VOLUME 77, ISSUE #6

February 2026 Monthly Newsletter

PASTimes

A Publication of the Phoenix Astronomical Society

TOBY PATTON -MEDUSA NEBULA

In this newsletter you can expect:

EVENT REMINDER

5 – Monthly Lecture Series: All about asteroids-Tom Polakis | 19– Telescope Workshop | 21 – Book Club |21-Public Star Party |23 – ASIG Meeting

Stu's Views

Last month did not give us a lot of clear nights to view our winter sky, but fear not, always another night coming our way.

Seestar Telescopes are very popular. In fact, we have two in our loaner inventory. Do you own one? We have a good training opportunity for PAS members on **Seestars.** Interested? Contact RichardMeyers@pasaz.org

Star Parties: We try to have at least one every month. If you enjoy our star parties, grab your notepad. Arizona is home to one of the largest star parties in the nation, at the Grand Canyon every June. https://www.nps.gov/grca/planyourvisit/grand-canyon-star-party.htm

Meteorites: Do you have a collection of your own? If so, our Startours Manager, Mr. Andrew Stone, needs to speak with you. He has many requests from local groups to see your collection. You will be paid! Contact: Andrewstone@pazaz.org

Lunar Eclipse: One is coming your way here in AZ. on March 3rd. More information to follow.

Sidewalk Astronomy: Idea for some of you telescope owners. Take your scope to the sidewalk in front of your house. Circle your scope with a string of red lights on the ground. Your neighbors will be lining up to see what you see with your scope. Have a step stool for the little ones. Pure fun! Don't forget to tell them you belong to PAS.
Tip: Learn what you are looking at. Use your phone app to quiz yourself on those specks of light you are viewing. Knowing the night sky makes using your scope, so much easier, even if it is a "go to" computer scope.
Contact me: StuartBrackney@pasaz.org

Astronomy tip: Some of you have made a New Year's Resolution list. Great! We think you need a PAS activity list. This list is comprised of everything you will need to take with you when you head out to our star parties or on your own, with your telescope. Some, if not many of the best amateur astronomers, at times, have left important items behind resulting in the cramping or stopping their viewing all together. Believe us when we say you won't regret creating a list of everything you will need before heading out to view our universe.

Stuart Brackney

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FEBRUARY 2026
UPCOMING EVENTS

5 THUR

MONTHLY LECTURE SERIES

All about asteroids"

19 THUR

TELESCOPE WORKSHOP 101/201

101 What to buy
201 How to operate your telescope$.

21 SATURDAY

BOOK CLUB

The Universe: A Biography , Murdin, Pau

21 SATURDAY

PUBLIC STAR PARTY

Our Star Parties are held at one of our public star party sites which have an excellent view of the night sky. Parties begin before sunset so equipment setup may be completed in the daylight.

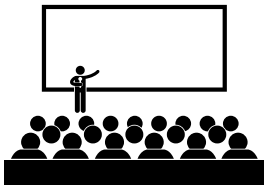
23 MON

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.



February Lecture: All About Asteroids
By Tom Polakis

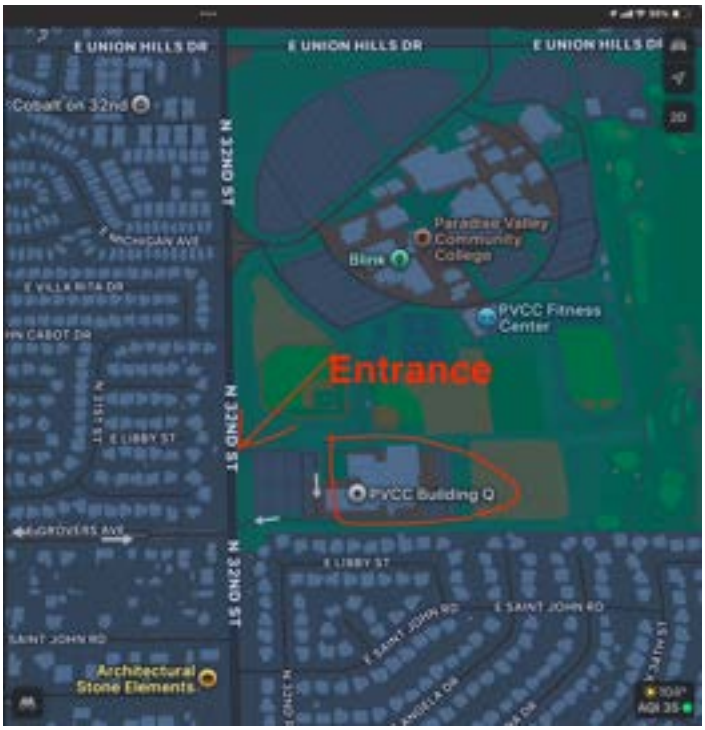
Since the first asteroid was discovered in 1801, astronomers have used widely differing approaches to learn about their nature. Nearly all asteroids are point sources that show no details through the largest telescopes, so clever methods to determine their properties have evolved. These include photometry, radar imaging, and stellar occultations. Tom's presentation about asteroids will range from historical discoveries to modern science.

Bio: Tom Polakis

Tom Polakis has been an active amateur astronomer for 48 years, during which has seen Saturn circle the sun 1 1/2 times. His main interests involve visual observing of all astronomical phenomena, and imaging of same with equipment ranging from a phone to a backyard observatory. He has a particular interest in describing the universe as an ever-changing entity. His writing and photography have regularly appeared in magazines such as "Astronomy" and "Sky & Telescope," and more recently he has been an author or co-author in refereed astronomical publications.

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
“The Search for Life Beyond Earth” Dr. Conti

Why Life Can Exist in Extreme Places

Extremophiles are organisms that thrive in harsh environments on Earth, showing us that life can adapt to conditions we once thought impossible. Here on Earth, we've discovered life flourishing in sea ice in polar regions, in hyper-acidic lakes and volcanoes, and in the deep sea living off hydrothermal vents. These discoveries fundamentally expand our understanding of where life might exist elsewhere in the universe, teaching us that "habitable" may mean far more than we originally imagined.

Current Search Efforts

The SETI Institute operates radio observatories like Arecibo that continuously scan the sky for technosignatures, which are signs of intelligent life. While there have been some speculative cases over the years, no confirmed signals have been discovered yet. This search continues as a parallel effort to NASA's focus on finding microbial or simple life forms.

NASA's Mission Roadmap

TESS (Transiting Exoplanet Survey Satellite) launched in 2018 and currently serves as NASA's workhorse for discovering exoplanets. It surveys the entire sky looking for transiting exoplanets, which are planets that pass in front of their host stars from our line of sight. While this method is limited to specific orbital orientations visible from Earth and represents only a small fraction of possible exoplanets, TESS continues to identify promising candidates for further study.

James Webb Space Telescope is currently operating and takes the next crucial step by analyzing the atmospheres of confirmed exoplanets. Webb uses an indirect method, studying starlight as it skims through exoplanet atmospheres to determine their composition. This represents a breakthrough moment because, as the presenter notes, "for the first time, we're starting to really get a handle on some possible biosignatures."

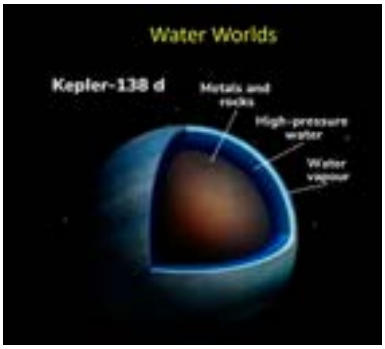
Roman Space Telescope, launching in May 2025, will mark a major advancement by directly studying exoplanet atmospheres rather than relying solely on the indirect starlight analysis that Webb employs. This more powerful approach will provide clearer data about atmospheric composition and increase our ability to identify potential biosignatures.

