



CLUB NEWS AND EVENTS

MONTHLY MEETINGS

Board Meeting: December 1 @ 7:00 p.m.
Members Meeting: December 1 @ 8:00 p.m.
Held at Schoonover Observatory

Program: Professor Bryan Boulanger, Ph.D., will discuss light pollution and its impacts on astronomical science and the environment.

Bryan is a professor of Civil and Environmental Engineering at Ohio Northern University, Chair of ONU's Department of Civil and Environmental Engineering, and Vice President of the Ohio Chapter of DarkSky International.

Officer nominations and elections:

Conclude at this December meeting. Please plan to attend to offer your officer nominations, and to cast your vote for 2024 club leadership.

SOCIETY EVENTS

Sunday Schoonover Observatory Openings

Have you picked up your eclipse glasses yet? The club continues to open many Sunday afternoons from 2:00 p.m. – 4:00 p.m. to allow those who can't make it on Friday nights to purchase their glasses. It's also a great time to find out more information about the astronomy and the club.

As the April 8, 2024 total solar eclipse is quickly approaching, we want to make sure everyone has an opportunity to get theirs!

Bulk discounts on eclipse glasses are offered. Inquire within or contact the club via email or Facebook if your organization or large family is in need of eclipse glasses to observe this rare event.

Lima Astro's eclipse glasses are made in the USA and ISO certified safe for solar viewing.

As a reminder, eclipse glasses are usable any time for observing the Sun, you don't have to wait for an eclipse to use them!

UNDER THE DOME

Club member Robert Verb presented November's program discussing his involvement in the development and engineering of the mirrors of the James Webb Space Telescope. Thank you to Bob for providing an extremely in-depth program and discussion lasting well over 90-minutes.

The program covered material sourcing, refinement, and properties, as well as how the mirrors were manufactured and the challenges faced during production. We had some great interactivity from the crowd as we reflected on the first couple years of JWST's life after lift-off.

Officer nominations for the 2024 calendar year were held. Additional nominations and the final election of officers will occur at the December 2023 meeting. The current nominations are:

- President - Joshua Crawford
- Vice President - David Humphreys
- Secretary - [no active nominations]
- Corresponding Secretary - Mindy Kimmet
- Treasurer - Michael Ritchie
- Members at Large - Mark Casazza, Blandey Doll

Any active Society member may be nominated for an officer position. Members may also nominate themselves.

Becoming an officer is a great way to contribute your vision and skills to the Society, as well as being an opportunity for personal development, and a chance to give back to the community.

In-depth astronomy knowledge is *not* required! Officer positions support the club in many ways and are a great way to broaden your knowledge in astronomy and hone your skills.



