



PAStimes

A Publication of the Phoenix Astronomical Society

Stu's Views

• Stu Brackney, President PAS

Well fans, great news! Your astronomy organization is planning a field trip to an Arizona astronomy location. Yep. Your board has agreed to organize a PAS sponsored field trip. Site and details to be decided, however all of you will be notified well in advance so you can plan your schedule. Keep an eye out for emails announcing our trip.

Our telescope/eye piece loaner program is doing well, with four scopes out all the time. Reminder... we do have a solar scope available. To sign up for scopes or lenses, go to: telescope@pasaz.org

We have a new board member, effective immediately. Mr. Damon Finell has been appointed by me to the Member at Larger position as Hector Bocanegra had to resign due to other obligations. Damon has been at our telescope workshops as an excellent instructor and of course always at our star parties sharing the night sky and his telescope equipment. Please give a warm welcome to Damon next time you see him.

Our Vice President Mark Johnston has been tasked to locate speakers for our monthly lecture series. I am sure all of you agree, he has done an excellent job, however I am guessing some of you have some suggestions for a speaker. If you know of someone Mark should reach out to please email: Markjohnston@pasaz.org

Ruza Sabelja is our Events Manager, responsible for organizing star parties and of course the monthly Telescope Workshops. Some of you not only own telescopes but I am sure you can lend a hand teaching others how to operate their equipment. Ruza is looking for more volunteer telescope instructors, so please help her out by contacting her: ruasabelja@pasaz.org

Happy Valentines Day everyone and of course, the cosmos belongs to everyone, so take some time to look up and enjoy it.

Inside This Issue

[Upcoming Events](#)

[February Lecture](#)

[January Recap](#)

[Membership Renew](#)

[Outreach-StarTours](#)

[Field Trip: Caris Mirror Lab](#)

[Crossword Puzzle](#)

[Night Sky](#)

[Feature: How Can You Help Curb Light Pollution?](#)

[Astronomy Images](#)

[What's in the Sky This Month](#)

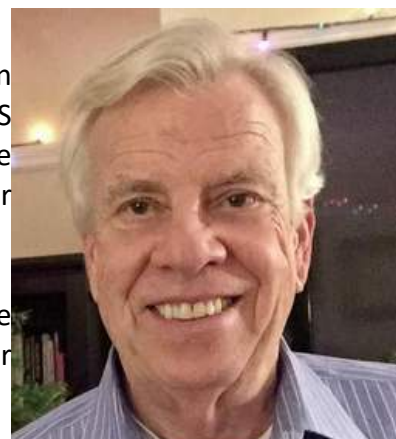
[Cosmic Classroom](#)

[Helpful Astronomy Websites](#)

[For Sale](#)

[Loaner Program](#)

[Scholarship/Contact/Book review/crossword solution](#)



UPCOMING

EVENTS

[Lecture: February 6th 2025](#)
[Vincent Ledvina- Auroras,](#)
[Professional aurora chaser](#)
[and photographer living in](#)
[Fairbanks, Alaska!](#)

[Now Forming : Astroimaging](#)
[group see page 2 for details](#)

[Workshop: February 20th 2025](#)
[PVCC Main Campus](#)

[ASIG: February 24th 2025](#)
[Zoom-PixInsight](#)

Upcoming Events

Don't forget to register—spots fill up fast!



February 2025

1st - Public Star Party- Apache Wash Trailhead Park
6th - Monthly Lecture Series - Auroras
20th - Telescope Workshop-PVCC Main Campus
24th -ASIG Zoom-Warren Keller PixInsight Ambasadoor

March 2025

1st -Public Star Party- Apache Wash Trailhead Park
6th - Monthly Lecture Series - TBD
20th - Telescope Workshop-PVCC Main Campus
24th - ASIG -TBD
29th - Public Star Party- Apache Wash Trailhead Park

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 Series

6th Lecture by Vincent Ledvina, Topic: "Aurora Chaser"

Vincent Ledvina, often referred to as "The Aurora Guy," is known for his work related to the aurora borealis, also known as the northern lights. He is a photographer, videographer, and educator who captures stunning images and videos of the aurora. Vincent shares his knowledge and passion for this natural phenomenon through social media, workshops, and educational content, helping others understand and appreciate the beauty of the aurora borealis.



TRENDING
NOW

Now Forming: Astroimaging Special Interest Group(ASIG)!

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 The Phoenix Astronomical Society's Astroimaging Special Interest Group as we launch this exciting new group!

Astroimaging, also known as astrophotography, is the practice of capturing images of celestial objects like stars, planets, galaxies, and nebulae. It combines photography and astronomy, allowing you to create stunning visuals of the universe while exploring its mysteries.

Our mission is to:

- ✨ Advance the art and science of astroimaging.
- 📺 Provide educational opportunities, mentorship, and technical q&a.
- 📸 Inspire growth through shared experiences, monthly challenges, and interactive discussions.

This is your chance to join a collaborative community of like-minded enthusiasts, explore new techniques, and uncover the wonders of the universe through imaging!

Interested? Drop us an email to sign up for notifications of future events!

SIGN UP

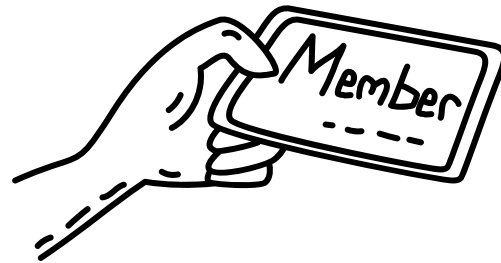


EMAIL: editor@pasaz.org subject: "Astroimaging" Join the Astroimaging Adventure—Email Us Today!



Sign Up

Beat the Rush...[Renew Your Membership Now](#)



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, look on the left index column for the link "Join Our Society," click on that and there ya go. Your membership runs from 1 January to 31 December or the date you sign up to the end of the year. Our new Membership Manager, Mr. Richard Pipkin will assist you with any questions you may have: richardpipkin@pasaz.org



Here's a recap of last month's lecture

January 9th Lecture by Chris Ford , Topic: "How Buzz Lightyear Added Another Dimension to the Universe!"



The relationship between astronomy and Hollywood visual effects has been mutually beneficial, with each field influencing the other. Early astronomical art by Chesley Bonestell set the stage for space-themed movies, while the advent of computer graphics in the 1970s revolutionized both fields. Movies like *The Wrath of Khan* and *Contact* introduced new visual effects techniques that were later adopted in astronomy visualization.

Modern techniques, such as those used in *Interstellar*, demonstrate how realistic simulations can blend seamlessly with live-action footage. The future holds exciting possibilities with advances in AI and real-time rendering, potentially leading to immersive experiences that are indistinguishable from reality.

This interplay has not only enhanced the way we visualize astronomical phenomena but also democratized the experience of space exploration, making it accessible to a wider audience.