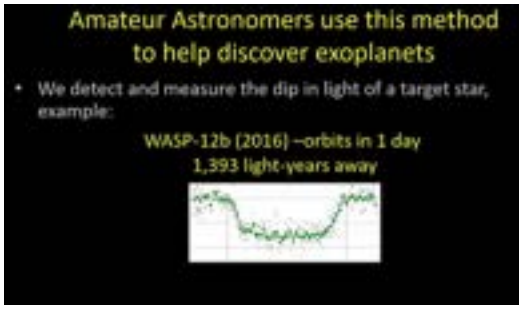
Europa Clipper is currently en route to study Jupiter's moon Europa, with a focus on understanding its ice shell and the water vapor plumes emanating from it. This mission looks closer to home within our own solar system and could reveal life-supporting conditions on an icy moon that likely harbors a subsurface ocean.

The Habitable Worlds Observatory, planned for the 2030s to 2040s if funding is approved, represents the culmination of this progressive mission architecture. This flagship mission is specifically designed to detect signs of life on Earth-sized worlds using a coronagraph instrument to block starlight and reveal hidden planets. It will search for water vapor, oxygen, methane, and other biosignatures, with the potential to discover dozens of habitable worlds in its first five years of operation.

The Ultimate Question

We've discovered thousands of exoplanets, but the fundamental question remains: how many have the conditions for life as we know it? This systematic approach from discovery through TESS to atmospheric analysis with Webb and Roman to life detection with the Habitable Worlds Observatory represents humanity's methodical effort to answer our oldest and most profound question: Are we alone in the universe?





Summary of Outreach Events

Star Tours & Outreach events

1/15 Girl scouts

1/16 Corporate (Biltmore)

1/22 Foothills Elementary

1/26 Corporate (AZ Grand)

1/28 Desert Harbor Elementary

1/29 Real Estate open House

StarTours by Andrew Stone

Objects to View in Feb 2026						
Object Name	Object Type	Constellation	Visual Magnitude	Apparent Size	Rise Time	Set Time
Saturn 🪐 Last Month!!!	Planet	Aquarius	0.6	16" (disk)	9:30 AM	7:30 PM
Uranus	Planet	Taurus	5.7	2.3" (disk)	10:30 AM	4:30 AM
Neptune Last Month!!!	Planet	Pisces	7.8	2.2" (disk)	9:30 AM	8:30 PM
Jupiter	Planet	Gemini	-2.7	45" (disk)	1:00 PM	4:30 PM
M1 Crab Nebula	Supernova Remnant	Taurus	8.4	6' x 4'	1:30 PM	3:30 AM
M42 (Orion Nebula)	Emission Nebula	Orion	4	60' x 60'	2:30 PM	3:00 AM
NGC 2392 Eskimo Nebula	Planetary Nebula	Gemini	9.2	0.8'	3:00 PM	5:00 AM
NGC 7662 Blue Snowball	Planetary Nebula	Andromedae	8.3	0.5'	6:00 AM	10:30 PM
M31 (Andromeda Galaxy)	Spiral Galaxy	Andromeda	3.4	180' x 60'	9:30 AM	10:30 PM
M33 (Triangulum Galaxy)	Spiral Galaxy	Triangulum	5.7	70' x 40'	9:00 AM	12:05 AM
M81 & M82 Bode's Galaxy	Galaxy	Ursa Major	6.9 & 8.4	21' x 10' & 11' x 4'	N/A	N/A
Double Cluster (NGC 869/884)	Open Cluster	Perseus	4.3 & 4.4	30'	N/A	N/A
M35	Open Cluster	Gemini	5.3	28'	1:30 PM	5:00 AM
M36	Open Cluster	Auriga	6	12'	12:30 PM	4:30 AM
M37	Open Cluster	Auriga	5.6	24'	1:00 PM	5:00 AM
M38	Open Cluster	Auriga	6.4	21'	12:00 PM	4:00 AM
M41	Open Cluster	Canis Major	4.5	38'	4:00 PM	3:30 AM
M44 Beehive Cluster	Open Cluster	Cancer	3.1	95'	5:00 PM	6:30 AM
M45: Pleiades	Open Cluster	Taurus	1.6	1.5°	11:30 AM	2:00 AM
NGC 457: Owl Cluster	Open Cluster	Cassiopeia	6.4	13'	N/A	N/A
NGC 2362 Tau Canis Majoris Cluster	Open Cluster	Canis Major	3.8	5'	5:00 PM	3:30 AM
Achird Eta Cassiopeiae	Double Star	Cassiopeia	3.5 / 7.5	12'	N/A	N/A
Castor	Double Star	Gemini	1.6	5"	2:30 PM	6:00 AM

Sam Insana PAS Student Scholarship

Sam Insana PAS Student Scholarship

Winners:
- Jacinda Lopez
- Cody Creech

A huge “Congratulations” to both of you!

Your hard work, passion, and dedication have truly shined, and we’re thrilled to recognize your achievements with this year’s Sam Insana PAS Student Scholarship. Keep reaching for the stars—this is just the beginning of an amazing journey!

MY FIRST TIME AT AAS-When Science Goes Big

By Richard Meyers

Sunday Through Thursday: Five Days That Changed How I See Science

2026 AAS Annual Meeting | Phoenix, Arizona | January 4–8

I made the 30-minute drive from home to downtown Phoenix on Sunday morning, January 4th, ready to pick up my badge and dive into my first American Astronomical Society (AAS) Annual Meeting. The 2026 conference was kicking off, and already the Phoenix Convention Center was filling with scientists, researchers, graduate and undergraduate students, and curious minds from around the globe. I had no idea that by Thursday, January 8th, my brain would be buzzing with exoplanet atmospheres, my phone would be full of new contacts, and I'd finally understand what "Science @ Scale" really means.

Spoiler alert: It's not just about big numbers. It's about big thinking.

Sunday, January 4: The Thread Between Past and Present

Sunday hit the ground running with two sessions that perfectly captured the breadth of astronomical research. The afternoon began with From Ancient Skies to Modern Institutions I in room 221 B—a fascinating oral session from the Historical Astronomy Division that traced humanity's evolving relationship with the cosmos. Hearing how ancient observers mapped the heavens without modern instruments reminded me why astronomy remains so accessible: the same stars they studied are still above us every night.

Then at 3:15 PM, I moved to room 126 A for Exploring SciX: A Researcher's Guide to the Science Explorer Platform. As someone who regularly searches astronomical databases for observation planning with the Phoenix Astronomical Society, this workshop felt like getting the keys to a treasure vault. SciX aggregates millions of scholarly articles across astronomy, planetary science, heliophysics, and astrophysics—exactly the kind of tool that bridges professional research and serious amateur astronomy work.

Monday, January 5: Information Overload — In the Best Way

Monday opened with the Fred Kavli Plenary Lecture at 8:00 AM—one of the meeting's signature talks. Daniella DellaGiustina took the stage to present From Launch to Legacy: How OSIRIS-REx Changed Our Understanding of Asteroids. It was a perfect way to start the week: a single mission that rewrote what we know about how small bodies in our solar system form and evolve.

By 9:00 AM, the Exhibit Hall opened its doors—and stayed open all day. That's when the poster sessions kicked off too. If you've never been to a poster session at a conference like this, here's how it works: instead of sitting in a dark auditorium listening to one speaker at a time, researchers display their work on large monitors—methods, data, results, all laid out on one screen. Then they stand next to their display for an hour, and anyone walking through can stop, study the work, and have a direct conversation with the researcher. It's one of the best parts of any scientific meeting. You get to ask questions face-to-face, see the actual data up close, and stumble across research you never would have found in a session catalog.

