solar educational event for Grayhawk Elementary School in Scottsdale. I showed the Sun to two sets of 5th grade classes. I brought a yellow beach ball representing the Sun and had a small model with various sized marbles and ball bearings. The kids had to guess which one was the size of the Earth compared to the Sun. Then they had an assignment to draw the solar prominences they saw on the Sun through my scope.

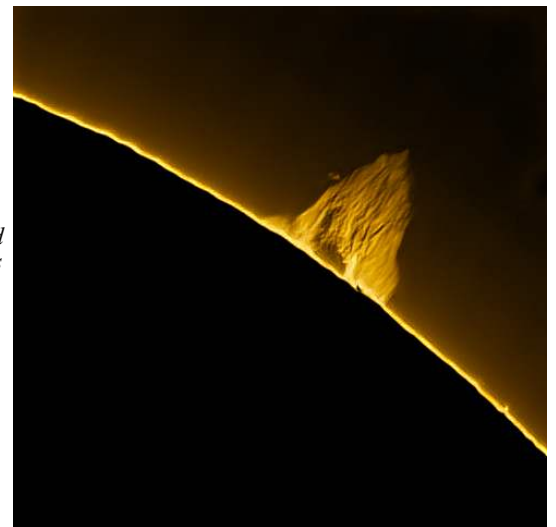
A first for me, a large male Javelina ran by, about 30 feet away from us during the event, which caused a lot of ruckus. But it all went well and I got a nice thank you card from the kids afterwards.



"The Sun" Captured by Mark under his arm, and Mark standing by his very impressive Solar Telescope at Grayhawk Elementary.



Students view through Mark's scope at the school during this Solar Viewing event. Photo provided by Mark.



A very well captured Solar Prominence is seen on May 19th, taken by Mark.



This is a gorgeous view of the Sun's surface taken at the Grayhawk event of May 18th through Mark's telescope, by Mark Johnston.

TOTAL LUNAR ECLIPSE MAY 15 2022

It was a very warm evening. Many PAS Members and Friends of PAS had held events or attended events. Here are the stories to go with these fantastic Eclipse photos of this evening. Weather wise, mostly everyone I phone texted about the Eclipse reported clouds in the way of a clear view of the Moon, for most of the evening.

By Mark Johnston, PAS Member

I did a Lunar eclipse star party for the Four Seasons resort, Scottsdale. I estimate over 150 attended.

I had my TEC140 with a ZWO2600MC Pro tracking the Moon from 8-10PM.

By Mark Savan, PAS Member

We actually had a fairly decent view of it from our Bortle 8 home in Ohio. I mean ... it wasn't like being at the Four Seasons in Scottsdale (referring to Mark's evening)... but it was pretty good.

By Terri Finch, PAS Member

I did a Lunar Eclipse star party for my Piano Student's Sweet 16 Birthday Party. I set up about 7pm, and we watched and photographed the entire eclipse from start to 10pm. The high thin clouds were in the way for other objects, but the Moon was available and visible for most of the evening from our party near 32nd street and Cactus Rd. in Phoenix. I used my telescope, Doctor Who, which is an 8" Celestron SCT. I used these eyepieces: 40mm, 32mm and 17mm eyepieces and I put filters on the eyepieces to cut the brightness of the Moon at the beginning and end of the eclipse. Photos were taken with cell phones, some through the telescope and others without the telescope. In attendance were Isis, Eddie, Cathy and Orion Delph, William & Terri Finch, and Ed & Bruce Wurst. I didn't get any good photos of the eclipse, but Cathy and Isis did. It was a very fun evening. Isis

captured several great photos of the Moon during the Eclipse, through my telescope with several different filters. Please enjoy these fantastic photos!

By Phil Hoppes, PAS Member

I was only able to get the second half of the eclipse. The 1st half was covered by clouds and some hills where I live.

The particulars on the photo:

Time/Date: 9pm - 11:30pm
5/16/2022

Location: Phoenix, Az

Equipment:

Telescope - Lunt LS80MT (night mode with etalons removed)

Mount: SkyWatcher EQ6R-Pro

Camera: ASI533MC

Software: SharpCap, Autostakkert, Registax, Photoshop

Photos: Over 2000 photos processed to make final picture.



This image of the Eclipsed Moon was taken by Cathy Delph on her Motorola 8 phone through Terri's telescope.



Here we have the Natural color of the Moon eclipsing. The funny thing about this particular eclipse is that there were so many high thin clouds and the light pollution from Phoenix, that the Moon didn't have much of a Red tint to it for this total eclipse. Photo by Isis.