1. Historical Context:

- Chesley Bonestell: Influential space-themed artist.
- Transition to Computer Graphics: Revolutionized astronomy visualization and movie production in the 1970s.

2. Interplay Between Astronomy and Hollywood:

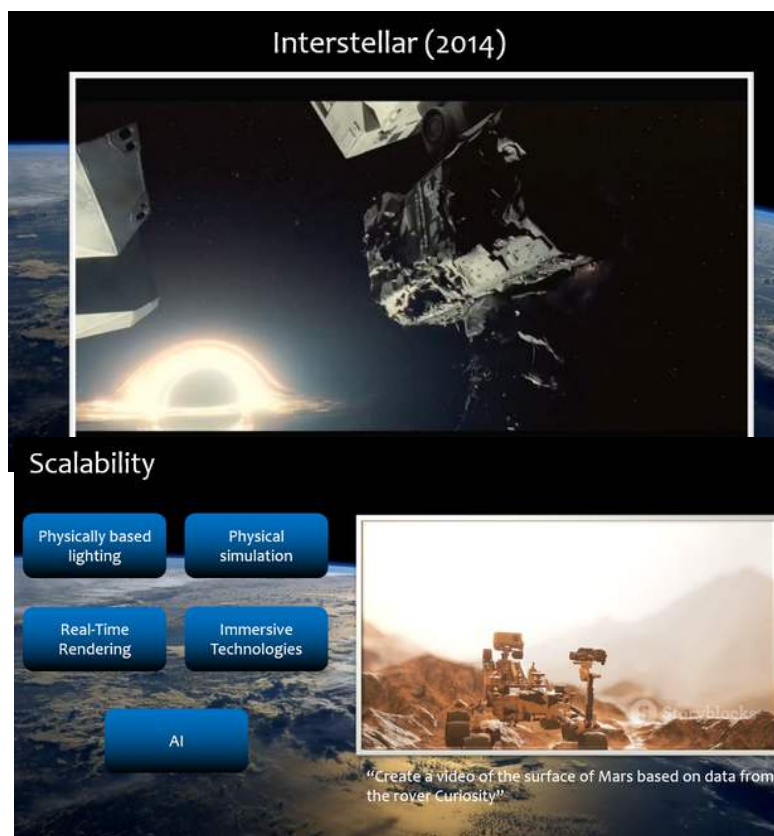
- *The Wrath of Khan*: Introduced rendered particle systems and fractals.
- 2010: *The Year We Make Contact*: Used fluid dynamics for Jupiter's clouds.
- Procedural Particle Systems: Standard in planetarium shows and documentaries.
- *Contact* (1997): Blended scientific accuracy with cinematic storytelling.
- Hubble's Eagle Nebula Image: Iconic 1990s astronomical image.
- Rover Opportunity Landing Animations: Evolution of mission visualization.

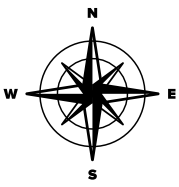
3. Modern Techniques and Examples:

- Planetarium Shows: Transitioned to CGI visuals.
- *WALL-E* (2008): Incorporated astronomy visualization tropes.
- *Interstellar* (2014): Realistic black hole simulations using DNGR.

4. Future of Visualization:

- Advances in AI and Real-Time Rendering: Potential for immersive, Holodeck-like experiences.





These were last month's Outreach Events

Star Party- None

9th- Star Tours- Sanctuary Camelback(Richard Sauerbrun)

23rd -Telescope Workshop-PVCC Main Campus

Damon Finell and Ted Blank lead a well attend class teaching the basic.
Inspiring the students with information and enthusiasm!

23rd -Star Tours- Foothills Elementary (Pete Turner, Richard Meyers,
Andrew Stone)

27th- Astroimaging meetup

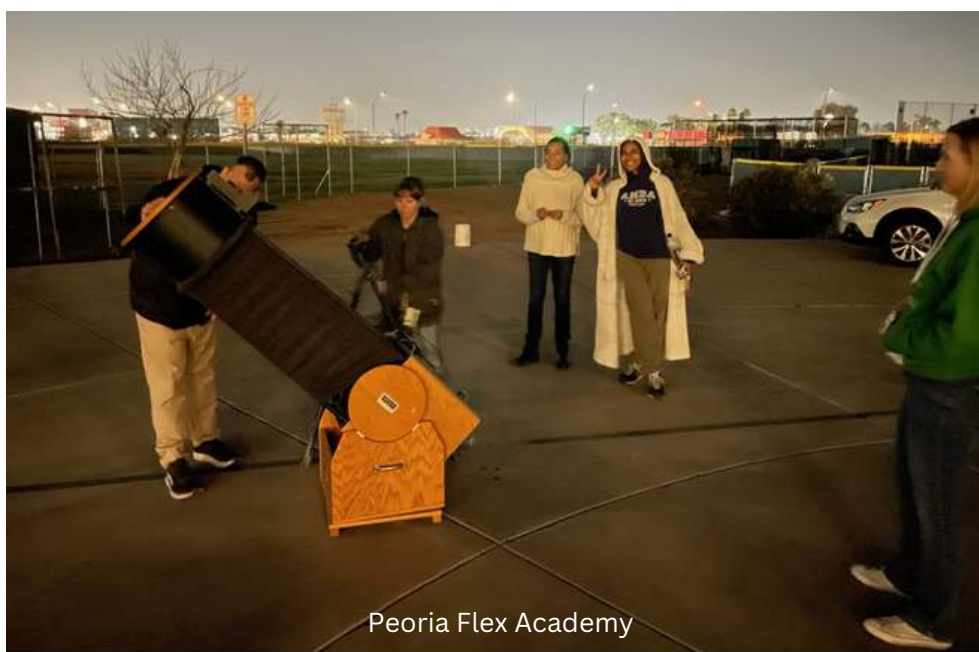
29th Star Tours-Desert Harbor Elementary (Pete Turner, Stu Brackney,
Ryder Cobean)

30th Star Tours- Peoria Flex Academy (Richard Meyers, Andrew Stone)



TAKE A TOUR

January Outreach Events



Caris Mirror Lab at U. of A. Trip- Mike Cawley

Ever since Galileo first pointed his tiny refractor telescope at the heavens, astronomers have desired ever larger telescopes to view the heavens. The desire even has a name--"aperture fever"--the quest for larger lenses or mirror areas to collect more photons. For visual purposes, it means a brighter view per given magnification and more detail. For imaging, it means more data per minute of exposure so objects millions of light years away can be captured and analyzed.

I recently took a trip to the Steward Observatory's Richard Caris Mirror Lab where, for a \$25 fee, I was able to see some of the largest monolithic mirrors in the world being crafted. Located in Tucson, the facility lies under the U of A football stands in what was the coaches' parking lot. The campus is also home to the Optical Science Department where a couple of instruments currently onboard the James Webb telescope were fabricated.