The afternoon is where the choices really multiplied. A NASA Update ran as an attendee event. A press conference on stellar behavior filled another slot. And by 1:00 PM, I was standing in the hallway trying to decide between Defending the Dark: Preserving Observational Astronomy in the Light Pollution Age—which spoke directly to my outreach work with the Phoenix Astronomical Society—and SPHEREx Early Science Results and Community Data Access happening in room 126 C. SPHEREx—the Spectro-Photometer for the History of the Universe, Epoch of Reionization and Ices Explorer—had launched just the previous March and was already releasing data. The session promised early results on everything from stellar spectra to molecular detection in the 3I/Atlas comet.

I went with the light pollution session. At 2:00 PM, Exoplanet Discovery kicked off in room 228 B—an oral session chaired by Ryan Oelkers. The talks moved fast, ten minutes each. Far-ultraviolet transit spectroscopy from Kevin France's team at University of Colorado. The TRExS photometry pipeline being built for the Nancy Grace Roman Space Telescope. Predictions for where Roman would find planets using gravitational microlensing. A candidate planet around Alpha Centauri A. Lessons from simulating 2,731 microlensing events. Each one a thread pulling toward the same question: what's out there, and how do we find it?

At 3:40 PM, the plenaries resumed in West Building 301AB. Adam Burgasser from UC San Diego presented The Brown Dwarf–Milky Way Connection: How Failed Stars Play a Unique Role in Galactic Archaeology. Brown dwarfs—objects too small to ignite hydrogen fusion and sustain themselves as true stars—aren't just cosmic curiosities. Burgasser's argument was that these "failed stars" are some of the best fossils we have for understanding how our galaxy built itself over time. They form alongside everything else, they don't burn out, and they carry chemical fingerprints from the gas clouds where they were born. Read those fingerprints carefully, and you're reading the history of the Milky Way.

The next plenary at 4:40 PM, also in 301AB, shifted the lens entirely. Björn Benneke from the University of Montreal presented A New Era of Planetary Astrophysics with JWST and High-Resolution Spectrographs. This one connected directly to the exoplanet work earlier in the afternoon. JWST isn't just taking prettier pictures of distant planets—it's reading their atmospheres in detail, chemical signature by chemical signature. Paired with ground-based high-resolution spectrographs, the combination is giving us a level of planetary detail that was science fiction just five years ago.

By 5:30 PM, the Exhibit Hall was hosting an iPoster session on Advances in Stellar Spectra—another chance to walk the displays and talk directly to researchers. And down the hall in West Building 301 C, something caught my eye on the event board: Reception for Astronomy Educators — open to all!. AAS had put it together for anyone with any interest in education, mentoring, outreach, or science communication. Lightly catered, informal, designed for educators of all kinds to connect and learn about AAS's education programs. Given my work helping with public outreach through the Phoenix Astronomical Society, I didn't hesitate.

That's when it hit me: this conference isn't designed for you to see everything. It's designed so that no matter what corner of science you care about, there's something here for you.

The Schwarzschild Method: How We Read Galaxies Like Books

The other plenary that stood out all week was the 2025 Royal Astronomical Society Gold Medal Lecture—the RAS's highest honor in astronomy—delivered by James Binney in West Building 301AB. Binney, one of the most respected names in galactic dynamics, walked the audience through Schwarzschild modelling—a technique for figuring out how a galaxy's stars are distributed and moving, using math alone rather than observing every single one. The concept sounds deceptively simple: guess a gravitational potential, generate thousands of orbits that sample through the galaxy's phase space, then find the right combination of orbit weights that matches what we actually observe. But the devil, as always, is in the details.

The real challenge is buried in the method. Those orbits are labelled by their initial conditions, but those labels are highly non-unique—meaning many different starting points can produce nearly identical orbits. And the density of sampling across phase space isn't obvious either. So the real magic happens in that final step: seeking the weights of orbits such that the entire ensemble becomes consistent with observed data. It's less like solving a puzzle and more like conducting an orchestra—thousands of individual orbits tuned together until the whole galaxy sings in harmony.

That plenary hall was "Science @ Scale" in its purest form. We're not just studying one star or one planet anymore. We're reverse-engineering entire galaxies—billions of stars at once—using mathematical models and sheer computational muscle. Binney made it feel both impossibly complex and deeply elegant at the same time.

Tuesday–Wednesday, January 6–7: From Reactive to Intentional

After Monday's overload, Tuesday felt different—not quieter, but more intentional. I'd learned the layout, gotten a feel for the pace, and stopped trying to be everywhere at once. The convention center had a steady hum to it now—researchers clustering at poster displays, grad students rehearsing talks in quiet corners, and the exhibitor hall drawing a steady stream of curious visitors.

Wednesday was when I stumbled across the SKAO exhibit—and spent far longer there than I planned. But SKAO was far from the only name worth knowing in that hall. Here's who was there and what they brought:

EXHIBITOR	WHAT THEY SHOWED
NASA	Astrophysics missions, booth demos, and community Q&A sessions
NSF / NRAO	ALMA upgrades, ngVLA prototype antennas, VLA and VLBA capabilities
Caltech / IPAC-NExScI	NASA Exoplanet Archive demos, IRSA data tools, SPHEREx archives
SKAO	Square Kilometre Array science working groups and mission overview
STScI	Hubble and JWST data access, MAST archive tools
NOIRLab	Vera C. Rubin Observatory, DECam surveys, community facilities
ESA / Euclid Team	Euclid mission status, Quick Data Release 1 results
Las Cumbres Observatory	Global telescope network, exoplanet follow-up capabilities
Astrosysteme GmbH	Telescope and mount hardware, imaging systems
ZWO	Astronomy cameras, filter wheels, and imaging accessories
Sky & Telescope / AAS	Membership resources, amateur astronomy outreach materials
ALPO	Association of Lunar & Planetary Observers, observer programs and resources

SKAO: Fourteen Questions. One Machine.

The SKAO exhibit in the hall was hard to walk past. A grid of 14 images, each one representing a different science working group for the Square Kilometre Array Observatory, covered an entire blue panel. Cosmology. Cradle of Life. Epoch of Reionization. Gravitational Waves. Pulsars. Transients. Fourteen distinct frontiers of radio astronomy, all converging on a single instrument that doesn't exist yet.

Fourteen distinct areas of science. All powered by one observatory that doesn't even exist yet.

The scale of the engineering is staggering. Thousands of dishes and antennas spread across South Africa and Australia, working in concert to form the largest radio telescope array ever built. Current instruments like the Very Large Array or China's single-dish FAST are already reshaping radio astronomy—but they each cover a limited patch of sky. SKAO is a different order of magnitude entirely. It's not an upgrade. It's a new capability. The array will generate more data per second than the entire internet, and the science working groups are already mapping out exactly how to make sense of that flood.

That"s the part that lingered. The observatory is years away from first light, but the scientific roadmap is already written. Each of those 14 panels in the exhibit hall represents a team of researchers actively preparing for data that will arrive on a scale no single telescope has ever produced. It was "Science @ Scale" in its most literal form: not one big question, but fourteen, all waiting on one extraordinary machine.

Thursday, January 8: Three Forefronts

Thursday morning, I found myself in a darkened conference hall watching a presentation that would become the highlight of my entire week. The slide glowed purple and orange—a visual feast—showing "Three forefronts in our understanding of planets."

Elemental abundances in giant planets revealing how planets form. Think of it as planetary archaeology—studying the chemical makeup of gas giants to understand the conditions that created them billions of years ago.

Sub-Neptunes and water worlds being characterized for the first time. These aren't Neptune-sized planets. These are smaller worlds that could be covered in oceans hundreds of kilometers deep. Or they could be hydrogen-rich mini-Neptunes. The difference matters enormously for habitability.

Temperate rocky exoplanets getting their first atmospheric measurements. We're talking about Earth-sized worlds in the habitable zones of other stars, where liquid water could exist. Scientists are now actually measuring what gases surround these distant rocks.