A FLAME IN THE SKY – THE ORION NEBULA

KAT TROCHE - NIGHT SKY NETWORK

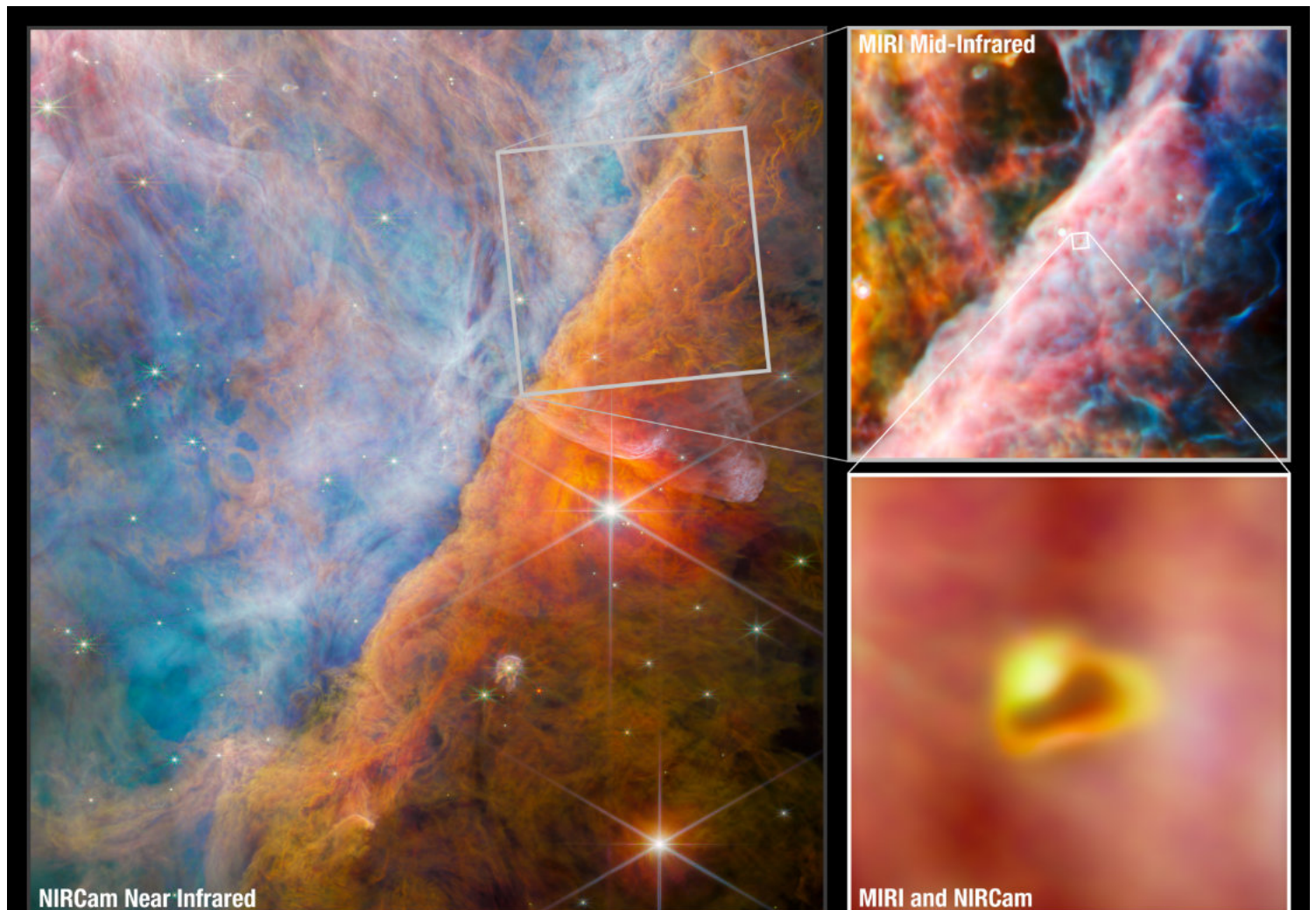
It's that time of year again: winter! Here in the Northern Hemisphere, the cold, crisp sky offers spectacular views of various objects, the most famous of all being [Orion the Hunter](#).

As we've previously mentioned, Orion is a great way to [test your sky darkness](#). With your naked eye, you can easily spot this hourglass-shaped constellation. Known as an epic hunter in Greco-Roman, Orion and all its parts have had many names and meanings across many cultures. In Egyptian mythology, this constellation represented the god Sah. The Babylonians referred to it as The Heavenly Shepard. In most cultures, it is Orion's Belt that has many stories: [Shen](#) in Chinese folklore, or [Tayamnicankhu](#) in Lakota storytelling. But the Maya of Mesoamerica believed that part of Orion contained [The Cosmic Hearth](#) – the fire of creation.

1,500 light years away from Earth sits the star-forming region and crown jewel of Orion – Messier 42 (M42), the Orion Nebula. Part of the “sword” of Orion, this cloud of

dust and gas sits below the first star in Orion's Belt, Alnitak, and can easily be spotted with the naked eye under moderate dark skies. You may also use binoculars or a telescope to resolve even more details, like the Trapezium: four stars in the shape of a baseball diamond. These young stars make up the core of this magnificent object.