The tour began at the old Steward Observatory dome on campus where we met in a conference room under the main dome. The 32" scope that resided there has been removed and is currently engaged in research on Kitt Peak. While in the hall, we learned about the theory and techniques employed in fabricating these behemoth mirrors. After our orientation and lecture, we began crossing thru the campus over to the lab.

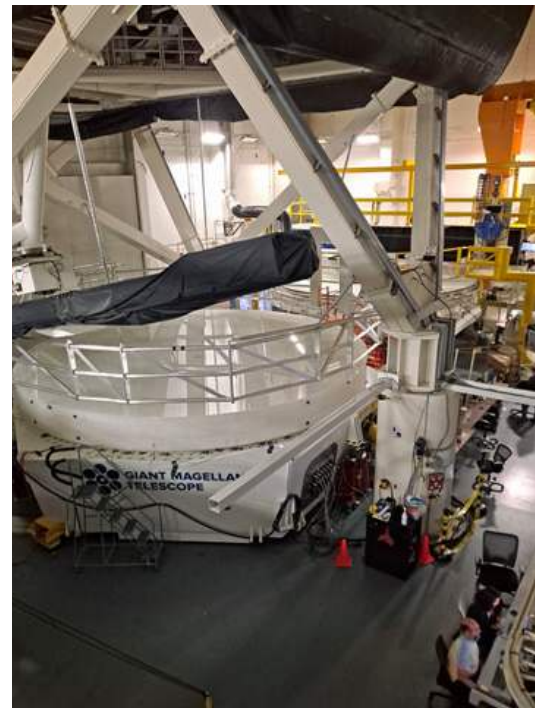
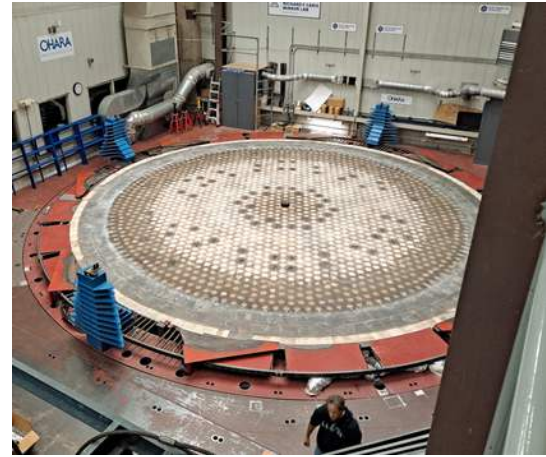
Despite the fairly large building area, given the huge size of these mirrors, space is pretty tight. On one side of the lab hall is the casting area with the rotating mirror kiln and cleaning area where they scour out the mold material. On the other side are the polishing machine deck, test stand and the final checkout and packing area. The lab has three mirrors in progress which are destined for the Giant Magellan Telescope. "Giant" is an apt description for these mirrors, too. Measuring at 8.4 meters across, these mirrors will join their partners in Chile to form a primary mirror measuring 25.4 meters across (that is, 83.3 feet). It is not all big numbers though. After the final polishing phase, the mirror surface can vary no more than 25 nanometers across the 8.4 meter diameter of the mirror. That is smaller than one-thousandth of the width of a human hair.

One of the biggest challenges in making the Giant Magellan mirrors is the telescope optical configuration. The design brief called for six mirrors surrounding a center mirror. Since the mirrors are required to form a single parabolic surface to focus light, only the center segment had the normal parabolic shape. The remaining segments had to form a 2-axis curve to correctly focus the light. Nicknamed the "Pringles" mirrors, these segments had to be ground into a saddle shape to correctly merge the incoming light. Normal polishing tools had to be revised in order to accomplish these curves. One tooling innovation involves the use of a child's toy in the polishing phase of the outer segments to get the same fine surface as the center segment.

Another amazing feature of these mirrors is their focal length. Expressed as F/X (with X being the ratio of diameter to aperture), telescopes owned by our club members usually run from F/4 for reflectors to as much as F/12 for Maksutov scopes. Once the seven mirrors are in place, the telescope will have a focal length of F/0.7! For comparison, a 24" F/5 Dobsonian requires a trip up a ladder to reach the eyepiece. That same scope with a F/0.7 focal length would be less than two feet tall! Imagine observing the heavens on your knees all night long!

The lab could make mirrors larger than 8.4 meters. According to our tour guides, the limitation is due to the size of bridges and other infrastructure on Interstate 10 and shipping port facilities.

Cutting edge design, engineering and fabrication are all on display here, well worth a trip down to Tucson for a look. Then you can also find out what child's toy played a big part in the polishing process!