The graph below showed planet occurrence rates across size ranges—from rocky planets barely bigger than Earth to sub-Neptunes to gas giants. The speaker listed publication after publication in Nature and Nature Astronomy from 2023, 2024, 2025, and even 2026. This wasn't science fiction. This was science happening right now.

XRISM: Japan's X-Ray Eye Is Rewriting the Rulebook

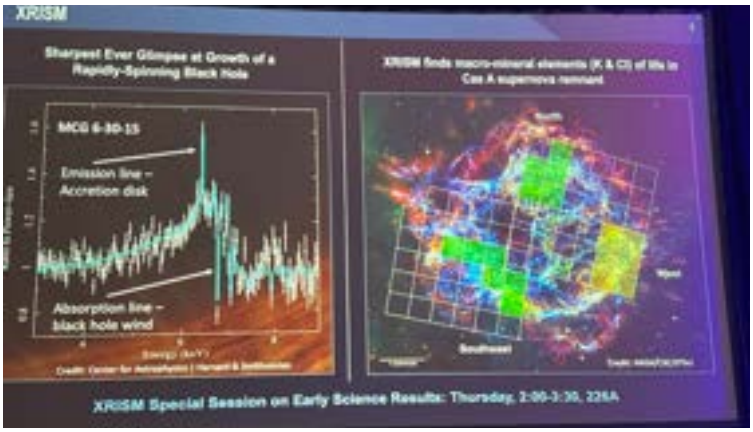
Thursday afternoon, room 226A, 2:00 PM. The lights went down and the screen lit up with two of the most stunning images I saw all week—and this was a conference full of stunning images.

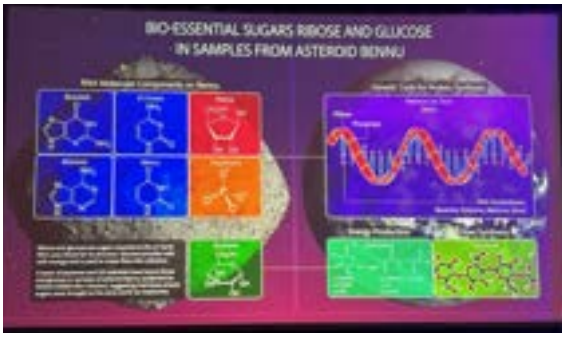
The XRISM Special Session on Early Science Results didn't waste any time. This is Japan's newest X-ray space telescope, and it is already delivering results that are turning heads across the entire astronomy community.

On the left side of the screen: the sharpest ever glimpse at the growth of a rapidly-spinning black hole. The target—MCG 6-30-15—is a well-known active galactic nucleus, but XRISM's spectral resolution revealed something extraordinary. You could clearly see two distinct signatures in the X-ray data: an emission line from the accretion disk—the swirling ring of superheated material feeding the black hole—and an absorption line from the black hole wind, where material is being blown outward at incredible velocities. Credit to the Center for Astrophysics at Harvard & Smithsonian for that data.

But the right side of the slide may have been even more jaw-dropping. XRISM found macro-mineral elements—potassium and chlorine—inside Cassiopeia A, one of the most famous supernova remnants in our sky. These aren't just random elements floating in space. Potassium and chlorine are building blocks of life as we know it. A star exploded thousands of years ago, scattered its guts across the cosmos, and XRISM is now mapping exactly where those life-essential elements ended up—pixel by pixel across the remnant, courtesy of NASA, Chandra X-ray Observatory, and the Space Telescope Science Institute.

The universe isn't just hosting life. It's manufacturing the parts.





The Same Ecosystem, Different Scales

Five days in Phoenix, and the biggest takeaway wasn't any single talk or exhibit—it was realizing how connected all of it is. From brown dwarf fossils to exoplanet atmospheres, from SKAO's fourteen science working groups to XRISM mapping life-building elements in supernova remnants, every thread led back to the same question: how did we get here, and what else is out there? As someone who helps with outreach through the Phoenix Astronomical Society, walking that convention center floor felt less like attending a conference and more like seeing the bigger picture up close.

And if you see a presentation on exoplanets? Don't skip it. Your brain will thank you.

The 2026 AAS Annual Meeting |January 4–8, 2026 | Phoenix Convention Center

Theme: Science @ Scale |meetings.aaas.org

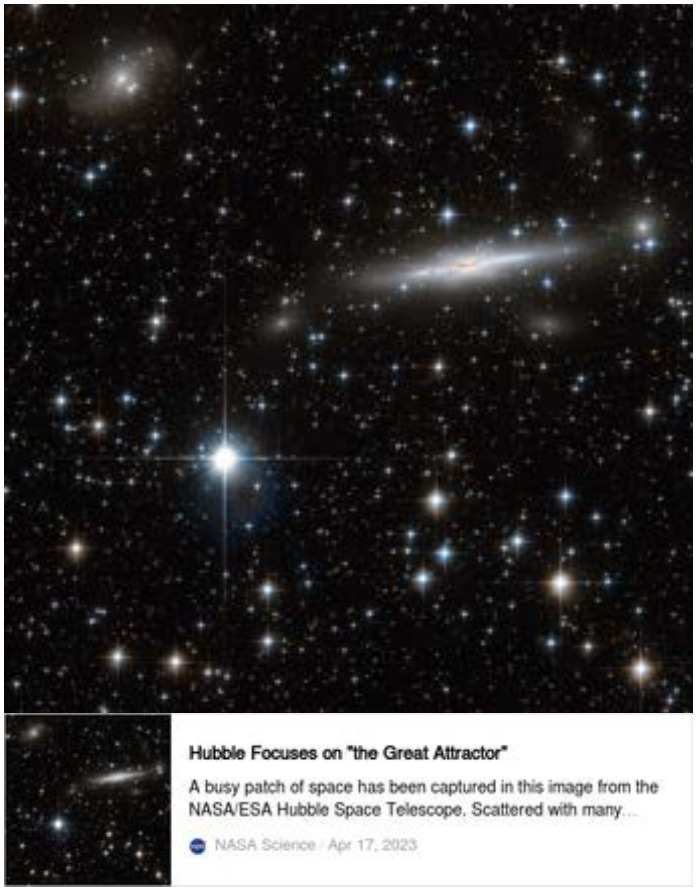
Full AAS 247 Program: submissions.mirasmart.com/AAS247

— Phoenix Astronomical Society

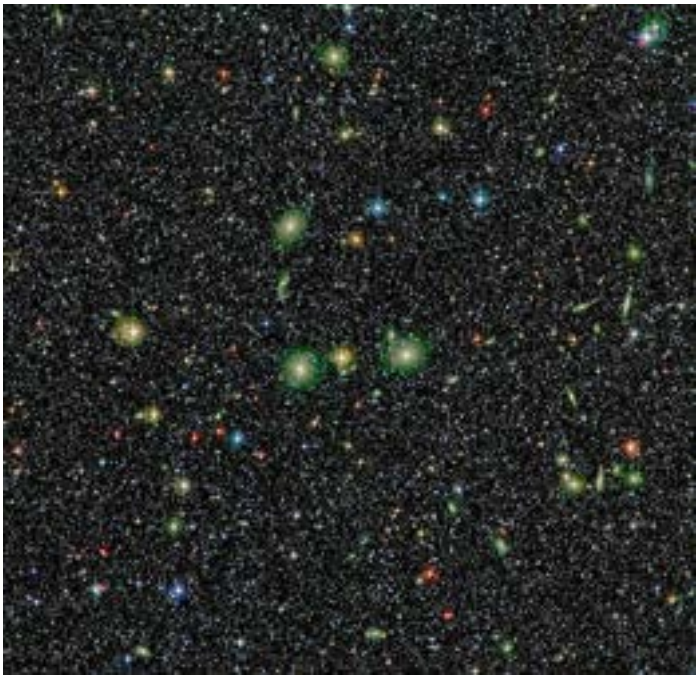
Cosmic Flow: The Great Attractor and the Shapley Supercluster

By Tristan Love

Our universe is approximately 90 billion light years across. Red shifting, as discovered by Edwin Hubble in 1929, lead to the conclusion that the universe and fabric of space time was expanding. But it is an anomaly in gravitational attraction that pulls local galaxies like our own to it. But we aren't moving away from other galaxies but rather are being drawn along with a hundred thousand other galaxies in one direction. It is a part of the Laniakea Super cluster which is about 500 million light years across diameter. The great attractor is estimated to be about 4–6 × 10^{15} solar masses. The great attractor is believed to be behind the milky way's giant cloud of dust. The region of the sky covered by this cosmic veil is labeled as "the Zone of Avoidance" This prevents us from being able to directly observe it. Research suggests that it is a congregation of dark matter, hiding far behind the Milky Way's cloudy veil. Normal optical telescopes cannot observe it because of the cloud of dust in our milky way to disk. Only infrared, x-ray, and radio light can pass through dust. From what we've been able to gather, it appears that the group of galaxies on our side of the great attractor experience an extreme pull towards it; however, galaxies on the other side of this massive structure do not.



