

October 2025

Monthly Newsletter



# PAStimes

A Publication of the Phoenix Astronomical Society

In this newsletter  
you can expect:

[Message from  
President](#)

[A Very Happy  
Canadian](#)

[Dark Matter  
Halos](#)

[Plaskett's Star](#)

[Navigating the  
October Night  
Sky](#)

[Galilean moons](#)

[First Point of  
Aries](#)

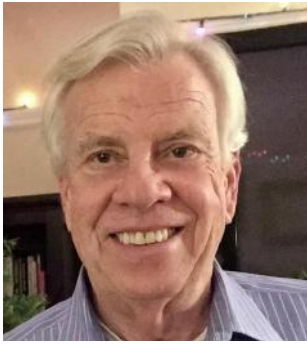
[Member Images ,  
Book Review and  
much more](#)

TOM FLEMING-FLYING DRAGON NEBULA



**EVENT  
REMINDER**

2 – Monthly Lecture Series: Southern Arizona's Smithsonian Observatory with Amy Oliver  
4-International Observe the Moon Night | 11-Large Binocular Telescope Tour  
11 – Book Club | 16 – Telescope Workshop | 27 – ASIG Meeting



Hi everyone!

In case you have not heard, we have a new home on the campus of Paradise Valley Community College. All of our campus events are in Building Q room 120 a (the campus conference center). Some of you may remember this was the Maricopa County Library 17811 N 32nd Street, Phoenix. A detailed map is shown in this newsletter.

We started off our monthly lecture series in our new location with a presentation from our Vice President Mark Johnston, sharing with us his marvelous visit to some of the world's best and largest telescopes in Chile. His lecture was recorded and will soon be posted on our public web site ([www.pasaz.org](http://www.pasaz.org)).

You may have heard this also, we are 150 strong. Our membership continues to grow and so do our activities. We now have a book club, astrophotography group, and are now scheduling more field trips to Arizona astronomical facilities. PVCC staff have publicized our two \$1,000.00 dollar scholarships and have informed me they are receiving multiple submittals.

**History:** Your PAS has 77 years of it (established in 1948) but we need a volunteer to keep our history logs updated. Interested? Please contact me. [Stuartbrackney@pasaz.org](mailto:Stuartbrackney@pasaz.org)

**Teachers:** You might be the one we need. Our Events Manager Ruza Sabelja is looking for members who have telescope knowledge. If you have some years of telescope use, email her to see if you can help out with our telescope workshops. [Ruzasabelja@pasaz.org](mailto:Ruzasabelja@pasaz.org)

Clear skies everyone...they belong to you

*Stuart Brackney*



## Table Of Contents

|                    |    |
|--------------------|----|
| Upcoming Events    | 3  |
| Lecture            | 4  |
| Recap              | 5  |
| In the NEWS        | 7  |
| OutReach           | 8  |
| Star Tours Targets | 9  |
| Feature Article's  | 10 |
| Feature Article's  | 11 |
| ASIG               | 12 |
| Night Sky Network  | 13 |
| Member Images      | 14 |
| Seven Targets      | 16 |
| Cosmic Classroom   | 17 |
| Celestial event    | 18 |
| Astronomy Websites | 19 |
| For Sale           | 20 |
| Telescope Loan     | 21 |
| Book Review        | 22 |
| Membership         | 23 |
| Contact            | 24 |

# SEPTEMBER 2025

## UPCOMING EVENTS

### SCHEDULE



2/  
THUR

#### MONTHLY LECTURE SERIES

A deep dive into the Smithsonian Institution's Fred Lawrence Whipple Observatory



4/  
SAT

#### INTERNATIONAL OBSERVE THE MOON NIGHT

Join lunar observers around the world in learning about lunar science and exploration, making celestial observations, and honoring cultural and personal connections to the Moon.



11/  
SAT

#### LARGE BINOCULAR TELESCOPE TOUR

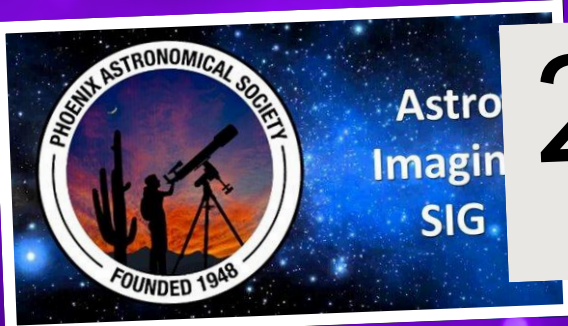
The event will include a 90 minute detailed behind-the-scenes afternoon tour of the facility, including control room, support facilities and the telescope.



16/  
THUR

#### TELESCOPE WORKSHOP 101/201

101 What to buy  
201 How to operate your telescope.



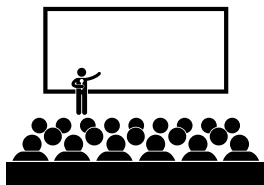
27/  
MON

#### ASIG/ASTROIMAGING - MEMBERS ONLY

Are you passionate about capturing the beauty of the cosmos? Whether you're a beginner or an experienced astrophotographer, now is the perfect time to join

**MORE  
INFORMATION**

For more information and to register for these events, go to the [PAS Event Calendar and Registration Site](#). It is important to register for all events. In case of an event change or cancellation, you will be notified via email.



# October Lecture-Amy Oliver

**Topic:** Southern Arizona's Smithsonian Observatory

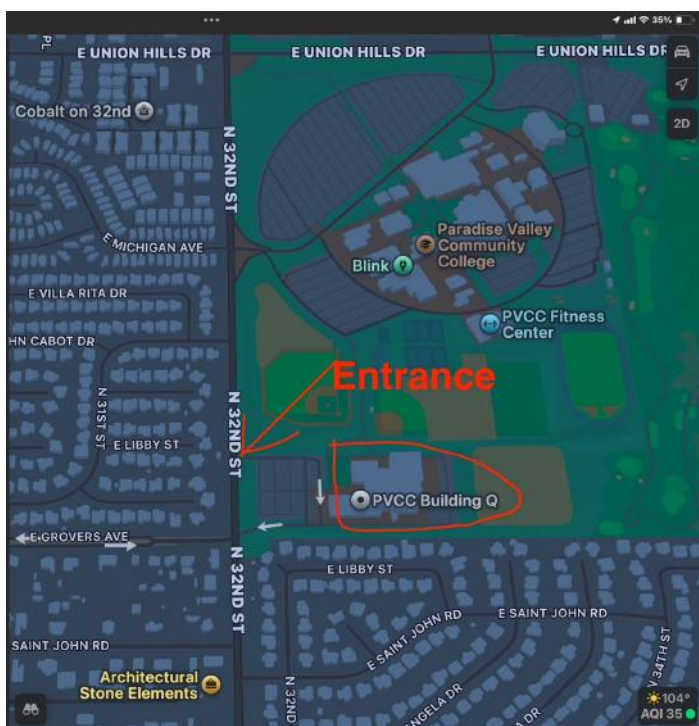
**Summary:** Join Amy C. Oliver, FRAS for a deep dive into the Smithsonian Institution's Fred Lawrence Whipple Observatory. Home to one of the largest single mirror telescopes on ground, the MMT and the only gamma-ray array in North America, the Whipple Observatory searches the visible and invisible Universe on roughly 300 clear nights to understand supernovae, galaxy behaviors, stellar metallicity, exoplanets, and TeV gamma rays.

**Bio:** Amy C. Oliver, FRAS is director of Smithsonian STARS — Scientists Taking Astronomy to Rural Schools — a program of the Center for Astrophysics at Harvard & Smithsonian, public affairs officer and science center manager at the Fred Lawrence Whipple Observatory, and SkyNights presenter at University of Arizona's Mount Lemmon SkyCenter. She previously served as public information and news manager for the National Science Foundation's National Radio Astronomy Observatory (NRAO) and the Atacama Large Millimeter/submillimeter Array (ALMA) in North America, social media contractor for NSF's NOIRLab, and associate marketing manager at Clark Planetarium.



## NEW LOCATION

All of our PAS events at Paradise Valley Community College are now being held in **Building Q room 120A**. This is the former Maricopa County Library building south of the PVCC athletic fields on 32nd street.



# Here's a recap of last month's Meeting

Mark Johnson, a NASA Solar System Ambassador, shared his experience visiting world-class observatories in Chile's Atacama Desert as part of the ACAP (Ambassador to Chile Astronomy Program) funded by the National Science Foundation. The program selects 10 people annually, including outreach educators, amateur astronomers, and STEM professionals, to visit these facilities. Johnson highlighted why Chile is ideal for astronomy: 330 clear nights annually, minimal light pollution, a stable atmosphere, low water vapor, cost-effective labor and materials, robust infrastructure, and a stable political climate. By 2040, 80% of the world's large observatories will be in Chile.