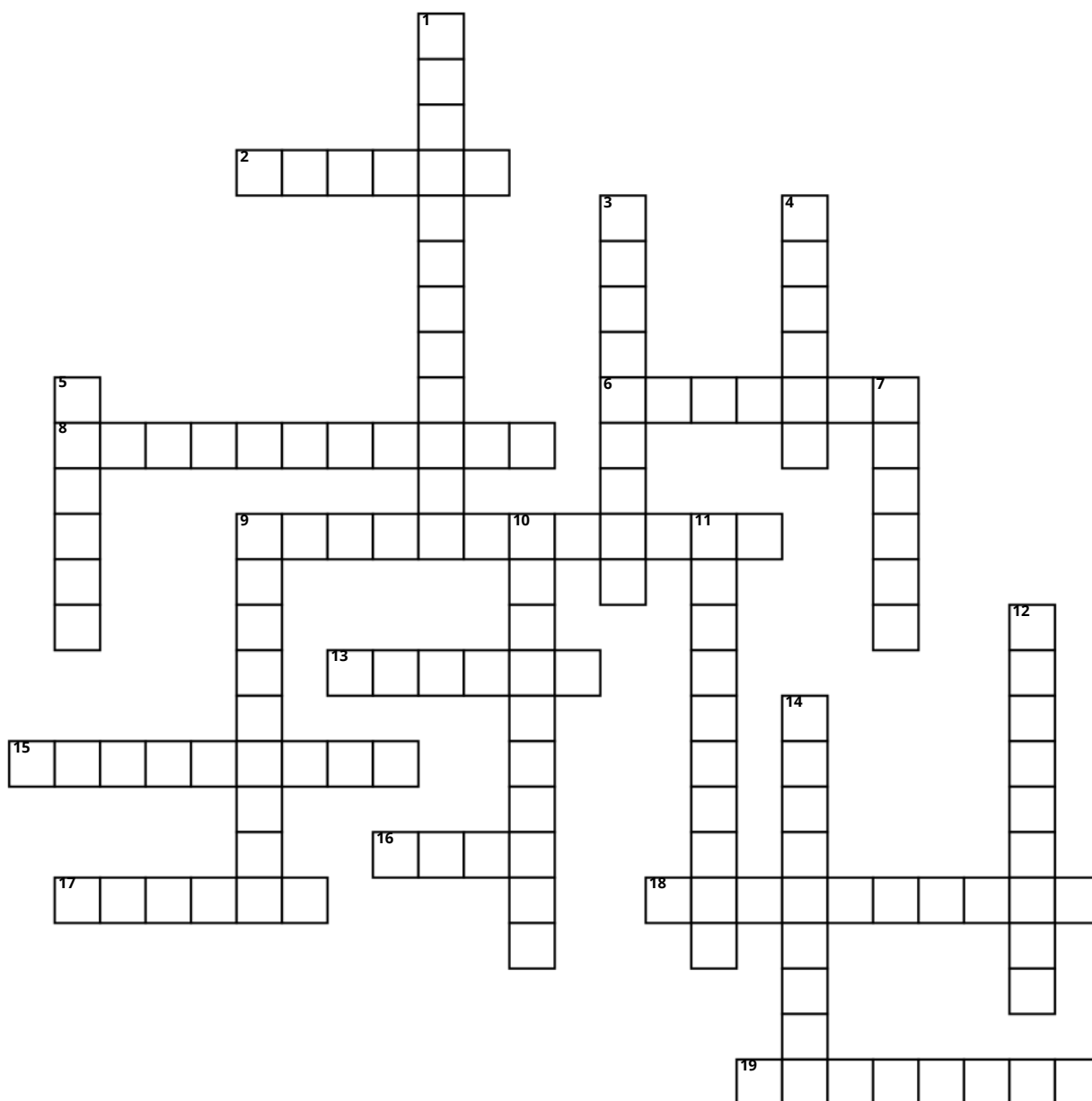
PAS Member Mike Cawley

[Richard F. Caris Mirror Lab tour tickets](#)



Enjoy your coffee with a crossword puzzle

Astronomy -Beyond the Milky Way:



Across

[2] What event occurs when two or more galaxies collide and combine into a single galaxy?

[6] What theory explains the origin of the universe and the formation of galaxies?

[8] What type of light is often emitted by young, hot stars in star-forming regions of galaxies?

[9] What is the term for a massive grouping of galaxy clusters?

[13] What is the extremely luminous object powered by a supermassive black hole at the center of a distant galaxy?

[15] What is the branch of science that studies the origin, evolution, and large-scale structure of the universe, including galaxies?

[16] What is the name of the roughly spherical region surrounding a galaxy, containing older stars and globular clusters?

[17] What type of spiral galaxy has a central bar-shaped structure made of stars?

[18] What mysterious substance is thought to make up most of a galaxy's mass, yet emits no light?

[19] What phenomenon indicates that galaxies are moving away from us, providing evidence for the universe's expansion?

Down

[1] What term refers to the space and matter found between the stars within a galaxy?

[3] What type of galaxy experiences an exceptionally high rate of star formation?

[4] What is the most common shape of galaxies, characterized by a central bulge and swirling arms?

[5] What is the name of the telescope that has captured detailed images of galaxies beyond the Milky Way?

[7] What is the term for a massive system of stars, gas, dust, and dark matter held together by gravity?

[9] What is the term for smaller galaxies that orbit larger galaxies like the Milky Way?

[10] What is the name of the galaxy group that includes the Milky Way, Andromeda, and about 50 other galaxies?

[11] What type of galaxy is shaped like a smooth, featureless oval and contains older stars?

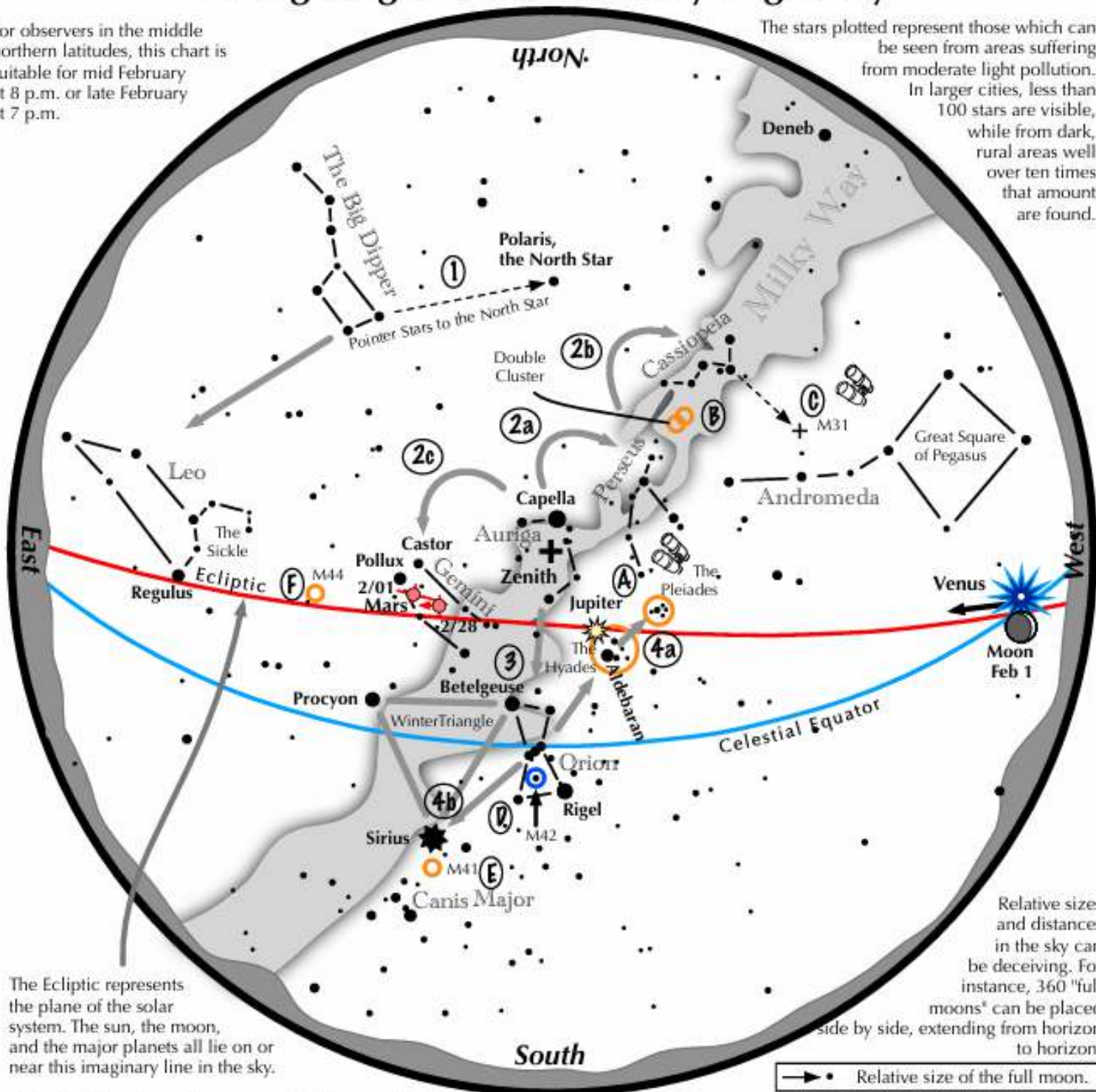
[12] What is the name of the nearest spiral galaxy to the Milky Way?