This dis-uniform attraction indicates something even crazier: the great attractor itself is part of an even greater cosmic flow caused by an object of greater proportion called the Shapley concentration. The Great Attractor is not the destination of the galaxy flow. It's just a "hill on the way down" toward something even bigger. The Shapely super cluster is about ten times bigger than the real big gun governing our local body at the center. The heart of the attraction is the Shapely super cluster, and the smaller secondary body is the great attractor for that. This massive attractive mound only appears to make up about 5.6% of our velocity because it is so massive and is therefore much farther away.



This image covers a field of 0.5° × 0.5° in the Southern constellation of Norma (The Level) and in the direction of the "Great Attractor". This region is at an angular distance of about 7° from the main plane of the Milky Way, i.e. less than 15 times the width of the image shown. In this colour composite, the foreground stars in the Milky Way mostly appear as whitish spots (the "crosses" around some of the brighter stars are caused by reflections in the telescope optics). Many background galaxies are also seen. They form a huge cluster (ACO 3627) with a number of bright galaxies near the center — they stand out by their larger size and yellowish colour.

Credit:
ESO

Main source: 0604402v1

Other sources:

Evanthorizan-youtuber

Thomasmulligan- youtuber

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 Targets (Small Telescopes & Binoculars)

M42 – Orion Nebula (Orion) – Mag 4.0

The king of winter skies. Bright, textured, and packed with structure; the Trapezium stars pop even in small scopes.

M41 – Open Cluster (Canis Major) – Mag 4.5

Loose, bright cluster just south of Sirius. Wide-field friendly with a sprinkling of orange stars.

M44 – Beehive Cluster (Cancer) – Mag 3.7

Massive and gorgeous in binoculars. Looks like crushed diamonds on velvet.

M67 – Open Cluster (Cancer) – Mag 6.1

Older, tighter, and more subtle than M44. A favorite for higher magnification and patient observing.

Challenge Targets (Large Telescopes)

NGC 2392 – Eskimo Nebula (Gemini) – Mag 9.2

Bright planetary with a double-shell structure. Takes magnification well; O-III filter brings out detail.

NGC 2174 – Monkey Head Nebula (Orion) – Mag 6.8

Large emission nebula near Betelgeuse. Easy photographically, challenging visually without narrowband filters.

NGC 2264 – Cone Nebula & Christmas Tree Cluster (Monoceros) – Mag 3.9

The cluster is easy; the nebula is not. The Cone itself is extremely difficult visually—dark skies and filters required.

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.

Mastersofpixinsight-Masters of PixInsight is an educational platform dedicated to teaching astrophotographers how to effectively use PixInsight for deep-sky image processing.

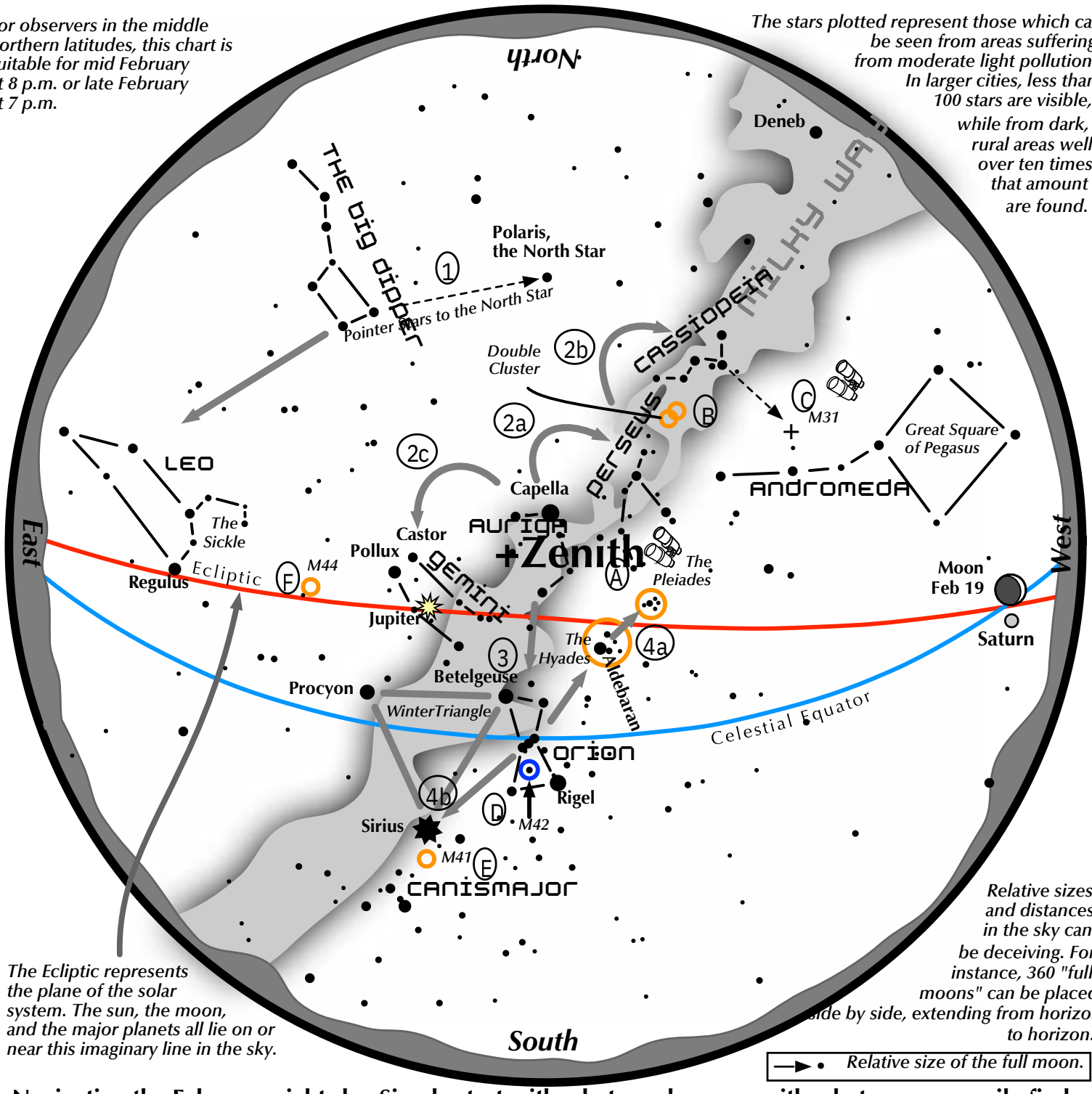
20 Top TIPS for Better Astrophotography Dylan O'Donnell Dylan covers both image acquisition as well as processing and provides some great tips for better images.