1. Alpha Aldebaran Observatory: A commercial facility offering public access to dark skies, where Johnson photographed constellations like the Southern Cross and Alpha Centauri.
2. Gemini South Observatory (Cerro Pachón, ~9,000 ft)\*\*: Features an 8.1-meter mirror with adaptive optics using a 20-watt laser to create an artificial star, improving resolution from 260 to 40 milliarcseconds in infrared. It focuses on high-resolution imaging of exoplanets, galaxies, and transient objects like supernovae, with remote control from La Serena.
3. SOAR Telescope (Cerro Pachón): A 4.2-meter telescope specializing in spectroscopy, with a 0.5-degree field of view and adaptive optics, achieving 30 milliarcsecond resolution.
4. Vera Rubin Observatory (Cerro Pachón)\*\*: Recently opened, it houses the Simonyi Telescope with an 8.4-meter mirror (limited by a transport tunnel) and a 3.2-gigapixel camera, the world's largest. Its 40-full-moon field of view and active optics (for low-frequency corrections) enable imaging 10 million galaxies at once. It will map the southern sky 825 times over 10 years, detecting transient events like supernovae and near-Earth objects. Data is publicly accessible via alerts.
5. Victor Blanco Telescope (Cerro Tololo): A 4.1-meter telescope, twin to Kitt Peak's Mayall, built in 1976. It produces more research papers than any other telescope (700 last year) and has a 576-megapixel camera with a 3-degree field of view. It discovered the largest comet (80 miles wide) and contributes to dark matter research.
6. Mushroom Farm (Cerro Tololo)\*\*: Hosts dozens of smaller telescopes (mostly  $\leq 1$  meter), owned by universities and countries, including a GONG solar telescope for daily hydrogen-alpha imaging.
7. ALMA (Atacama Large Millimeter/submillimeter Array, 9,500–16,500 ft)\*\*: Comprises 66 radio telescopes (54 at 12 meters, 12 at 7 meters) with 5 milliarcsecond resolution, the highest for radio telescopes. It images protoplanetary disks and operates 24/7, reconfigured daily using massive German-built transporters. Located in the dry Atacama, it observes millimeter/submillimeter wavelengths, complementing optical telescopes. A rare snowstorm required pointing dishes horizontally to protect receivers.

Johnson emphasized the broader impact of astronomy: technologies like aperture synthesis (used in CAT scans/MRIs), digital cameras, and GPS owe their origins to telescope research. Vera Rubin will enhance asteroid detection, aiding planetary defense. Big data management from these observatories benefits fields like finance and cybersecurity. Astronomy also boosts STEM literacy and drives innovations in materials, aviation, and cancer treatment.





Photo By Stu Brackney



Photo By Stu Brackney



Photo By Stu Brackney



Photo By Stu Brackney



Photo By Stu Brackney



Photo By Stu Brackney

# In the NEWS

## Mars Organic Matter

The article titled "Redox-driven mineral and organic associations in Jezero Crater, Mars" published in *Nature* presents compelling findings from NASA's Perseverance rover mission. Here's a concise summary:

### Key Findings

- Organic carbon and redox reactions: Mudstones in the Bright Angel formation of Jezero Crater contain organic carbon that appears to have participated in low-temperature redox reactions, forming minerals like vivianite (iron phosphate) and greigite (iron sulfide).
- Potential biosignatures: These mineral associations and textures—especially nodules and reaction fronts—are consistent with features produced by biological processes on Earth, though abiotic pathways are also considered.
- Geological context: The formation is sedimentary, deposited from water under conditions potentially habitable for life. It includes fine-grained mudstone and coarser conglomerates, indicating varied depositional environments.
- Instrumentation: Data were collected using Perseverance's suite of tools, including PIXL, SHERLOC, SuperCam, and Mastcam-Z, enabling detailed chemical and mineralogical analysis.

### Implications

The study suggests that the Bright Angel formation contains features that merit classification as "potential biosignatures"—features that challenge researchers to determine whether they are biological or abiotic in origin. The return of the Sapphire Canyon sample to Earth is expected to provide deeper insights.

<https://www.nature.com/articles/s41586-025-09413-0>

## New nova might be visible to the eye

A new nova was spotted in the constellation Centaurus in early September 2025.

The nova, designated Nova Centauri 2025, was discovered by John Seach in Australia on September 8, using a DSLR camera. It reached a brightness of magnitude 7.4, making it visible with binoculars and small telescopes, especially from the Southern Hemisphere.

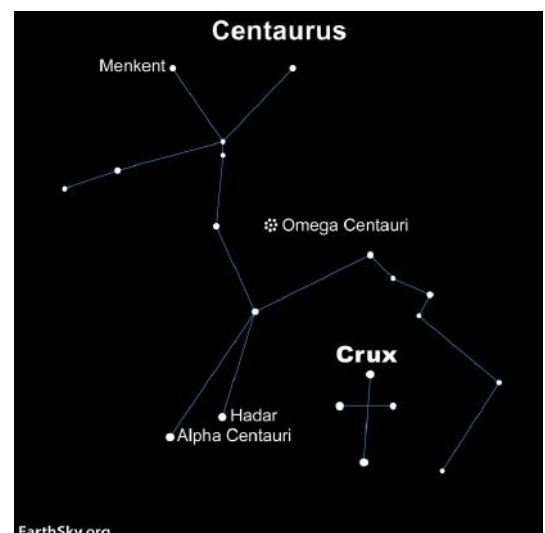
### What Is a Nova?

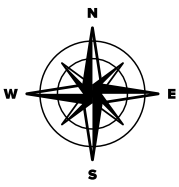
- A nova occurs when a white dwarf star in a binary system pulls material from its companion star.
- When enough hydrogen accumulates, it triggers a thermonuclear explosion on the white dwarf's surface, causing a sudden brightening.

### Viewing Tips

- The nova is located near the star Eta Centauri, making it easier to find.
- Best viewed from southern latitudes, especially under dark skies away from city lights.
- Observers are encouraged to monitor its brightness over time, as novae typically fade gradually.

<https://earthsky.org/space/new-nova-in-centaurus-sept-2025/>





# Summary of Outreach Events

Star Tours Outreach events  
6<sup>th</sup> Scottsdale Adventures Tour  
24<sup>th</sup> St Elizabeth Star Party  
26<sup>th</sup> Lifetime Fitness Rooftop





# StarTours by Andrew Stone

October 2025 will be an exceptional month, with the possibility of 2 comets being potentially visible to the naked eye under dark-sky conditions. This rare event coincides with the new moon and the peak of the Orionid meteor shower, creating a prime window for observation.

## Comet C/2025 R2 (SWAN)

**Visibility:** This recently discovered comet is expected to make its closest approach to Earth between October 19–21. It is predicted to brighten to around magnitude 4, making it potentially visible to the naked eye in dark skies. **Location:** Oct 20th it will be to the south near the milky way above Sagittarius. What to expect: Its tail is described as being five times the length of the full moon.

## Comet C/2025 A6 (Lemmon)

**Visibility:** Discovered by the Mount Lemmon Survey in Arizona, this comet will also be at its closest approach to Earth on October 21. Optimistic predictions suggest it could brighten to magnitude 4 or 5, potentially becoming a faint naked-eye object. **Location:** Oct 20th, Comet Lemmon will be available for evening viewing in the northwest after sunset in Bootes. What to expect: Look for a faint, fuzzy glow that may show some tail structure with binoculars.

Best time and conditions for viewing

The prime viewing window for both comets is around October 20–23, when they are at or near their closest approach to Earth.

**Darkest skies:** The new moon occurs on October 21, meaning the sky will be at its darkest, creating perfect viewing conditions. Darkness adaptation: To see fainter objects like comets, allow your eyes at least 20–30 minutes to adjust to the darkness.

Avoid light pollution: For the best results, get away from city lights to a location with broad, clear horizons.

While potentially visible to the naked eye, binoculars or a small telescope will provide a much better view of the comets' fuzzy cores and tails.

### Objects to View in October 2025

| Object Name                                                                                | Object Type      | Visual Magnitude | Apparent Size | Rise Time | Set Time |
|--------------------------------------------------------------------------------------------|------------------|------------------|---------------|-----------|----------|
| Saturn  | Planet           | 0.6              | 18" (disk)    | 2:00 PM   | 1:00 AM  |
| Uranus                                                                                     | Planet           | 5.7              | 2.3" (disk)   | 10:00 PM  | 10:00 AM |
| Neptune                                                                                    | Planet           | 7.8              | 4" (disk)     | 8:00 PM   | 8:00 AM  |
| M13: Great Globular Cluster                                                                | Globular Cluster | 5.8              | 20'           | 12:00 PM  | 1:00 AM  |
| M92                                                                                        | Globular Cluster | 6.5              | 14'           | 1:00 PM   | 1:00 AM  |
| M15                                                                                        | Globular Cluster | 6.2              | 12'           | 1:00 PM   | 3:00 AM  |
| M2                                                                                         | Globular Cluster | 6.5              | 16'           | 1:00 PM   | 4:00 AM  |
| M27 (Dumbbell Nebula)                                                                      | Planetary Nebula | 7.5              | 8'            | 2:00 PM   | 11:00 PM |
| M57 (Ring Nebula)                                                                          | Planetary Nebula | 8.8              | 1.4'          | 2:00 PM   | 12:00 AM |
| NGC 7009: Saturn Nebula                                                                    | Planetary Nebula | 8                | 0.5'          | 1:00 PM   | 11:00 PM |
| NGC 6826 Blinking                                                                          | Planetary Nebula | 8.8              | 2.1'          | 10:00 AM  | 6:00 AM  |
| NGC 7662 Snowball                                                                          | Planetary Nebula | 8.3              | 0.5'          | 3:00 PM   | 8:00 AM  |
| M31 (Andromeda Galaxy)                                                                     | Spiral Galaxy    | 3.4              | 180' x 60'    | 4:00 PM   | 8:00 AM  |
| M33 (Triangulum Galaxy)                                                                    | Spiral Galaxy    | 5.7              | 70' x 40'     | 6:00 PM   | 9:00 AM  |
| M52                                                                                        | Open Cluster     | 6.9              | 13'           | 6:00 PM   | 9:00 AM  |
| M103                                                                                       | Open Cluster     | 7.4              | 6'            | 6:00 PM   | 9:00 AM  |
| Double Cluster (NGC 869/884)                                                               | Open Cluster     | 4.3 & 4.4        | 30'           | 7:00 PM   | 8:00 AM  |
| M45: Pleiades                                                                              | Open Cluster     | 1.6              | 1.5°          | 9:00 PM   | 11:00 AM |
| M34                                                                                        | Open Cluster     | 5.5              | 35'           | 8:00 PM   | 10:00 AM |
| M11 (Wild Duck Cluster)                                                                    | Open Cluster     | 6.3              | 14'           | 10:00AM   | 7:00 PM  |
| NGC 457: Owl Cluster                                                                       | Open Cluster     | 6.4              | 13'           | 7:00 PM   | 9:00 AM  |
| Albireo                                                                                    | Double Star      | 3.1 / 5.1        | 35"           | 1:00 PM   | 9:00 PM  |
| Epsilon Lyrae Double-Double Star                                                           | Double Star      | 4.7 / 4.7        | 3.5'          | 2:00 PM   | 10:00 PM |
| Almach (Gamma Andromedae)                                                                  | Double Star      | 2.3 / 5.1        | 9.6"          | 4:00 PM   | 8:00 AM  |