[14] What is found at the center of most large galaxies, including the Milky Way?

Navigating the mid February Night Sky

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

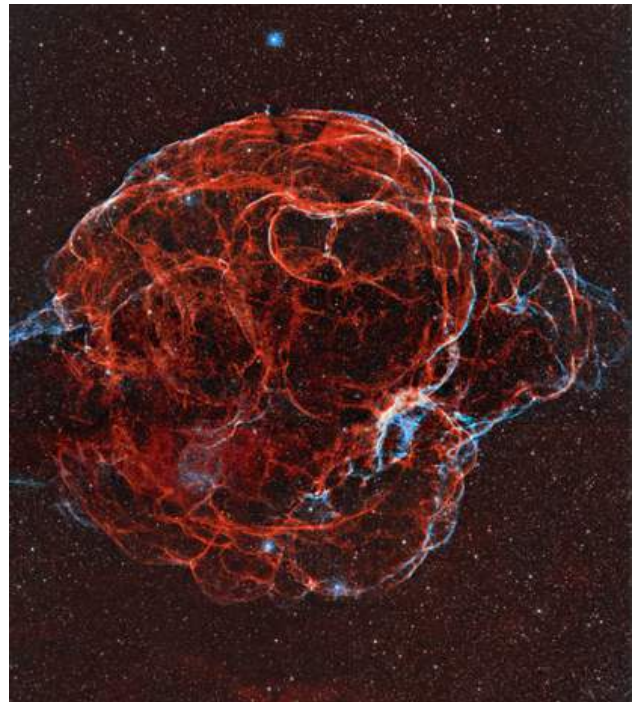
- A: Examine the stars of two naked eye star clusters, the Pleiades and the Hyades.
 B: Between the "W" of Cassiopeia and Perseus lies the Double Cluster.
 C: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.
 D: M42 in Orion is a star forming nebula. 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.



Member Astro Images

**IC1848-KEITH
MOMBOURQUETTE**

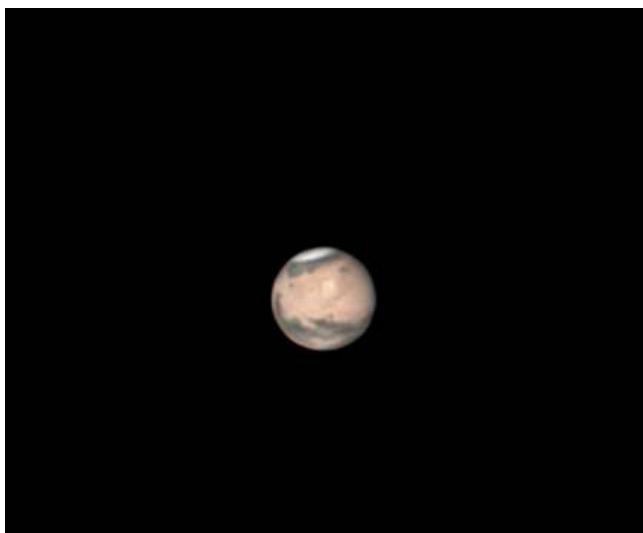
**SH2-240-KEITH
MOMBOURQUETTE**



**B33 -RICHARD
SAUERBRUN**



MARS & M78 -MARK JOHNSTON



7 Telescope Targets

Each month, we feature 7 good targets for small telescopes that should be visible in the evening.

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

Star Party Targets

February is a great month for stargazing, with several fascinating targets to observe. Here are some popular telescope targets for a star party in February:

- Orion Nebula (M42): One of the brightest nebulae in the sky, located in the constellation Orion. It's a fantastic target for both beginners and experienced astronomers.
- Pleiades (M45): Also known as the Seven Sisters, this open star cluster in the constellation Taurus is easily visible to the naked eye and stunning through a telescope.
- Crab Nebula (M1): A supernova remnant in the constellation Taurus. It's a bit more challenging to observe but rewarding for those with a medium to large telescope.
- Horsehead Nebula (B33): Located in Orion, this dark nebula is a favorite among astrophotographers. It's best observed with a larger telescope and under dark skies.
- Rosette Nebula (Caldwell 49): A large nebula in the constellation Monoceros. It's a beautiful target for those with a small refractor telescope.
- Flame Nebula (NGC 2024): Another target in Orion, this emission nebula is often imaged alongside the Horsehead Nebula.
- Venus: Often called the "Evening Star," Venus will be visible in the western sky just after sunset. It's very bright and easy to spot
- Mars: Look for Mars in the eastern sky after sunset. It will appear as a reddish dot and is quite prominent
- Jupiter: This giant planet will be visible overhead in the evening. It's one of the brightest objects in the night sky
- Saturn: You can find Saturn in the southwestern sky after sunset. Its rings make it a stunning target through a telescope
- Uranus: Located between Jupiter and the western planets, Uranus is not visible to the naked eye but can be seen with binoculars or a small telescope
- Neptune: Also between Jupiter and the western planets, Neptune requires a telescope to be seen
- Mercury: By the end of February, Mercury will join the lineup, making it possible to see seven planets in the night sky

These targets offer a mix of easy and challenging objects, making them perfect for a star party where observers of all skill levels can enjoy the night sky. Happy stargazing! 🌌



Observing Double Stars



An estimated 50% – 85% of stars are members of a binary or a multiple star system. For a few of these, their stellar components can be separated - or "split" – using a small telescope.