Moon with Dark Red Filter and some visible craters through my telescope, by Isis Delph.



And one more photo with natural lighting, no filters, through my telescope and taken by Isis.

And then I added a light red filter to the purple filter and Isis was able to obtain this image. Isis used her Iphone 8.



Using a Purple Filter, through my scope, image captured by Isis Delph.



And here's a literal Blue Moon, by Isis, again through my telescope.

Almost fully eclipsed Moon with Red Filter and Moon Filter through my telescope, by Isis Delph .



This photo is Mark's set-up showing his scope, the eclipsed Moon, and his laptop capturing the image. Photo provided by Mark Johnston.



This Amazing Image of the Moon in Motion from May 15th was created with over 2000 photos processed to make this final Image. Photo procesed & provided by Phil Hoppes.



The Total Eclipse of the Moon by Mark Johnston.

This is the Pre Eclipse of the Moon showing Earth's shadow. Photo by Mark Johnston.

ANNOUNCING OUR NEW ONLINE MEMBERSHIP PROCESSING SYSTEM!

By Pete Turner, PAS Webmaster

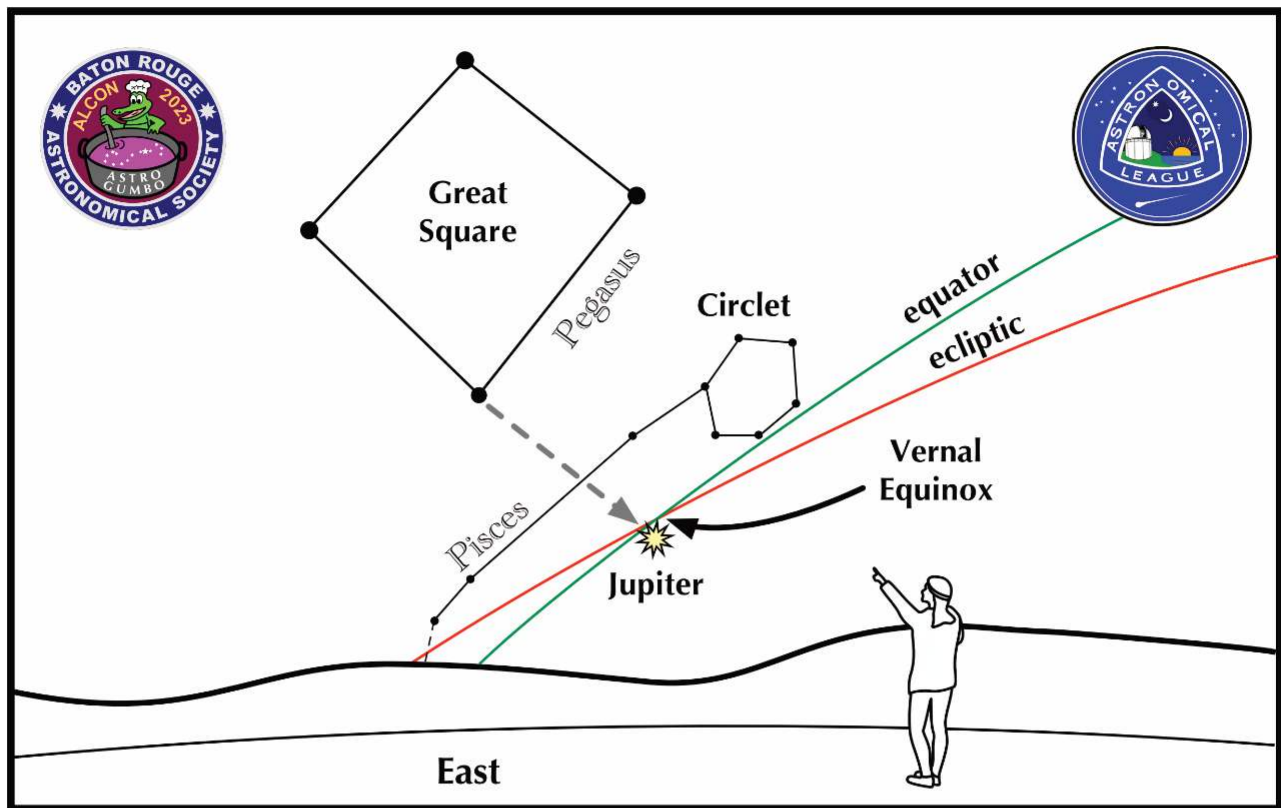
PAS (Phoenix Astronomical Society) is pleased to announce that memberships can be purchased online via our website, www.pasaz.org. Click on the 'Join Our Club' page, or use the Join Our Club button at the bottom of most web pages on our site.