# Peering into the Past: A Dome That Changed Canadian Astronomy

by Richard Meyers

I first learned about the Dominion Astrophysical Observatory (DAO) through the Royal Astronomical Society of Canada (RASC), whose outreach led me to one of their monthly star parties. Located just outside Victoria on southern Vancouver Island, the DAO sits atop Observatory Hill—a secure site that requires advance registration for public events. The experience is absolutely worth it. That evening, surrounded by fellow stargazers and guided by passionate volunteers, I watched the dome rotate and the telescope lock onto Saturn's rings. It was a moment of shared awe, echoing the spirit of discovery that's defined the DAO for over a century.

The observatory opened in 1918, a bold project led by J.S. Plaskett and R.K. Young, with assistant Thomas Tennant Hutchison. Their mission? To chart the motion of hundreds of stars using one of the world's largest telescopes at the time—a 72-inch (1.8-meter) reflector. Within a year, they had exposed over 1,800 photographic plates and measured 1,000 stars—an astronomical feat that helped map our galaxy's structure.

One of DAO's most dazzling achievements came in 1921, when Plaskett discovered a massive binary system now known as Plaskett's Star. It was the most massive stellar pair ever recorded, and the find made headlines around the globe. Suddenly, the DAO wasn't just a Canadian observatory—it was a world-class research center.



Public interest soared. In the 1920s and '30s, the Victoria Colonist ran bi-weekly "Astronomy Talks," and W.E. Harper brought celestial news to the radio waves. By 1929, nearly 40,000 visitors a year were climbing the hill to see the stars.

The DAO's legacy didn't stop at discovery. In 1922, its astronomers joined a Canadian eclipse expedition to Western Australia, helping confirm Einstein's Theory of General Relativity. Later, Plaskett's work on the Milky Way's rotation became one of the observatory's greatest contributions to science.

Today, standing beneath that historic dome—especially during a star party—you can almost hear the echo of early astronomers turning cranks, adjusting lenses, and chasing the mysteries of the universe. It's a place where curiosity met precision—and where Canada found its place among the stars.

## A Very Happy Canadian Member of ASIG-

By Keith Mombourquette

Not too far from where I live, the North York Astronomical Society hosts an annual Star Party they call Starfest. This year, I was honored to be asked to be one of their presenters, speaking on the topic of how to automate data collection. This event has been held each year since 1982. One of the beloved parts of their event is the Astro Imaging Contest. For the first time, this year's contest had a collaboration category where a group of up to 4 imagers could combine their skills and data collected any time in the last 5 years to produce an image. I and 3 colleagues decided to tackle a dusty area near M81/M82 where Bray Falls and a group of his colleagues had discovered a nebulous area they dubbed the Vulcan Nebula. In total we collected over 181 Hours on this one. My contribution was 60.5 hours of Oiii collected with both my Askar FRA300, and my Askar 107 PHQ reduced to f4.9. Of 7 teams that entered this category, we were honoured to be selected as the winners.

Our image and all the nerdy details can be found on Astrobin here:

<https://app.astrobin.com/u/Old-Photons?i=yc4q9s#gallery>

# Dark Matter Halos: The Scaffold of Galaxies

by Cyrus Mousavi

If galaxies had an origin story, dark matter halos would be their unsung superhero capes—never seen, always working, and utterly essential to the drama. Ready for an astronomical backstage tour? Grab a cosmic popcorn bucket and let's dive in.

## Meet the Galactic Stage Manager: Dark Matter Halos

Picture a galaxy: dazzling stars, swirling gas, perhaps a planet or two auditioning for their big "life-supporting" break. But none of it would hang together in the chaos of cosmic auditions without a dark matter halo calling the cues. A dark matter halo is a gigantic, invisible blanket (think: weighted, but on an intergalactic scale) that gravitationally glues together a galaxy's stars and gas—holding everything in place even when it wants to spin wildly off stage.

Dark matter halos don't shine, don't get Instagram followers, and rarely show up in family photos with the stars. But their gravity enables galaxies to not only exist, but thrive in the galactic spotlight.

## Evidence: Star-Speed Speeding Tickets

Here's the astronomical detective twist: When astronomers clock the speeds of stars whizzing around the edges of galaxies, those stars seem to have a need for speed that should fling them into the void. Instead, they stick around, pulled by the gravitational embrace of an invisible something—the dark matter halo awarding invisible speeding tickets and telling the stars, "Not so fast, you're still on my stage!"

That mystery mass—first suspected by the cosmic gumshoe Vera Rubin in the 1970s—led to the reveal of dark matter halos as the secret script-writers behind every galaxy's performance.

## Building the Halos: Cosmic LEGO Masters

Go back to the Big Bang, when the universe was basically a hot mess of particles with commitment issues. Tiny bumps in matter density were seeds just waiting for gravity to do its thing. Over billions of years, these proto-halos sucked in more dark matter and grew, merging together like cosmic LEGO sets into ever larger and more complex structures.

Galaxies are born not in isolation but in these dark matter cocoons. Like talent scouts, halos supplied the gravitational potential for ordinary gas to fall in, cool down, and light up as stars—thus creating the universe's luminous pinwheels.

## Halos: The Galaxy Architects

Think of dark matter halos as the real estate developers of the cosmos. A massive halo means a luxurious, star-studded galaxy. A modest halo? Expect a cozier, fainter cluster of stars. These invisible architects even spatially organize galaxies into neighborhoods—clusters, filaments, and superclusters—ensuring the cosmic suburbs are ever-expanding and brimming with celestial drama.

And halos keep on giving: their leftover bits (subhalos) can shepherd around smaller satellite galaxies, the way our own Milky Way has a retinue of lesser-known companions like the Magellanic Clouds.

## Halo Life: Not Just an Origin Story

The influence of a dark matter halo doesn't fade once the galaxy lights come up. How fast a galaxy forms stars, how many supernova outbursts it suffers, and whether it turns into a cosmic charmer or a wallflower—all depend on the size and assembly history of its halo. Halos can capture or lose gas, moderate the galactic fireworks, and basically set the playlist for a galaxy's long cosmic dance.

## Cosmic Curtain Call

Despite all our telescopic peeping, dark matter halos remain the ultimate cosmic stagehands—never seen, always crucial. Whether galaxies dazzle as spirals or brood as ellipticals, their shapes, spins, and destinies owe everything to the scaffolding laid down by dark matter. So, next time you gaze up at the Milky Way, give a silent ovation to the dark matter halo keeping the entire show together. The universe: now available in theaters everywhere—thanks to halos.

## References

1. Wikipedia: Dark matter halo. 2005-02-23.
2. Cambridge University Press: Formation and Structure of Dark Matter Halos. 2010-05-13.
3. arXiv: The Connection between Galaxies and their Dark Matter Halos. 2018-04-08.
4. Fiveable: Role of dark matter in cosmic structure formation. 2024-07-21.
5. MNRAS: Exploring the link between galaxy assembly and dark matter halo assembly. 2025-02-27.
6. KITP: Structure of Dark Matter, The Backbone of the Universe. 2004-01-31

# Astroimaging Special Interest Group (ASIG)

Your astroimages have been stunning—each galaxy spiral and nebular glow pushes our group's passion deeper into the cosmos.

## Monthly Target Challenge:

### Easy (Small Telescopes)

- M15 (Globular Cluster, Pegasus) A compact, bright globular cluster with a dense core. Easily spotted in small scopes as a fuzzy ball; larger scopes resolve individual stars around the edges.
- NGC 457 (Owl Cluster, Cassiopeia) A charming open cluster resembling an owl with outstretched wings. Great for outreach—its bright “eyes” make it a hit with beginners.
- M2 (Globular Cluster, Aquarius) Slightly fainter than M15 but still accessible. Appears as a soft glow in small scopes, with hints of granularity under good conditions.