Factors to consider when observing:

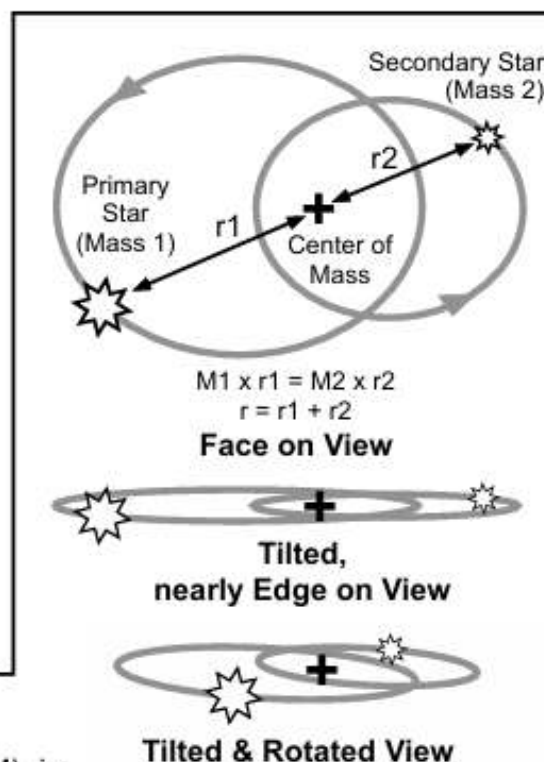
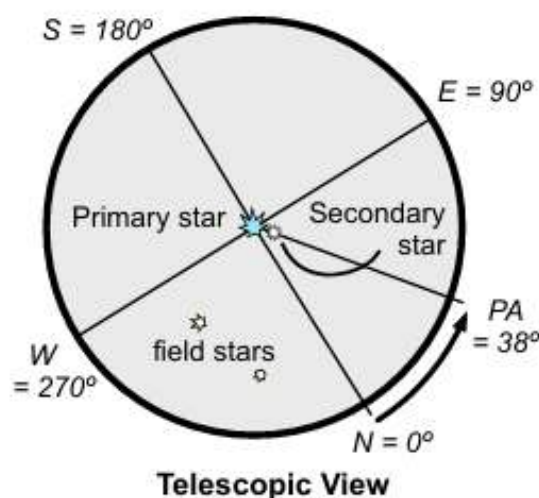
- **The magnitude of each component.** If the magnitude difference is large, the components need to be widely separated to be seen.
- **Their angular separation, r .** Very close binaries are separated by a few seconds of arc and require high magnification and good seeing. Widely separated binaries can be over 1 minute of arc apart and many of these can be split in binoculars.
- **The position angle, PA:** The angle in degrees from North made by the Secondary relative to the Primary in the N-E-S-W direction.
- **The color of each component.** Many are white, while others are red, blue, and yellow.

Precisely estimating these factors is very difficult when done visually. Measuring the star system on images is much more reliable.

Optical Double: A chance alignment of stars appearing near each other, but they are actually nowhere near each other in three dimensional space.

Visual Binary: Gravitationally bound stars, each seen orbiting their center of gravity.

Spectroscopic Binary: Two stars that can not be seen visually, but the spectrum of the system indicates that it consists of two stars orbiting very closely to each other.



Orbital Orientation:

Because binary stars orbit their center of mass (COM) in elliptical orbits, they constantly change the distance between them (r). It takes years to notice a significant change in separation, though.

The COM is at the focus that they share. The primary (brighter) star lies on one side of that focus and the secondary (dimmer) star always lies on the opposite side.

If tracked for what often turns out to be many tens or even hundreds of years, their orbits can be determined. Our viewing angle from Earth distorts the true orbital ellipses into a tilted and rotated representation.



What's Up, Doc? †

February 2025

Dr. Aaron B. Clevenson, Observatory Director, Insperity Observatory

This document tells you what objects are visible this next month for many of the Astronomical League Clubs. If you are working on one of the more advanced clubs, then I assume that you are also probably tracking where your objects are all the time. This concentrates on the more common and starter level clubs. All times are Mountain Time (Boise Idaho).

Naked-Eye Clubs

Meteors – any night, any time, anywhere, the darker the sky the better.

<u>Showers</u>	<u>Duration</u>	<u>Maximum</u>	<u>Type</u>
Aurigids	1/31 to 2/23	2/5 to 2/10	Minor
Alpha Centaurids	2/2 to 2/25	2/8 & 2/9	Minor
Beta Centaurids	2/2 to 2/25	2/8 & 2/9	Minor
Delta Leonids	2/5 to 3/19	2/22 & 2/23	Minor
Sigma Leonids	2/9 to 3/13	2/25 & 2/26	Minor
Capricornids-Sagittariids	1/13 to 2/28	1/30 to 2/3	DAYLIGHT
Chi Capricornids	1/29 to 2/28	2/13 & 2/14	DAYLIGHT

Constellations, Northern Skies – any night, any time, anywhere, the darker the sky the better.

Last Chance this cycle: Cepheus, Lacerta, Andromeda, Pisces, Cetus, Fornax.

Transit Camelopardis, Auriga, Taurus, Orion, Lepus, Columba, Caelum.

New arrivals: Ursa Major, Leo Minor, Leo, Sextans, Pyxis, Puppis.

Binocular Clubs

Binocular Messier – Monthly highlights include:

Easy – 3, 34, 35, 36, 37, 38, 41, 42, 44, 45, 46, 47, 48, 50, 67, 93, 103.

Medium – 40, 49, 53, 63, 64, 78, 79, 81, 21, 94.

Hard – 1, 51, 65, 66, 68, 97, 101, 104, 106.

Big Binoculars – 58, 59, 60, 61, 84, 85, 86, 87, 88, 89, 90, 95, 96, 99, 100, 102, 105, 108, 109.

Deep Sky Binocular – Monthly highlights include:

3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42.

Other Clubs

Messier

In addition to those listed under Binocular Messier, check out: 43, 76, 91, 98.

Caldwell

1, 2, 3, 5, 6, 7, 8, 10, 13, 14, 21, 23, 24, 25, 26, 29, 31, 32, 35, 36, 38, 39, 40, 41, 45, 46, 48, 49, 50, 52, 53, 54, 58, 59, 60, 61, 64, 71, 74, 79.

Double Star

5, 8, 11, 14, 16, 17, 18, 20, 23, 25, 27, 28, 29, 32, 34, 35, 39, 40, 42, 43, 45, 51, 52, 53, 54, 55, 56, 57, 59, 65, 67, 68, 69, 70, 71, 73, 74, 75, 76, 78, 79, 80, 81, 82, 83, 85, 92, 95, 98, 99, 100.

Other Clubs (of the Solar System)

Planetary (Planets and Dwarf Planets) – These are the tasks that can be done this month:

Ceres, and Pluto will not be visible during the evening hours. They are morning stars or too close to the sun.

Sun – Any clear day is a good time to get those sunspots. And they are on the rise...

The Sun sets at 1816 mid-month.

Moon:

The Maria requirement can be done any time the moon is visible. Look before 2/20 or after 2/5 for the fullest views.

The Highlands requirement can be done at the same time.

The Crater Ages requirement is best done on 2/4 and 2/5.

The Scarps requirement is best done on 2/6.

Occultations occur all the time, the bright ones can be found on the internet. Objects disappear on the East side of the moon.

Asteroids – Course Plotting and Measuring Movement requirements can be done at any time on any asteroid as long as it is visible in the nighttime sky.