Navigating the mid February Night Sky

2026

For observers in the middle northern latitudes, this chart is suitable for mid February at 8 p.m. or late February at 7 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 February night sky: Simply start with what you know or with what you can easily find.

1 *Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.*

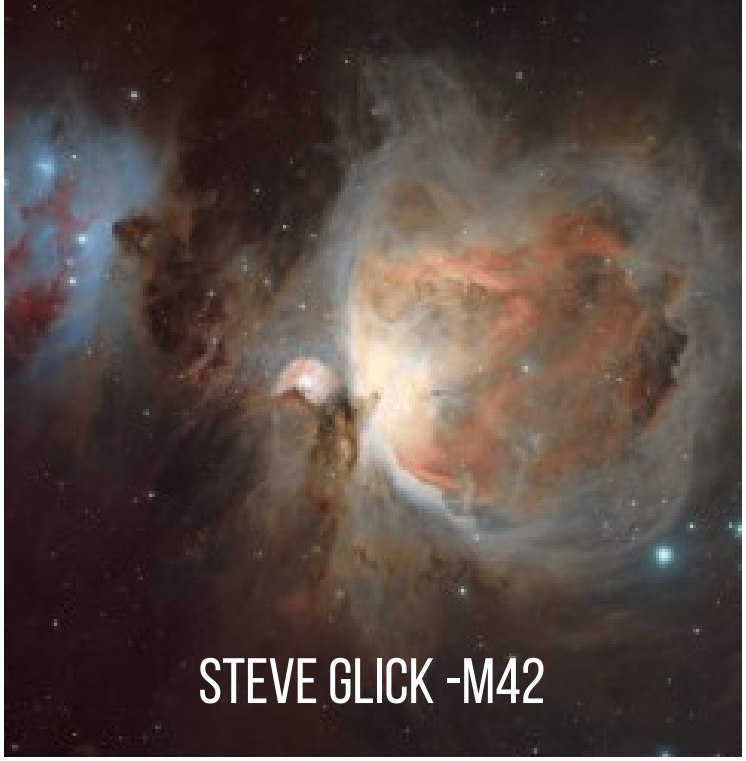
2 *Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next jump southeastward from Capella to the twin stars of Castor and Pollux in Gemini.*

3 *Directly south of Capella stands the constellation of Orion with its three Belt stars, its bright red star Betelgeuse, and its bright blue-white star Rigel.*

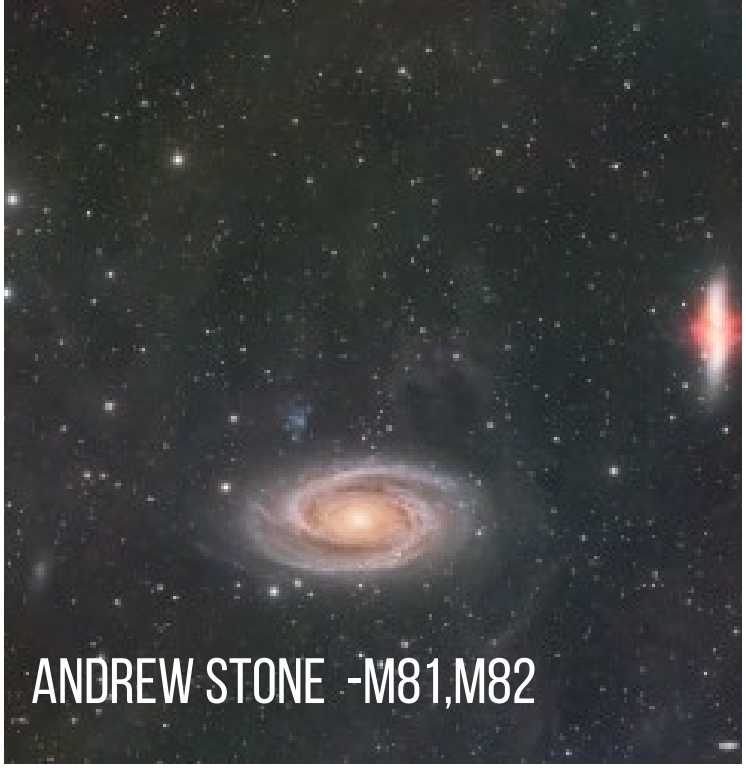
4 *Use Orion's three Belt stars to point northwest to the red star Aldebaran and the Hyades star cluster, then to the Pleiades star cluster. Travel southeast from the Belt stars to the brightest star in the night sky, Sirius, a member of the Winter Triangle.*

Binocular Highlights

A: *Examine the stars of two naked eye star clusters, the Pleiades and the Hyades.*
B: *Between the "W" of Cassiopeia and Perseus lies the Double Cluster.*
C: *The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.*
D: *M42 in Orion is a star forming nebula.* **E:** *Look south of Sirius for the star cluster M41.* **F:** *M44, a star cluster barely visible to the naked eye, lies southeast of Pollux.*



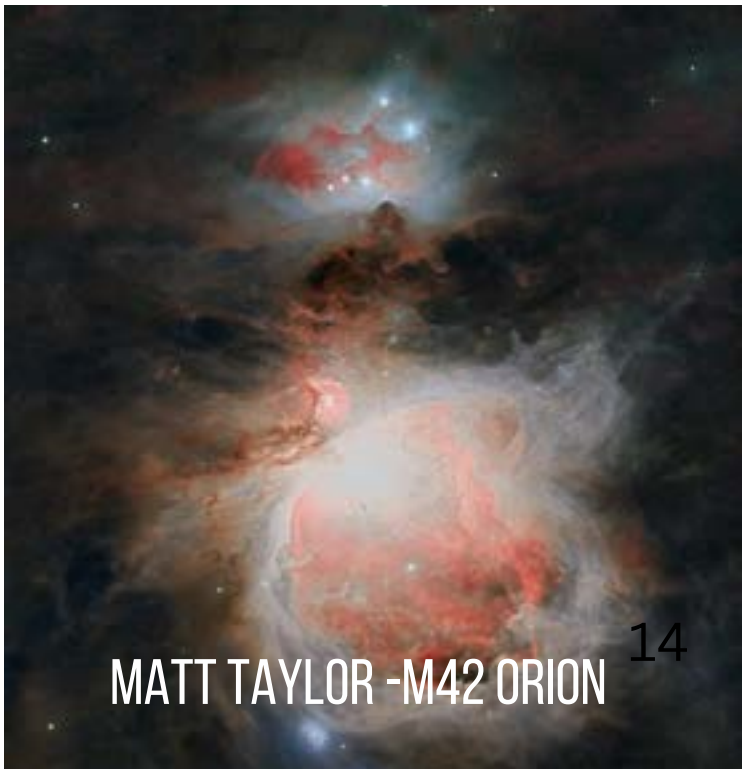
STEVE GLICK -M42



ANDREW STONE -M81,M82

MARK JOHNSTON -SUN

TMATT TAYLOR-NGC2239



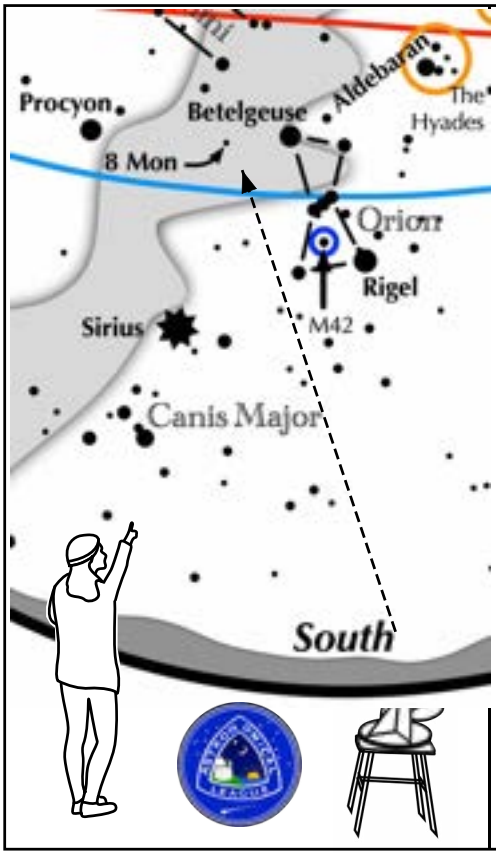
MATT TAYLOR -M42 ORION

7 Telescope Targets

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

1. M45 The Pleiades Famous asterism in Taurus
2. M41 star cluster Open cluster in Canis Major about the size of the full Moon
3. Canis Major 145 The Winter Albireo
4. Castor triple A 6-star system, three of which are visible in small scopes
5. Galactic Anticenter This is not something to see, but just beside Beta Auriga is the opposite direction from the center of the Milky Way
6. M36, 37, 38 Trio of nice open star clusters in Auriga
7. Beta Monocerus Beautiful triple star in Monocerus