### Challenge (Large Telescopes)

- NGC 7331 (Spiral Galaxy, Pegasus) Often called a Milky Way analog. Shows a bright core and faint spiral structure in large scopes. A rewarding target for visual observers and imagers alike.
- M74 (Phantom Galaxy, Pisces) A low surface brightness spiral galaxy—tricky to spot, but stunning in long exposures. Best tackled under dark skies with high aperture.
- NGC 7662 (Blue Snowball Nebula, Andromeda) A compact planetary nebula with a vivid blue hue. High magnification reveals internal structure. A great follow-up to NGC 7009.

## Helpful YouTube channels

[AstroBackyard](#) – Excellent for beginner and intermediate astrophotographers, covering gear, imaging techniques, and post-processing.

[Nebula Photos](#) – Focuses on budget astrophotography, including DSLR and smartphone imaging.

[Peter Zelinka](#) – Great for nightscape and deep-sky astrophotography techniques.

[Chuck's Astrophotography](#) – Covers deep-sky imaging, processing tutorials, and equipment reviews.

[NSN Webinar Series: JWST: Revealing the Invisible Universe](#) - Principal Science Visuals Developer Joseph DePasquale will provide some background on the observatory and the art and science of image processing that reveals the inherent beauty of the infrared universe.

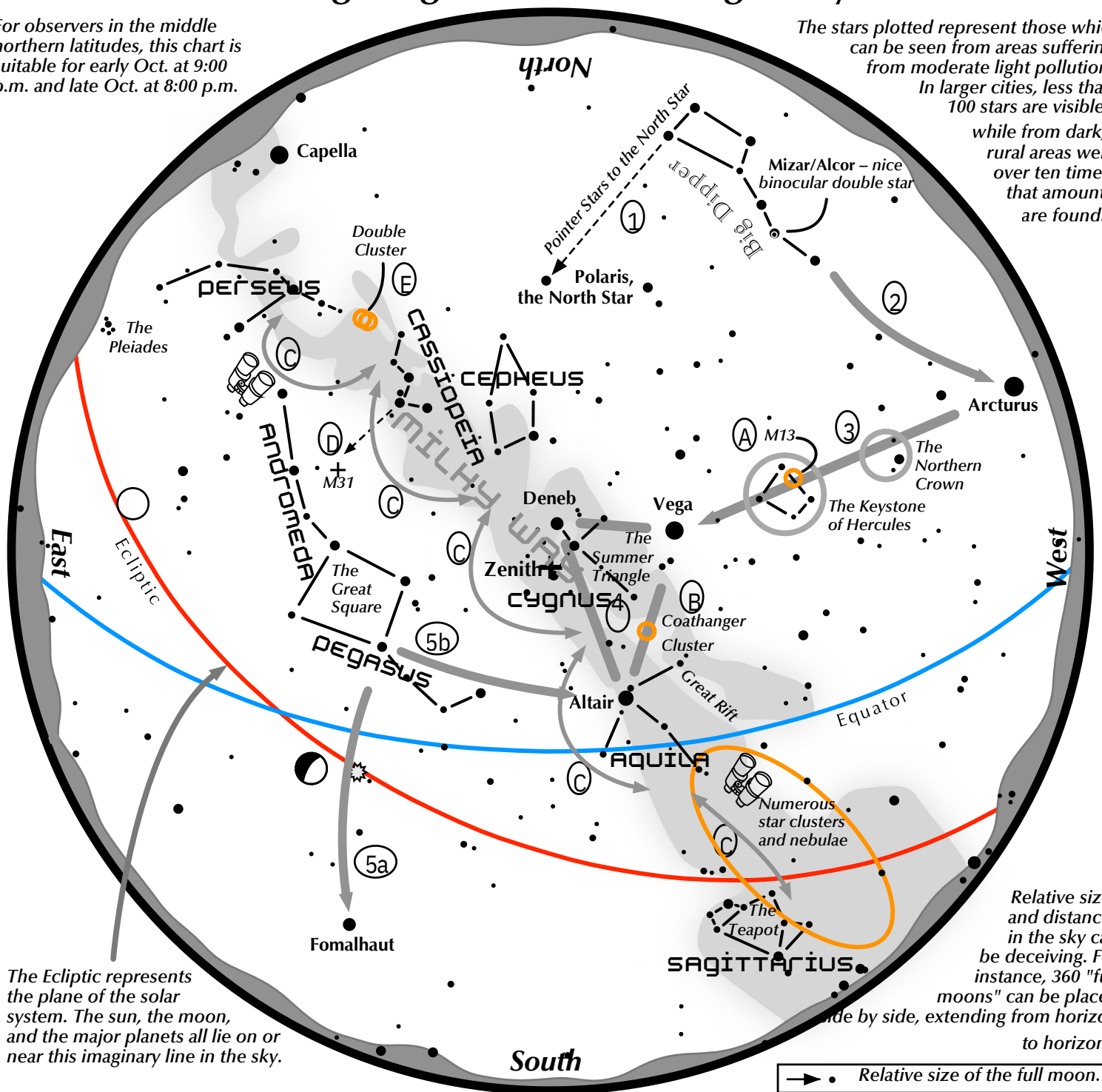
[Masterofpixinsight](#)-Masters of PixInsight is an educational platform dedicated to teaching astrophotographers how to effectively use PixInsight for deep-sky image processing.

[20 Top TIPS for Better Astrophotography](#) Dylan O'Donnell Dylan covers both image acquisition as well as processing and provides some great tips for better images.

# 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.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

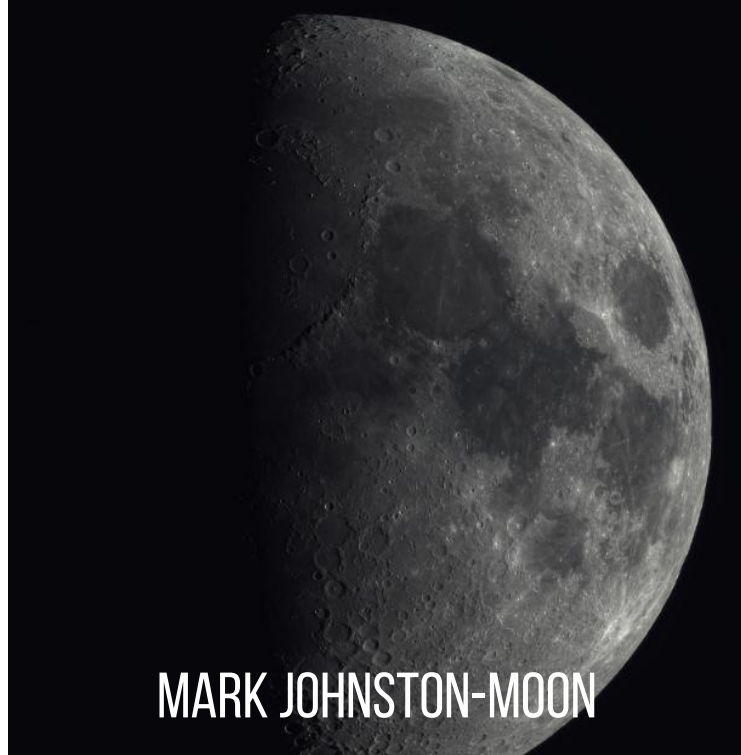
**Navigating the October night sky: Simply start with what you know or with what you can easily find.**

- 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.

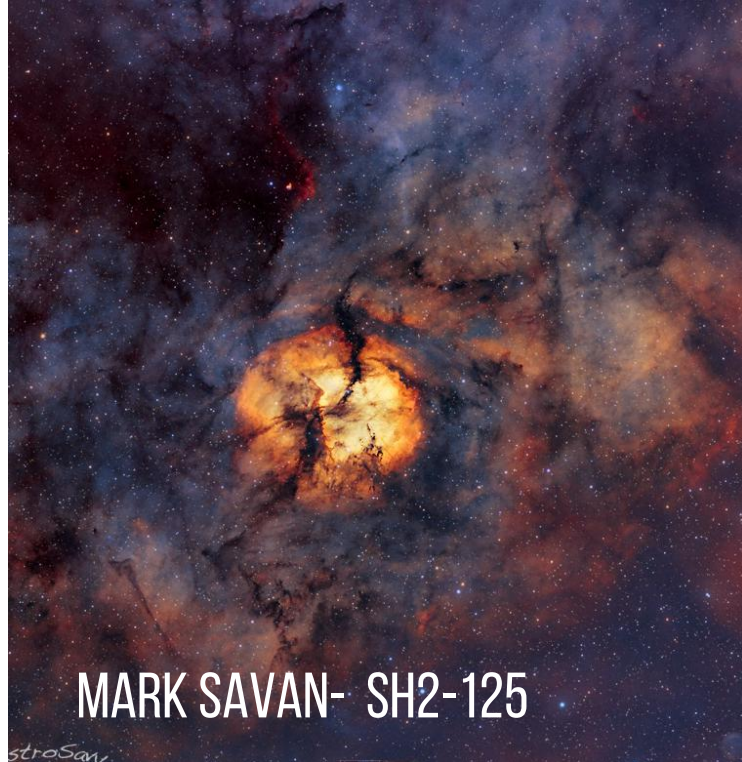
## Binocular Highlights

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.