New, or Returning Members can pay via their PayPal account, or via Debit/Credit card (which is processed through PayPal). Members will receive several emails: A receipt from PAS and another from PayPal, among them.

In addition, a Welcome Kit will also be attached to the email you receive from PAS.

Join or renew your membership today and save \$5. Membership is going from \$25 to \$30 on Jan 1, 2023.

If you can see only one celestial event in the evening this October, see this one.



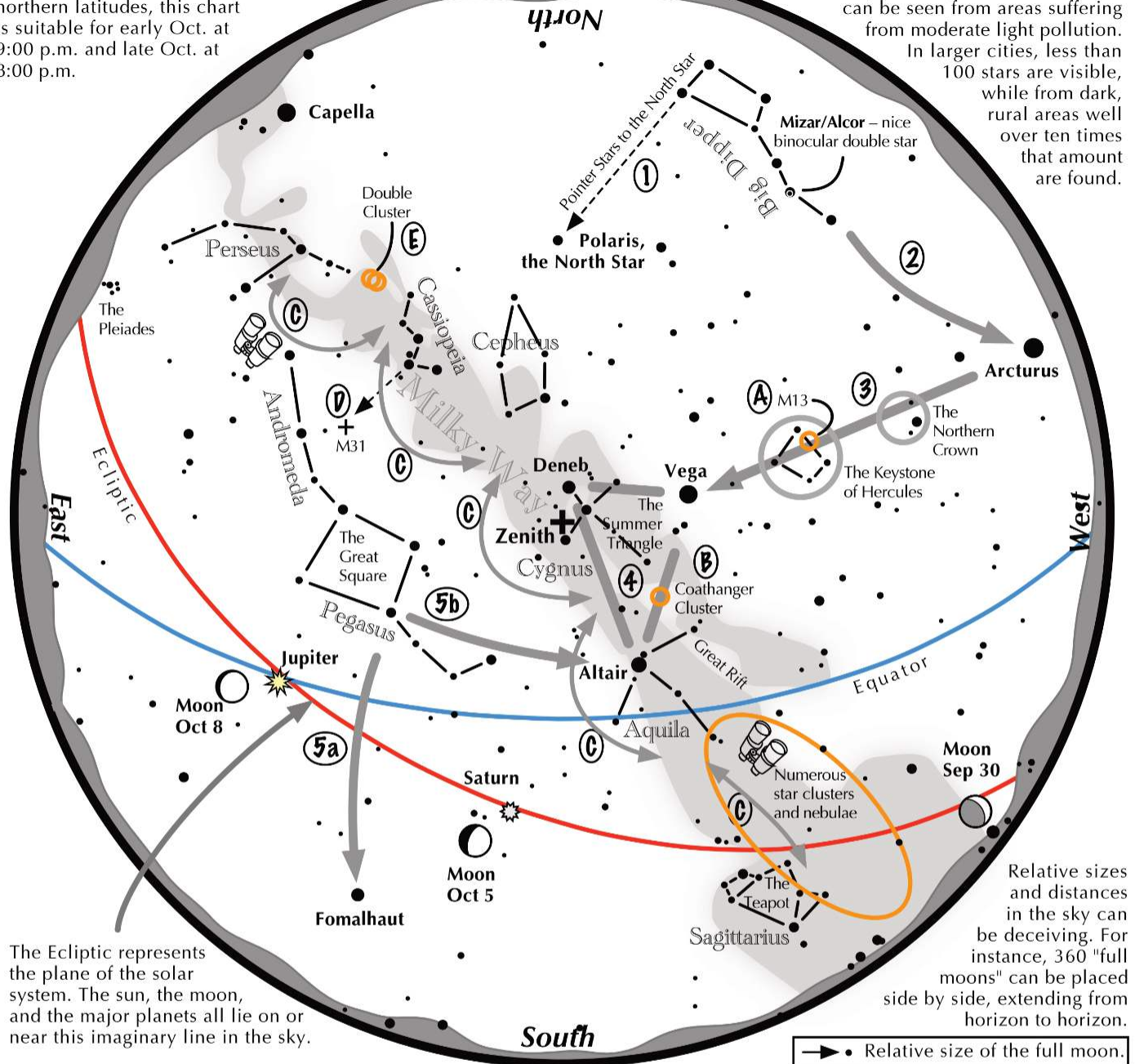
Jupiter lies at the Vernal Equinox

- Look in the east–southeast 90 minutes after sunset during October.
- Choose an evening when no bright moon is in the sky, such as one after October 12.
- Jupiter shines brightly above the horizon very near the location of the vernal equinox – the sun's position on March 21.
- Jupiter also acts as a good guide in finding the six dim stars of the "Circlet" of Pisces. This odd stellar grouping really does take on the shape of a flattened circle. Dark skies are needed to see this interesting asterism.
- Jupiter will not be in the same location next year, as it will have moved eastward approaching the Pleiades. However, the Circlet will always lie immediately south of the Great Square. So, once you meet it, these stars will be a celestial friend greeting you in the same sky location this time every year.

Navigating the October Night Sky

For observers in the middle northern latitudes, this chart is suitable for early Oct. at 9:00 p.m. and late Oct. at 8:00 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



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

- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the early October evening sky.
- 3 To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 4 Nearly overhead lie the summer triangle stars of Vega, Altair, and Deneb.
- 5 High in the east are the four moderately bright stars of the Great Square. Its two southern stars point west to Altair. Its two western stars point south to Fomalhaut.

Binocular Highlights