Mercury is in Aquarius and sets at 1833 mid-month.

Venus is in Pisces and set at 2144 mid-month.

Mars is in Gemini and is up all evening mid-month.

Jupiter is in Taurus and is up all evening mid-month.

Saturn is in Aquarius and sets at 1957 mid-month.

Uranus is in Aries and is up all evening mid-month.

Neptune is in Pisces and sets at 2047 mid-month.

Lunar

Key timings are indicated below (all times are Mountain Time):

New, 2/27 4 days, 2/2 7 days, 2/5 10 days, 2/8 14 days, 2/12

Old moon in new moons arms – before 1300 on 2/1, ~10 % illuminated. (72 hr > New)

New moon in old moons arms – after 1745 on 2/24, ~10 % illuminated. (72 hr < New)

Waxing Crescent – before 1300 on 1/31 or before 1745 on 3/1, ~4 % illuminated. (48 hr > New)

Waning Crescent – after 1745 on 2/25, ~4 % illuminated. (48 hr < New)

Major Astronomical Events:

2/1 – Lunar Perigee

2/4 – Jupiter returns to Prograde Motion

2/9 – Moon and Mars Conjunction (46')

2/15 – Ceres at Solar Conjunction

2/16 – Veus at Brightest Level

2/17 – Lunar Apogee

2/24 – Mars returns to Prograde Motion

2/28 – Moon and Mercury Conjunction (23')



This article is distributed by NASA's Night Sky Network (NSN).

The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

February Night Sky Notes: How Can You Help Curb Light Pollution?

By Dave Prosper

Updated by Kat Troche



Before and after pictures of replacement lighting at the 6th Street Bridge over the Los Angeles River. The second picture shows improvements in some aspects of light pollution, as light is not directed to the sides and upwards from the upgraded fixtures, reducing skyglow. However, it also shows the use of brighter, whiter LEDs, which is not generally ideal, along with increased light bounce back from the road. Image Credit: [The City of Los Angeles](#)

Light pollution has long troubled astronomers, who generally shy away from deep sky observing under full Moon skies. The natural light from a bright Moon floods the sky and hides views of the Milky Way, dim galaxies and nebula, and shooting stars. In recent years, ~~human-made light~~ pollution has dramatically surpassed the interference of even a bright full Moon, and its effects are now noticeable to a great many people outside of the astronomical community. Harsh, bright white LED streetlights, while often more efficient and long-lasting, often create unexpected problems for communities replacing their older streetlamps. Some notable concerns are increased glare and light trespass, less restful sleep, and disturbed nocturnal wildlife patterns. There is increasing awareness of just how much light is too much light at night. You don't need to give in to despair over encroaching light pollution; you can join efforts to measure it, educate others, and even help stop or reduce the effects of light pollution in your community.

Amateur astronomers and potential citizen scientists around the globe are invited to participate in the [Globe at Night \(GaN\)](#) program to measure light pollution. Measurements are taken by volunteers on a few scheduled days every month and submitted to their database to help create a comprehensive map of light pollution and its change over time. GaN volunteers can take and submit measurements using multiple methods ranging from low-tech naked-eye observations to high-tech sensors and smartphone apps.

Globe at Night citizen scientists can use the following methods to measure light pollution and submit their results:

Their own smartphone camera and dedicated app

Manually measure light pollution using their own eyes and detailed charts of the constellations

A dedicated light pollution measurement device called a Sky Quality Meter (SQM).

The free GaN [web app](#) from any internet-connected device (which can also be used to submit their measurements from an SQM or printed-out star charts)

Night Sky Network members joined a telecon with Connie Walker of Globe at Night in 2014 and had a lively discussion about the program's history and how they can participate. The audio of the telecon, transcript, and links to additional resources can be found on their [dedicated resource page](#).



Light pollution has been visible from space for a long time, but new LED lights are bright enough that they stand out from older streetlights, even from orbit. Astronaut Samantha Cristoforetti took the above photo from the ISS cupola in 2015.

The newly installed white LED lights in the center of the city of Milan are noticeably brighter than the lights in the surrounding neighborhoods. Image Credit: [NASA/ESA](#)

The [International Dark-Sky Association \(IDA\)](#) has long been a champion in the fight against light pollution and a proponent of smart lighting design and policy. Their website provides many resources for amateur astronomers and other like-minded people to help communities understand the negative impacts of light pollution and how smart lighting policies can not only help bring the stars back to their night skies but also make their streets safer by using smarter lighting with less glare. Communities and individuals find that their nighttime lighting choices can help save considerable sums of money when they decide to light their streets and homes "smarter, not brighter" with [shielded, directional lighting, motion detectors, timers, and even choosing the proper "temperature" of new LED light replacements to avoid the harsh "pure white" glare that many new streetlamps possess.](#) Their pages on [community advocacy](#) and on [how to choose dark-sky-friendly lighting](#) are extremely helpful and full of great information. There are even [local chapters of the IDA](#) in many communities made up of passionate advocates of dark skies.

The IDA has notably helped usher in "[Dark Sky Places](#)", areas around the world that are protected from light pollution. "[Dark Sky Parks](#)", in particular, provide visitors with incredible views of the Milky Way and are perfect places to spot the wonders of a meteor shower. These parks also perform a very important function, showing the public the wonders of a truly dark sky to many people who [may have never before even seen a handful of stars in the sky, let alone the full glorious spread of the Milky Way.](#)

More research into [the negative effects of light pollution on the health of humans and the environment](#) is being conducted than ever before. Watching the nighttime light slowly increase in your neighborhood, combined with reading so much bad news, can indeed be disheartening! However, as awareness of light pollution and its negative effects increases, more people are becoming aware of the problem and want to be part of the solution. There is even an episode of PBS Kid's [SciGirls](#) where the main characters help mitigate light pollution in their neighborhood!

Astronomy clubs are uniquely situated to help spread awareness of good lighting practices in their local communities to help mitigate light pollution. Take inspiration from [Tucson, Arizona](#), and other dark sky-friendly communities that have adopted good lighting practices. Tucson even reduced its skyglow by 7% (as of 2018) after its own [citywide lighting conversion](#), proof that communities can bring the stars back with smart lighting choices.

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!

Starzonia: <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.