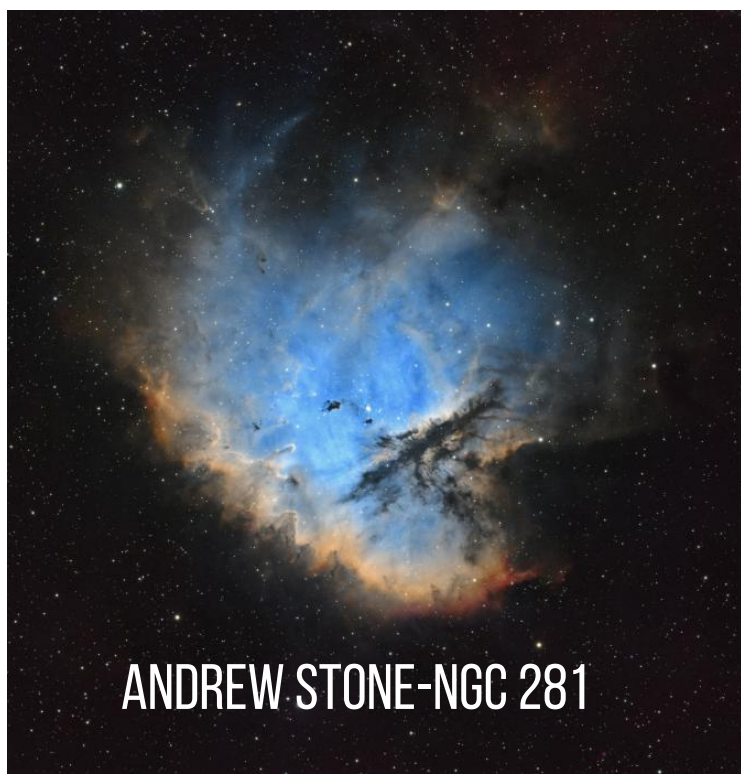
MARK JOHNSTON-MOON



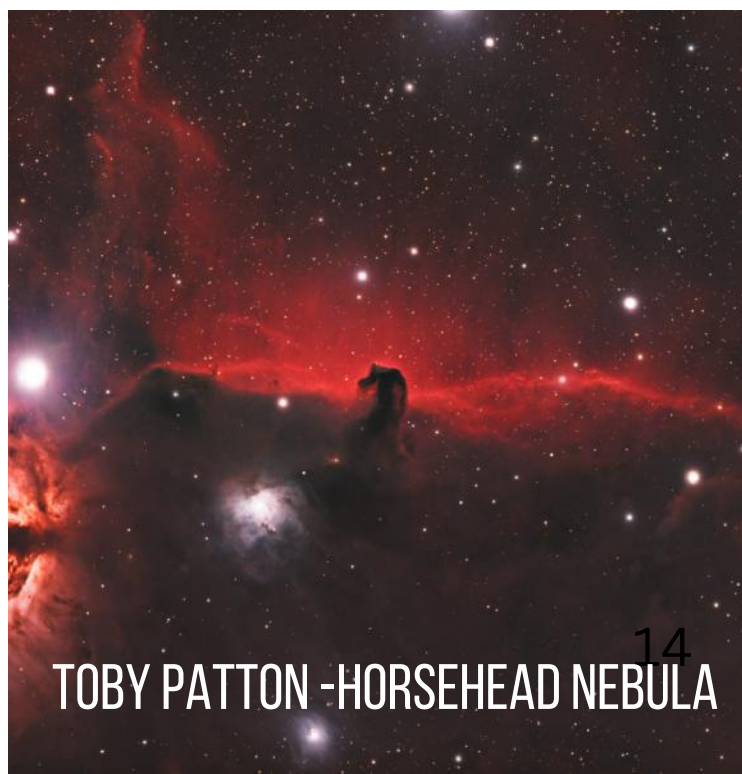
MARK SAVAN- SH2-125



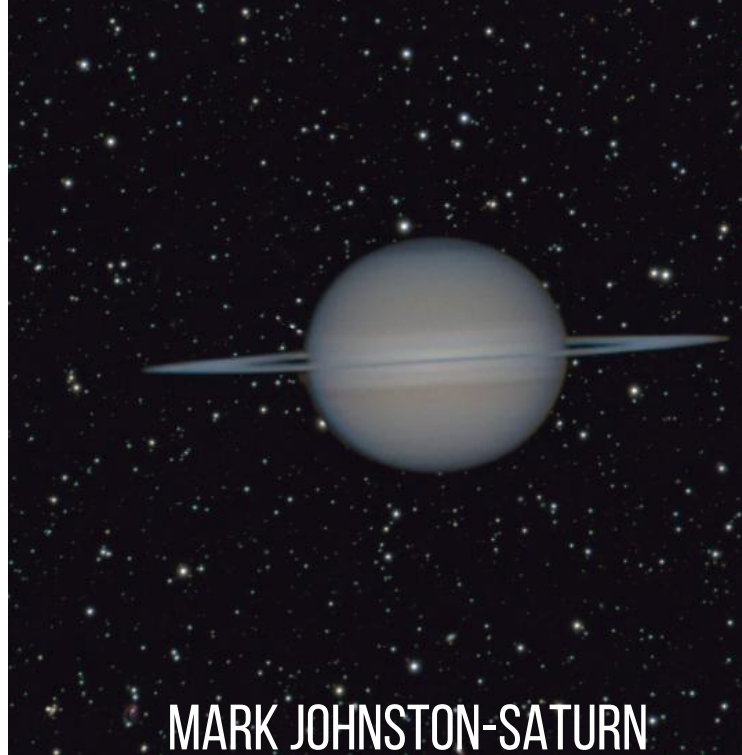
STEVE GLICK- M17



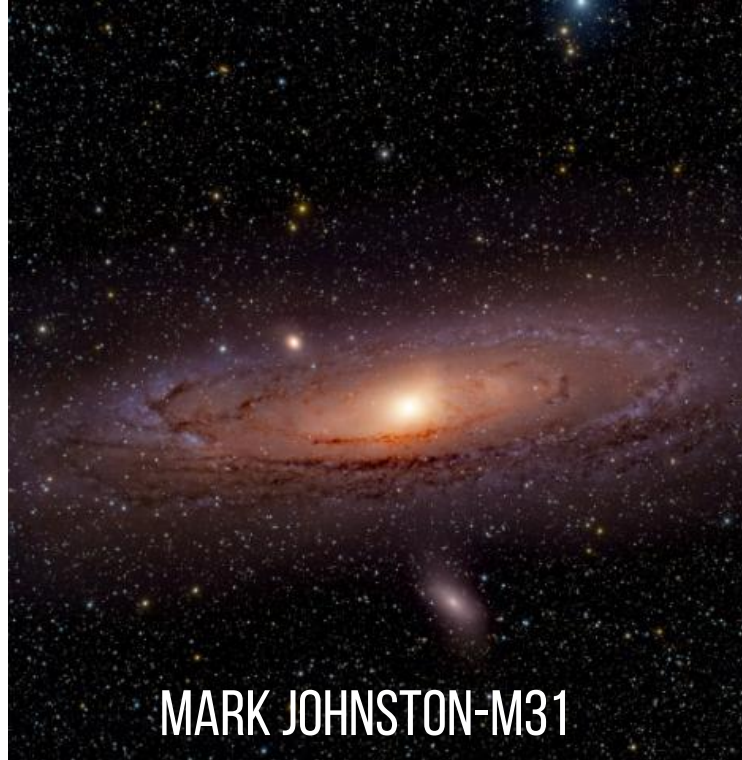
ANDREW STONE-NGC 281



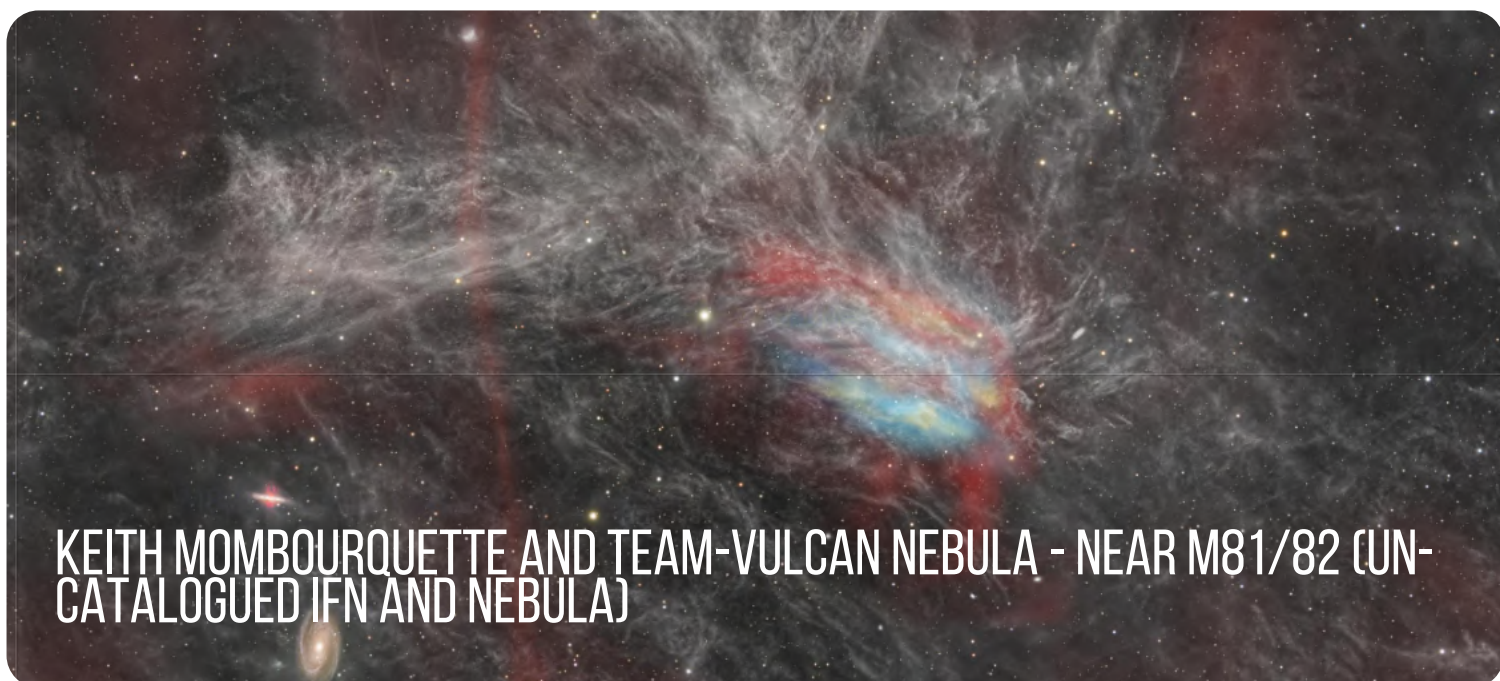
TOBY PATTON -HORSEHEAD NEBULA



MARK JOHNSTON-SATURN



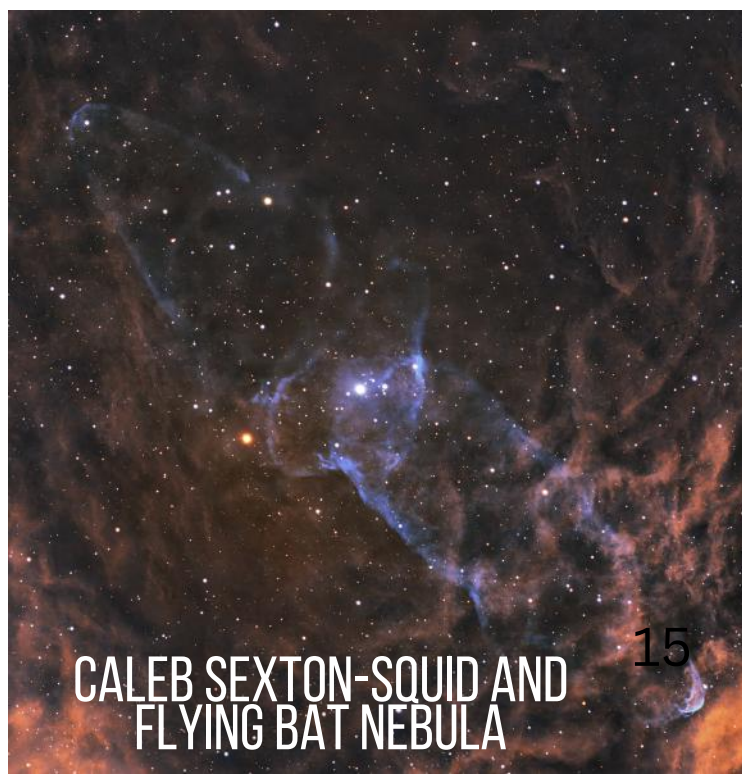
MARK JOHNSTON-M31



KEITH MOMBOURQUETTE AND TEAM-VULCAN NEBULA - NEAR M81/82 (UN-CATALOGUED IFN AND NEBULA)



KEITH MOMBOURQUETTE-NGC6820

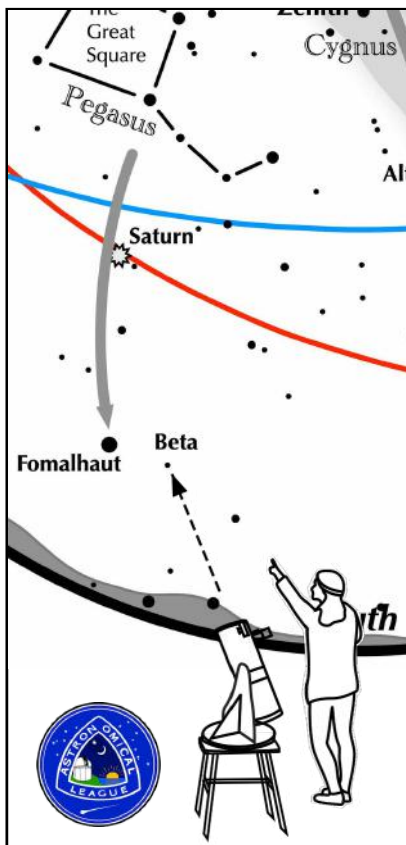


CALEB SEXTON-SQUID AND  
FLYING BAT NEBULA

## 7 Telescope Targets for October

Each month, we feature 7 good targets for small telescopes that should be visible in the evening. For the month of September, the targets are:

1. **31 Cygni** – easy orange, blue, and white triple star
2. **Delta Cygni** – one side of the Northern Cross. Tight double star of uneven magnitudes
3. **NGC7000 North America nebula** – large emission nebula near Deneb. Try with binoculars from a darker site away from the city
4. **NGC6992 Eastern Veil nebula** – beautiful supernova remnant, opposite from Delta Cygni on other side of the constellation
5. **NGC6960 Western Veil nebula** – also known as the Witch's broom, part of the same supernova complex
6. **Mu Cephei Garnet star**- Red supergiant star in Cepheus. If it were in our solar system all planets up to Jupiter would be inside it
7. **Delta Cepheus** -Beautiful blue/yellow binary. One of the closest Cepheid variable stars to Earth



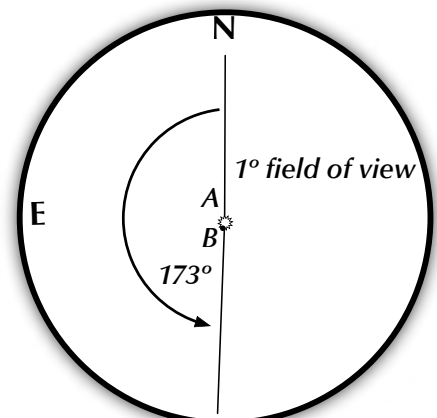
### Other Suns: Beta Piscis Austrini

How to find Beta Piscis Austrini on an October evening

*The two western stars of the Great Square point southward to the bright star Fomalhaut. One binocular field west lies 4.3 magnitude Beta Piscis Austrini.*

**Beta Piscis Austrini A-B separation: 30 sec**  
**A magnitude: 4.3 B magnitude: 7.1**  
**Position Angle: 173° A & B colors: white, white**

*Suggested magnification: >20x  
Suggested aperture: >2 inches*





An "Oh! Wow!" moment

## High magnification viewing of the Galilean moons

Are you ready for a solar system observing activity? Try viewing the tiny disks of the Galilean moons of Jupiter!

- Attempt on a night with good seeing. You need to resolve 1.1 arc seconds.
- Best when Jupiter is in Taurus or Gemini, and reaches its nightly culmination. This places it high above the horizon for minimal atmospheric distortion.