ASTRONOMICAL LEAGUE Double Star Activity



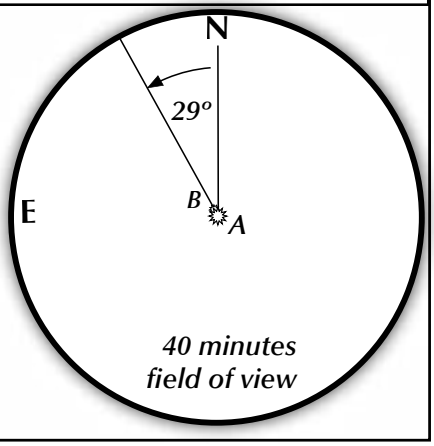
Other Suns: Epsilon (8) Monocerotis

How to find Epsilon Monocerotis on a February evening

Face south. Look for the Winter Triangle stars of Betelgeuse and Procyon. Epsilon Monocerotis is about 1/3 between Betelgeuse and Procyon. It is a 4.3 magnitude star so dark skies are needed to spot it.

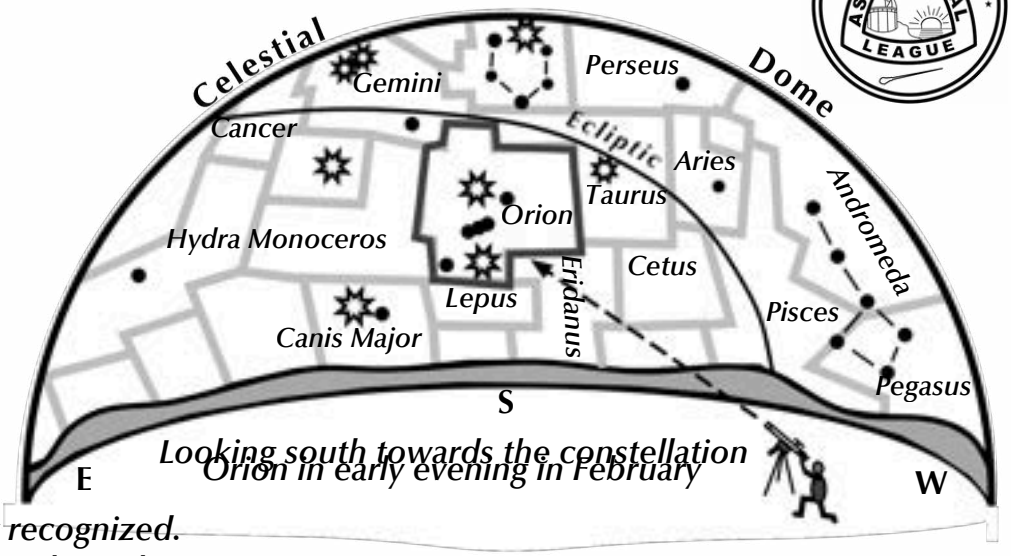
Suggested magnification: >20x
Suggested aperture: >3 inches

Epsilon (8) Mon *A-B*
separation: 12 sec A
magnitude: 4.4 B
magnitude: 6.6
Position Angle: 29°
Colors:
white
lilac



CONSTELLATIONS & ASTERISMS

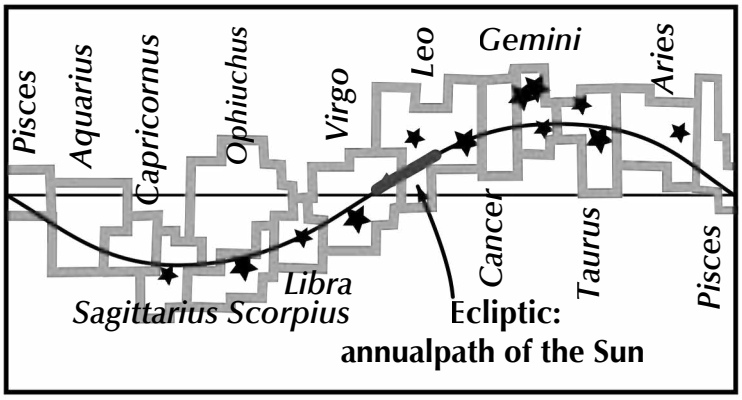
A constellation *is an officially recognized section of the celestial sphere that has established boundaries, containing stars, planets, and other astrophysical objects. It is much like a state of the United States which contains many cities of different sizes, rivers, and mountains.*



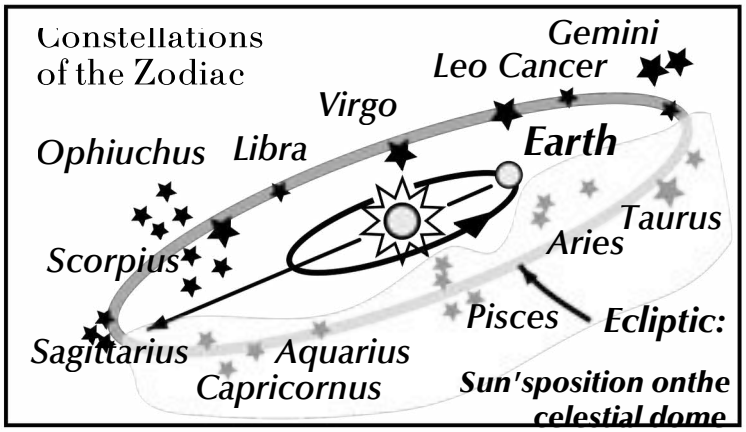
Looking south towards the constellation Orion in early evening in February

- *88 constellations are officially recognized.*
- *The Sun appears to travel throughout the year among 13 constellations along the ecliptic.*
- *Stick figures of most constellations do not closely resemble what they are said to represent.*
- *Some, but not all constellations contain bright stars. They all contain many dim stars visible to the unaided eye.*
- *The Moon and planets are found in or near the constellations of the Zodiac.*

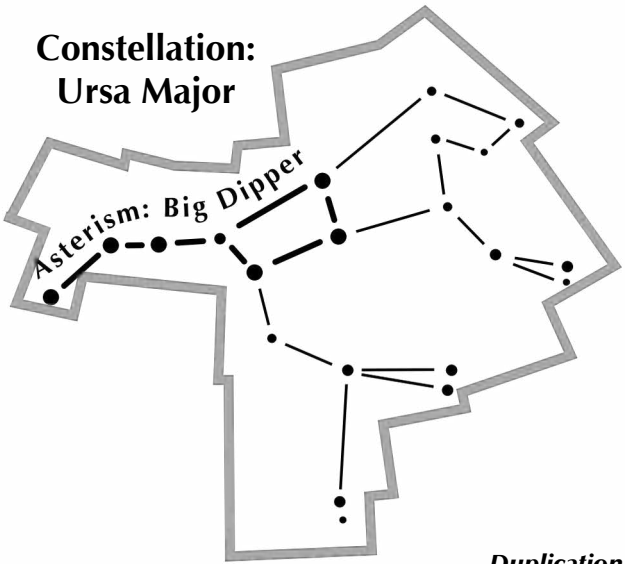
Constellationsofthe Zodiac



An asterism *is an unofficial group of stars contained within one or more constellations. Asterisms range in size from being seen only through a telescope to streching across appreciable portions of the sky. The Big Dipper, within Ursa Major, a constellation. forinstance,isanasterism.It lies*