Make: ZWO

Model: EFW-7

Description: <http://www.iopas.com/product/zwo-efw-5-x-2inch-7-x-2inch/>

Price: \$150

Contact Information:

Richard Sauerbrun

Preferred Contact Method:

richard@sauerbrun.com

Approximate Location:

Scottsdale, AZ



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

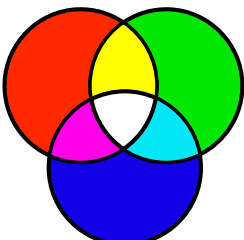
Celestron 6" F/4 Newtonian Astrograph Telescope

- Fast 6"-aperture reflector lets you take short exposures with bright, high-resolution results
- Precise 2" dual-speed (10:1) linear-bearing Crayford focuser lies 7" back in the optical tube to block stray light and boost contrast
- Orion-exclusive steel reinforcement plate under focuser eliminates flexure with heavy imaging gear attached
- 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 / Non-Member Price: \$400

Various Filters – 1.25"

- Red
- Yellow
- Blue
- Green
- Multiple O3 filters



Member Price: \$100 / Non-Member Price: \$200

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



AstroImaging Group

Our Astroimaging Special Interest Group had an incredible first meeting! Enthusiasts of all levels came together to explore the art and science of capturing the cosmos.

We kicked off with an inspiring discussion on what's possible in astroimaging, followed by great conversations on technology, software, and imaging techniques. It was fantastic to see members sharing tips, experiences, and a passion for the night sky.

This is just the beginning—exciting workshops and field sessions are ahead! A huge thank-you to everyone who joined. Here's to capturing the wonders of the universe together!



Book Review: [Turn Left At Orion: Hundreds of Night Sky Objects to See in a Home Telescope - and How to Find Them 5th Edition](#)
[by Guy Consolmagno \(Author\), Dan M. Davis \(Author\)](#)

"Turn Left at Orion: A Hundred Night Sky Objects to See in a Small Telescope - and How to Find Them" by Guy Consolmagno and Dan M. Davis is highly regarded among amateur astronomers. The book is praised for its accessibility to beginners, providing clear instructions on how to use telescopes and binoculars, making it easier for novices to get started with stargazing.

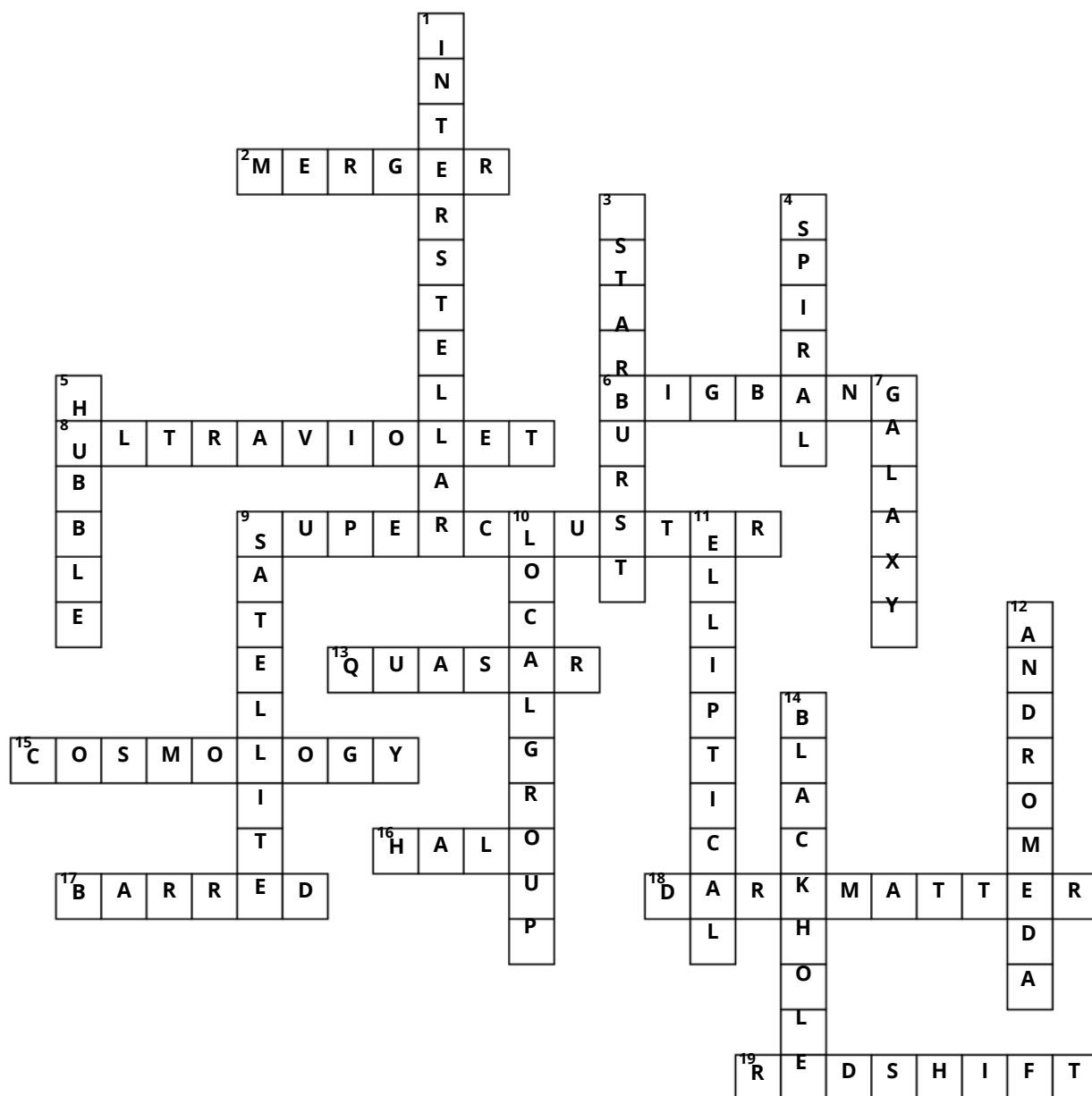
It covers a wide range of celestial objects, including the Moon, planets, star clusters, nebulae, and galaxies. The book includes numerous illustrations and seasonal maps of the Moon's surface. The authors offer practical advice on locating and observing celestial objects, which helps reduce the frustration often experienced by beginners.

The latest edition includes new chapters and updated information, such as tips on observing upcoming astronomical events and using modern technology like Dobsonian telescopes and personal computers for planning observing sessions. Described as the "home astronomer's bible," the book is well-received for its detailed yet easy-to-understand content.

Overall, "Turn Left at Orion" is a valuable resource for anyone interested in exploring the night sky, especially those new to the hobby.

February Crossword Solution

Solution



Sam Insana PAS Student Scholarship Winners

Jacqueline Valenzuela-Brauch receiving her scholarship, presented by Prof. Jenny Hall.

Phoenix Astronomical Society Contact Info

President	Stu Brackney	president@pasaz.org
Vice President	Mark Johnston	vicepresident@pasaz.org
Treasurer	Richard Sauerbrun	treasure@pasaz.org
Secretary	Chris Ford	secretary@pasaz.org
Newsletter Editor	Richard Meyers	editor@pasaz.org
Member-at-Large	Peter Turner	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

PAS is incorporated in the state of Arizona as a non-profit, scientific and education- al 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 . 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