- Best when Jupiter is near opposition. This gives the greatest disk diameter of the moons.
- Use at least 300 magnification. This gives a magnified diameter for Ganymede of 300 times its true angular diameter.
- Polar alignment is very helpful, and tracking is a plus.

If you have resolved the disk of Neptune, you likely will be able to discern the disks of the Galilean moons at high magnification (>300x).

Note:

Is Ganymede noticeably wider than Io and Europa?

Are there any apparent color differences among the four moons?

Are there albedo differences among the moons?

| Moon            | Magnitude | Diameter (miles) | Angular Diameter (arc sec) | Albedo |
|-----------------|-----------|------------------|----------------------------|--------|
| <i>Io</i>       | 4.9       | 2264             | 1.2                        | 0.63   |
| <i>Europa</i>   | 5.2       | 1940             | 1.1                        | 0.67   |
| <i>Ganymede</i> | 4.5       | 3274             | 1.8                        | 0.43   |
| <i>Callisto</i> | 5.5       | 2995             | 1.6                        | 0.22   |

### Relative angular diameters of various bodies in the solar system

| Near Opposition            |                        |                              |                             |                             |                           | Near Conjunction        |
|----------------------------|------------------------|------------------------------|-----------------------------|-----------------------------|---------------------------|-------------------------|
| <i>Europa</i> ,<br>1.1 sec | <i>Io</i> ,<br>1.2 sec | <i>Callisto</i> ,<br>1.6 sec | <i>Ganymede</i> ,<br>1.8sec | <i>Neptune</i> ,<br>2.3 sec | <i>Uranus</i> ,<br>3.8sec | <i>Mars</i> ,<br>3.9sec |
|                            |                        |                              |                             |                             |                           |                         |

*Jupiter, near Opposition*  
Angular diameter: 48 arcsec  
Diameter: 86881 miles



Scan the area with binoculars for asterisms and stellar groupings



## Between the First Point of Aries and the Water Jar

The **First Point of Aries** marks the intersection of the celestial equator and the ascending ecliptic which defines the location of 0 hrs Right Ascension.