A: On the western side of the Keystone glows the Great Hercules Cluster, a ball of 500,000 stars. **B:** 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger. **C:** Sweep along the Milky Way for an astounding number of fuzzy star clusters and nebulae amid many faint glows and dark bays, including the Great Rift. **D:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **E:** Between the "W" of Cassiopeia and Perseus lies the Double Cluster.





FOMALHAUT: NOT SO LONELY AFTER ALL

David Prosper

Fall evenings bring a prominent visitor to southern skies for Northern Hemisphere observers: the bright star **Fomalhaut**! Sometimes called “The Autumn Star,” Fomalhaut appears unusually distant from other bright stars in its section of sky, leading to its other nickname: “The Loneliest Star.” Since this star appears so low and lonely over the horizon for many observers, is so bright, and often wildly twinkles from atmospheric turbulence, Fomalhaut’s brief but bright seasonal appearance often inspires a few startled UFO reports. While technically not of this world – Fomalhaut is about 25 light years distant from our Earth – it has been extensively studied and is a fascinating, and very identified, stellar object.

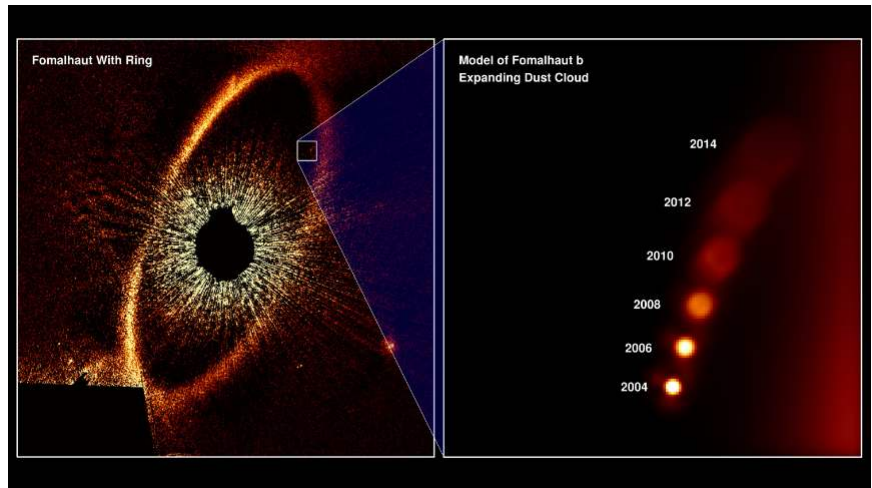
Fomalhaut may appear solitary, but it does in fact have company. Fomalhaut’s entourage includes two stellar companions, both of which keep their distance but are still gravitationally bound. Fomalhaut B (aka TW Piscis Austrini, not to be confused with former planetary candidate Fomalhaut b*), is an orange dwarf star almost a light year distant from its parent star (Fomalhaut A), and Fomalhaut C (aka LP 876-10), a red dwarf star located a little over 3 light years from Fomalhaut A! Surprisingly far from its parent star – even from our view on Earth, Fomalhaut C lies in the constellation Aquarius, while Fomalhaut A and B lie in Piscis Australis, another constellation! – studies of Fomalhaut C confirm it as the third stellar member of the Fomalhaut system, its immense distance still within Fomalhaut A’s gravitational influence. So, while not truly “lonely,” Fomalhaut A’s companions do keep their distance.