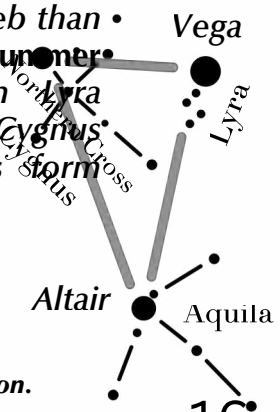


Constellation: Ursa Major



Asterisms can cover more a single constellation. The **Summer Triangle** *contains stars from Lyra (Vega), Aquila (Altair), and Cygnus (Deneb). Portions of Cygnus form another asterism called the* **Northern Cross.**

Deneb than •



Designed and created by John Goss

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

Clear Sky Charts: 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/
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/
Great website for finding a dark observing location.

Heavens above: 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/
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/
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**: **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.

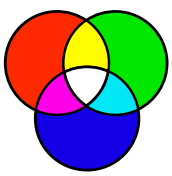
Posted 12/2025 Thinning the herd a little bit more. 41MM Panoptic, body is in great condition. Optics are clean with no blemishes. Includes paperwork on features and design. Price on the Panoptic is $450, Price includes PayPal and shipping to the lower 48. Any questions? Please get in touch. m42astronomer@gmail.com

Posted 1/2026 Maxvision EXOS-2/EQ5 GOTO Mount w/1.5-inch steel tripod w/Bresser ASCOM SW&Cable $449.95 https://www.ebay.com/itm/167985261719 NIKON D5100 DSLR Astronomy Camera /Full-Spectrum Astro Modified $289.95 https://www.ebay.com/itm/167989296026 Explore Scientific iEXOS-100 Go To Equatorial Mount w/Tripod & Azimuth Adjuster $249.95 https://www.ebay.com/itm/168021245863 Contact : Mathew A. Taylor mathewallantaylor@gmail.com

NEW

Posted 2/2026 Used Celestron Nexstar 6SE Schmidt -Cassegrain Go-To telescope bundle with extra Celestron FirstScope telescope as extra. Both telescopes in great condition. Come with the following items.
NexStar 6SE telescope with tripod,StarSense Auto align,SkySync GPS,NexImage Solar System Imager, EZ Finder red dot scope X2, Celestron phone mount, Celestron Solar filter,Celestron 3x Barlow,Orion 2x Barlow,Celestron 32mm Plossl 1.25" eyepiece,Celestron 25mm Plossl 1.25" eyepiece, Celestron 5mm X-Cel 1.25" eyepiece, Celestron 1.25" Star Diagonal, Celestron Firstscope telescope Contact Kristen Morris for more photos and information.
kristen.lee.morris@gmail.com

PAS offer: This is a first come, first served offer. Review the list. Decide what you want. Email 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.



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 with the following information:

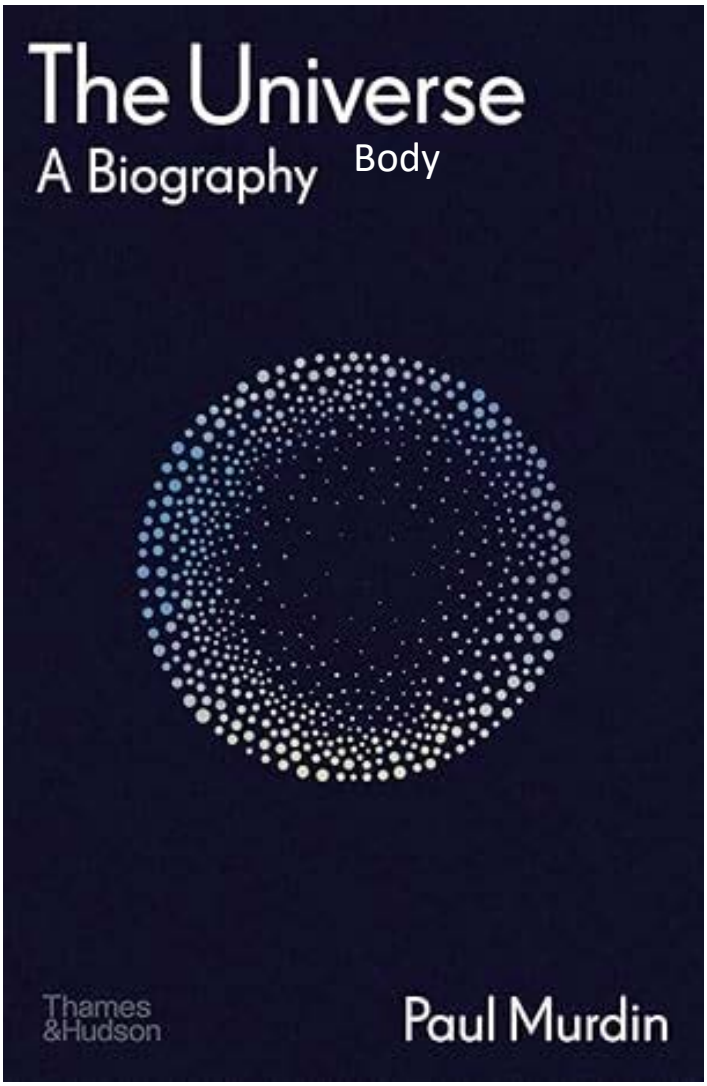
- Full Name
- Email Address
- Desired Telescope and/or accessory kit
- Check out date
- Check in date
- Additional information as needed

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

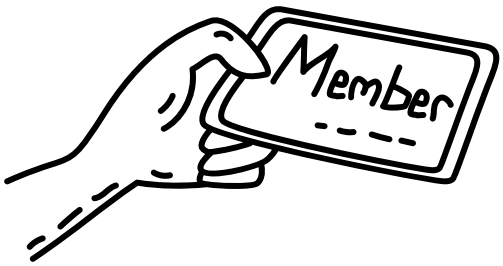
The 2026 Book Club

The Universe

We'll be covering the first five chapters, and everyone is welcome to attend and participate in the discussion. For more information or to join, contact Cyrus at saeidmousavi@yahoo.com



Paul Murdin's The Universe: A Biography takes a big, sweeping topic—the history of the cosmos—and turns it into a readable narrative that feels like a life story with a beginning, middle, and (possible) end. Murdin, an astronomer who helped identify the first stellar-mass black hole in our galaxy, organizes the book chronologically from the Big Bang through galaxy formation, the birth of stars and planets, and eventually to Earth and the future of the universe. Rather than a dry textbook, this book reads like a voyage through time, blending core concepts of astrophysics—black holes, dark matter, cosmic expansion—with the human endeavor behind those discoveries.



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. Renewing your membership is quick and easy: just visit **www.pasaz.org**, look in the left index column for "Join Our Society," click it, and you're on your way.

We now offer a year-round membership, which means you can join at **any time with no enrollment deadlines**, and you'll receive a full 12 months of benefits. If you have any questions, our Membership Manager is happy to help at 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

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Vice President	Mark Johnston	vicepresident@pasaz.org
Treasurer	Richard Sauerbrun	treasurer@pasaz.org
Secretary	Chris Ford	secretary@pasaz.org
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Event Manager	Ruza Sabelja	events@pasaz.org
Website Manager	Ed Skinner	webmaster@pasaz.org

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Star Tours Team 2025

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

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