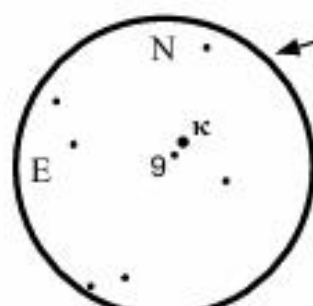
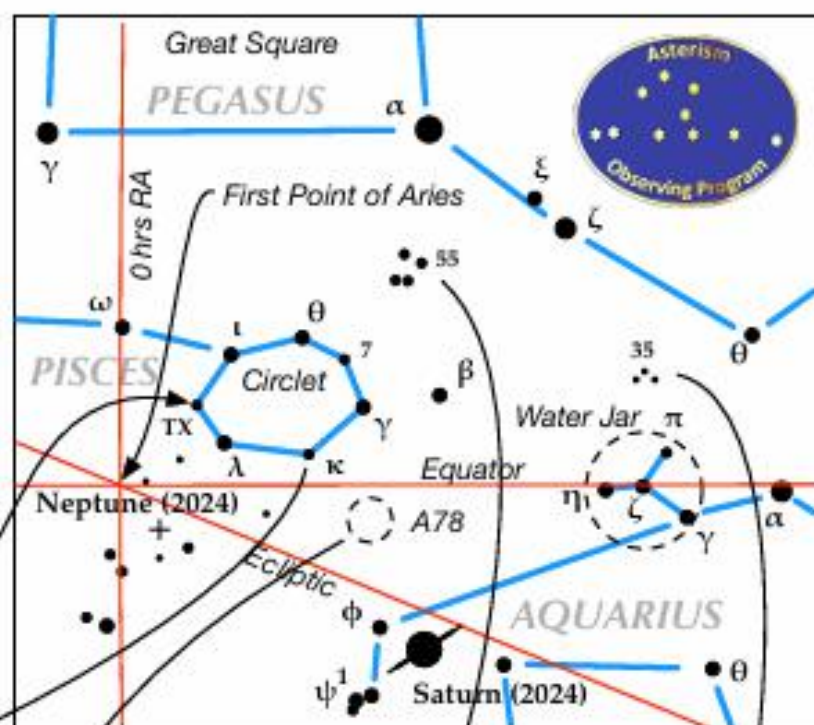
### Naked eye and binocular sights

**Circlet.** These six, maybe seven depending on sky clarity and visual acuity, 4th and 5th magnitude stars trace a squashed circle at the far southwestern corner of Pisces.

It lies  $10^\circ$  below the southern edge of the asterism the **Great Square** in Pegasus, and less than  $15^\circ$  east of another asterism, the four 4th & 5th magnitude stars of the **Water Jar** in Aquarius.

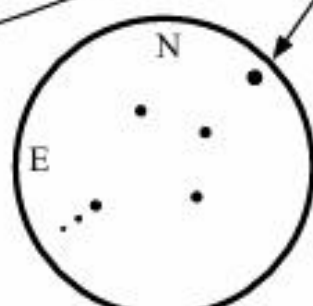
**These features are subtle, not bright.**  
Best seen from a dark location with a transparent sky.

Binoculars users enjoy studying **TX Piscium**. The star varies between 4.8 and 5.2 magnitude, a noticeable amount to the careful observer. It appears as a distinct orange-red hue and its period is irregular, but averages around 224 days.



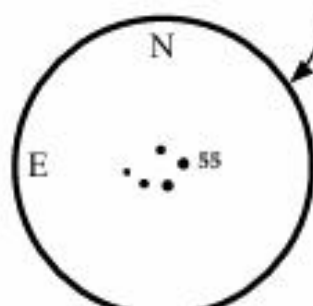
6° Field

**Binocular Double**  
4.9 mag. Kappa Psc  
6.2 mag. 9 Piscium  
Separation: 9 min



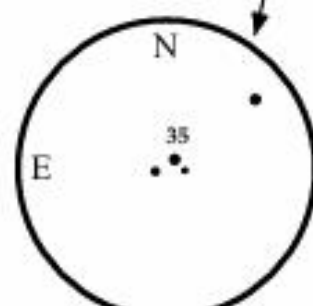
1° Field

**Asterism A78**  
7 stars of 7-8 mag.  
tracing the outline  
of a "rocketship"



6° Field

**Binocular sight**  
A stellar quintet  
Four 5th mag stars  
& one 6th mag star.



6° Field

**Binocular sight**  
A stellar trio  
One 5th mag. star &  
two 6th mag. stars.

# Helpful Astronomy Websites

by Mark Johnston

The following websites are great free resources to help you plan and enjoy your astronomy adventures

**Astromart:** [astromart.com/](http://astromart.com/)

This is one of the top two sites for buying and selling used astronomy gear, product reviews, and forums where you can discuss any aspect of astronomy with other enthusiasts. A small fee is required.

**Astrometry.net:** <https://nova.astrometry.net/>

This site will take any astronomy image you send it (galaxy, starfield, nebula, etc) and then tell you what it is and where it is in the sky.

**Astronomy Tools:** [astronomy.tools/calculators/field\\_of\\_view/](http://astronomy.tools/calculators/field_of_view/)

This site has a lot of capabilities but I use it primarily to figure out how a target (e.g. the Helix nebula) will look in my eyepiece or astronomy camera. You pick your scope, camera, eyepiece and target and the site does the rest.

**Astrospheric:** [www.astrospheric.com/](http://www.astrospheric.com/)

Probably the best short term astronomy weather forecasting tool, providing predictions of clouds, transparency and seeing.

**Clear Sky Charts:** [www.cleardarksky.com/](http://www.cleardarksky.com/)

Excellent source of astronomy seeing conditions forecast. Also a great tool for finding observing sites with lower light pollution.

**Cloudynights:** [www.cloudynights.com/](http://www.cloudynights.com/)

This is one of the top two sites for buying and selling used astronomy gear, product reviews, and forums where you can discuss any aspect of astronomy with other enthusiasts. Free.

**Dark site finder:** [darksitefinder.com/map/](http://darksitefinder.com/map/)

Great website for finding a dark observing location.

**Heavens above:** [heavens-above.com/](http://heavens-above.com/)

Top site for predicting naked eye observations of satellites. See when the ISS is visible in your neighborhood!

**Jupiter transits:** [shallowsky.com/jupiter/](http://shallowsky.com/jupiter/)

For anyone with a small telescope, this is a great site. You can find out when the Great Red Spot and Jupiter's satellite transits are visible.

**Solar Dynamic Observatory (SDO):** <https://sdo.gsfc.nasa.gov/data/>

Find out how the Sun looks right now, at various wavelengths. If you own a solar telescope, this site coupled with Astrospheric is all you need to plan fabulous solar observing!

**Starizona:** <https://starizona.com/>

Astronomy store located in Tucson, Arizona. They specialize in a wide range of astronomy equipment and accessories, catering to both amateur and professional astronomers. Their offerings include telescopes, cameras, filters, and eyepieces, among other products. Knowledgeable staff and passion for astronomy.

**Telescopius:** [telescopius.com/](http://telescopius.com/)

This site is very helpful in planning an observing evening. It will tell you when any particular target is rising and setting and when is the best time to observe it. This allows you to sequence your observing in a planned manner.

# Used equipment for sale

**Duration:** Ads run for 3 months and may be renewed if submitted by the deadline and space permits.

**Cost:** Ads are FREE for members only. Equipment Requirements: All items must be in good working order.

Acceptable items include books, star charts, telescopes, eyepieces, finder scopes, binoculars, lasers, and other astronomy-related gear.

Submission Details: Email the following information to [editor@pasaz.org](mailto:editor@pasaz.org): *\*Make \*Model \*Description (Under 100 words-include a link to the manufacturer's site if available) \*Price \*Contact Information \*Preferred Contact Method(Email or phone) \*Approximate Location*

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.

Description: Obsession 18" f/4 UC with Feather Touch Focuser, Argo Navis (factory installed), Shroud, Telrad

-Purchased the equipment 3 years ago, but have not used the scope in a year having moved from visual to imaging. At 65 years old with the onset of cataracts imaging is a more satisfying pursuit to me now. I also have the Paracorr, 21mm, 13mm Ethos eyepieces which the purchaser may elect to buy as well (priced separately)

Price: \$8,000

Contact Information: Toby Patton

Preferred Contact Method: flyfishman2010@gmail.com



PAS offer: This is a first come, first served offer. Review the list. Decide what you want. Email [president@pasaz.org](mailto:president@pasaz.org) what you want. He will set up a day/time for you to come to his location to purchase.

Bring your check payable to Phoenix Astronomical Society or cash ... no credit cards please.