Fomalhaut’s most famous feature is a massive and complex disc of debris spanning many billions of miles in diameter. This disc was first detected by NASA’s IRAS space telescope in the 1980s, and first imaged in visible light by Hubble in 2004. Studies by additional advanced telescopes, based both on Earth’s surface and in space, show the debris around Fomalhaut to be differentiated into several “rings” or “belts” of different sizes and types of materials. Complicating matters further, the disc is not centered on the star itself, but on a point approximately 1.4 billion miles away, or half a billion miles further from Fomalhaut than Saturn is from our own Sun! In the mid-2000s a candidate planetary body was imaged by Hubble and named Fomalhaut b. However, Fomalhaut b was observed to slowly fade over multiple years of observations, and its trajectory appeared to take it out of the system, which is curious behavior for a planet. Scientists now suspect that Hubble observed the shattered debris of a recent violent collision between two 125-mile wide bodies, their impact driving the remains of the now decidedly non-planetary Fomalhaut b out of the system! Interestingly enough, Fomalhaut A isn’t the only star in its system to host a dusty disc; Fomalhaut C also hosts a disc, detected by the Herschel Space Observatory in 2013. Despite their distance, the two stars may be exchanging material between their discs - including comets! Their comingling may help to explain the elliptical nature of both of the stars’ debris discs. The odd one out, Fomalhaut B does not possess a debris disc of its own, but does host at least one

suspected planet.

While Hubble imaged the infamous “imposter planet” of Fomalhaut b, very few planets have been directly imaged by powerful telescopes, but NASA’s James Webb Space Telescope will soon change that. In fact, Webb will be imaging Fomalhaut and its famous disc in the near future, and its tremendous power is sure to tease out more amazing discoveries from its dusty grains. You can learn about the latest discoveries from Webb and NASA’s other amazing missions at nasa.gov.

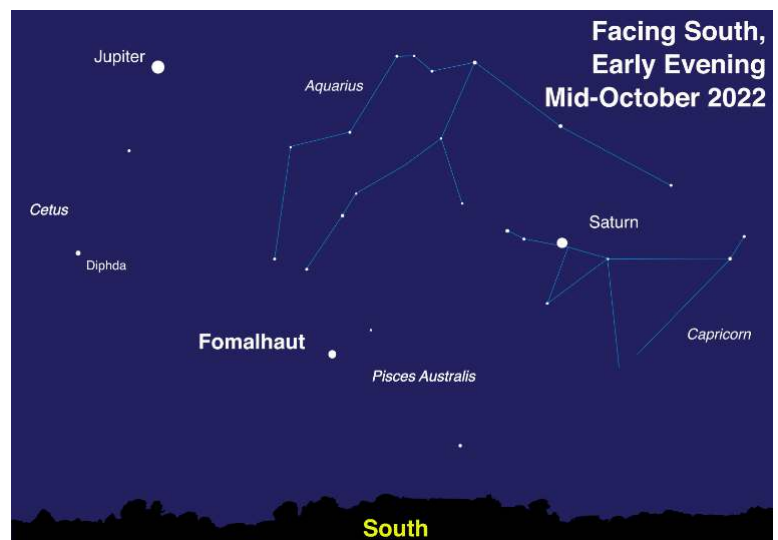
*Astronomers use capital letters to label companion stars, while lowercase letters are used to label planets.



The magnificent and complex dust disc of the Fomalhaut system (left) with the path and dissolution of former planetary candidate Fomalhaut b displayed in detail (right).

Image credits: NASA, ESA, and A. Gáspár and G. Rieke (University of Arizona)

Source: <https://www.nasa.gov/feature/goddard/2020/exoplanet-apparently-disappears-in-latest-hubble-observations>



Sky map of the southern facing sky for mid-latitude Northern Hemisphere observers. With Fomalhaut lying so low for many observers, its fellow member stars in the constellation Piscis Australis won’t be easily visible for many without aid due to a combination of light pollution and atmospheric extinction (thick air dimming the light from the stars). Fomalhaut is by far the brightest star its constellation, and is one of the brightest stars in the night sky. While the dim constellations of Aquarius and Capricorn may also not be visible to many without aid, they are outlined here. While known as the “Loneliest Star,” you can see that Fomalhaut has two relatively close and bright visitors this year: Jupiter and Saturn! Illustration created with assistance from Stellarium.