Explore Scientific AR102 with Tripod

· 102mm Doublet Refractor

· 2" Eyepiece adapter

· Alt-Az manual mount

Member Price: \$400



Celestron 6" AstroMaster

· 6" Newtonian Telescope – OTA only

Member Price: \$50



Meade ETX-70

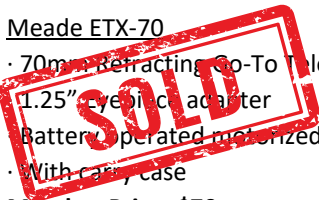
· 70mm Refracting Go-To Telescope

· 1.25" Eyepiece adapter

· Battery operated motorized mount

· With carry case

Member Price: \$70



Celestron 6" F/4 Newtonian Astrograph Telescope

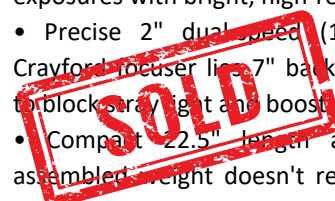
• Fast 6"-aperture reflector lets you take short exposures with bright, high-resolution results

• Precise 2" dual-speed (10:1) linear-bearing Crayford focuser lets 7" back in the optical tube to block stray light and boost contrast

• Compact 22.5" length and light 12.7 lb. assembled weight doesn't require an enormous mount

• Includes two heavy-duty hinged tube rings, 8x50 finder scope, dovetail mounting bar, and more

Member Price: \$250



Celestron Powerseeker 127

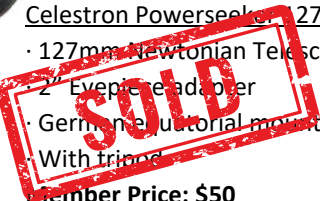
· 127mm Newtonian Telescope

· 2" Eyepiece adapter

· German equatorial mount

· With tripod

Member Price: \$50

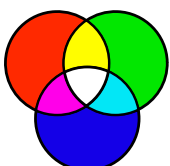
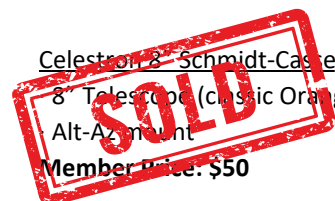


Celestron 8" Schmidt-Cassegrain

· 8" Telescope (classic Orange Tube)

· Alt-Az mount

Member Price: \$50



Various Filters – 1.25"

Red, Yellow, Blue, Green, Multiple O3 filters

Member Price: \$100

# Telescope Loan Program

The PAS Telescope Loan Program provides PAS active members access to various donated telescopes and accessories to enhance their learning of visual astronomy as well as astrophotography.

**Check-out Process:** The entire PAS inventory of telescopes is available for active members to use. Some telescopes require completion of a training program, others do not. Several of the loaner telescopes represent a significant dollar value. In certain cases, the PAS member will be asked to provide credit card information as insurance against potential damage or loss.

A kit of eyepieces and accessories is available for all loaner telescopes if needed. There is also a special kit of advanced 2" eyepieces available for loan as well as advanced finder scopes. Laser collimation tools are also available for loan if needed.

Loan periods are for a maximum of one month. However, longer periods may be granted in special cases.

All telescope equipment and accessories must be picked up at the PAS storage facility and delivered back to the facility by the end of the loaner period. If you wish to check out one of PAS's telescopes, send an email to [telescope@pasaz.org](mailto:telescope@pasaz.org) with the following information:

- Full Name
- Email Address
- Desired Telescope and/or accessory kit
- Check out date
- Check in date
- Additional information as needed

ZWO SeeStar S50

Coronado Personal Solar Telescope (PST)

Orion SkyQuest XT-10 - 10" Dobsonian

Orion Skyquest XT-8 – 8" Dobsonian

Meade ETX-70 Go-To Refractor

Sky-Watcher – 10" Collapsible Motorized Dobsonian

Accessory Kit #4 - Advanced Observing

Accessory Kit #5 – 1.25" Eyepieces & filters

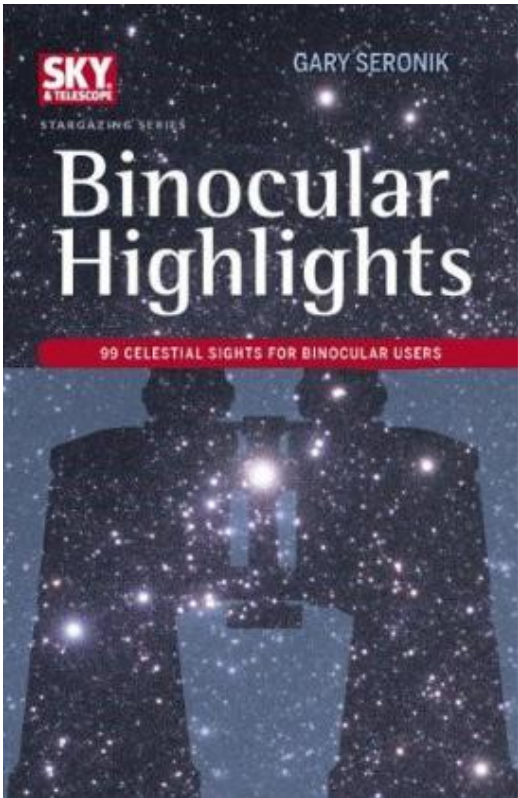




**Book: "Binocular Highlights: 99 Celestial Sights for Binocular Users" by Gary Seronik**

Gary Seronik’s Binocular Highlights is the ultimate guide for binocular astronomy enthusiasts. The book features 99 celestial objects that are perfect for binocular observation, from star clusters and nebulae to the planets and the Moon. Each object is described in detail with star maps, tips for viewing, and background information, making it easy for readers to find and appreciate these wonders in the sky. The inclusion of practical tips on binocular usage adds extra value, ensuring readers get the best experience possible.

Verdict: A fantastic resource for anyone interested in exploring the night sky with binoculars. Detailed, practical, and visually engaging.



18/

SAT

**BOOK CLUB-MEMBERS ONLY**

The Particle at the End of the Universe: How the Hunt for the Higgs Boson Leads Us to the Edge of a New World by Sean M. Carroll, Chapters-6-9

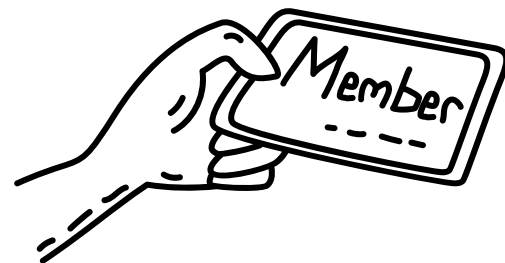
Please reach out to: [saeidmousavi@yahoo.com](mailto:saeidmousavi@yahoo.com)



Sign Up

Are you fascinated by the stars and eager to explore the wonders of the universe? Do you want to connect with like-minded individuals who share your passion for astronomy?

Hi everyone. Great news, your Board of Directors decided not to keep up with inflation. They did not raise your annual dues! More good news is, you can easily renew your membership by going to our public website [www.pasaz.org](http://www.pasaz.org), look in the left index column for the link "Join Our Society," click on that, and there you go. Your membership runs from 1 January to 31 December or from the date you sign up to the end of the year. Our Membership Manager will assist you with any questions you may have: [membership@pasaz.org](mailto:membership@pasaz.org)



## Benefits of PAS Membership

- Helping the Society accomplish its mission of astronomy outreach and education
- Contributing toward the Society's ability to provide college scholarships to astronomy students
- Participation on the Society's email distribution list
- Email receipt of the Society's monthly newsletter
- Participation in the Society's telescope loaner program
- Ability to serve as a teacher at the Society's telescope workshops
- Ability to serve as a mentor at the Society's star parties
- Ability to participate in the Astro Imaging Special Interest Group (ASIG)
- Ability to serve as a paid presenter in the Society's Star Tours program
- Opportunity to purchase used astronomical equipment at 50% off current value
- Access to club trips to the darkest Arizona sites and top observatories
- Connections with professional astronomers and researchers through guest lectures or workshops.
- Opportunities to hold leadership positions within the club, such as committee chairs or officers.

By becoming a member of the Phoenix Astronomical Society, you not only enhance your own astronomical journey but also contribute to a vibrant community that shares your passion. Together, let's explore the universe and inspire others to do the same.

Sign Up Now and Start Exploring the Cosmos with Us!



# Phoenix Astronomical Society Contact Info

|                    |                   |                         |
|--------------------|-------------------|-------------------------|
| President          | Stu Brackney      | president@pasaz.org     |
| Vice President     | Mark Johnston     | vicepresident@pasaz.org |
| Treasurer          | Richard Sauerbrun | treasurer@pasaz.org     |
| Secretary          | Chris Ford        | secretary@pasaz.org     |
| Newsletter Editor  | Richard Meyers    | editor@pasaz.org        |
| Member-at-Large    | Ruza Sabelja      | mal1@pasaz.org          |
| Member-at-Large    | Damon Finell      | mal2@pasaz.org          |
| Membership Manager | Richard Pipkin    | membership@pasaz.org    |
| Star Tours Manager | Andrew Stone      | startours@pasaz.org     |
| Event Manager      | Ruza Sabelja      | events@pasaz.org        |
| Website Manager    | Ed Skinner        | webmaster@pasaz.org     |

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 and distributed via the Internet. All issues are available for download on our website [www.pasaz.org](http://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 Richard Meyers unless otherwise credited. All articles and photos are copyright by their respective authors or PASTimes.

## Star Tours Team 2025

These individuals have successfully met the qualifications to participate in Star Tours Events and receive compensation for their services. ★

Mark Johnston  
Ted Blank  
Mark Savan  
Andrew Stone-Star Tours Manager  
Richard Sauerbrun  
Stu Brackney  
Roger Anzini  
Peter Turner  
Chris Ford  
Scott Adams  
Ryder David  
Alessandro Cavallaro  
Richard Meyers