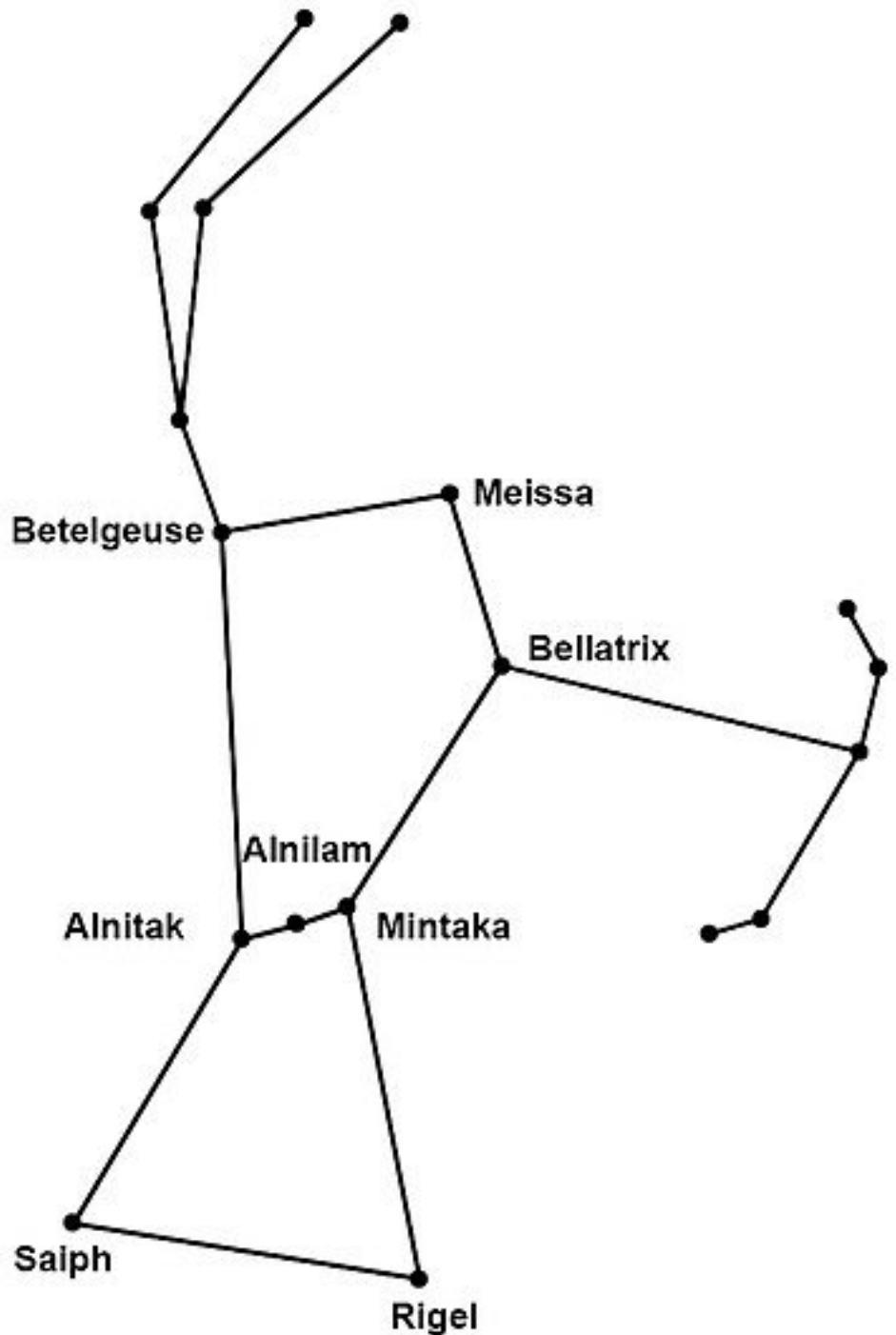
Of course, it's not just for looking at! M42 is easily one of the most photographed nebulae around, by astrophotographers here on the ground, large ground-based observatories, and space telescopes alike. It has long been a place of interest for the Hubble, Spitzer, and Chandra X-ray Space Telescopes, with James Webb Space Telescope joining the list in February 2023. Earlier this year, NASA and the European Space Agency released [a new photo](#) of the Orion Nebula taken from JWST's NIRCam (Near-Infrared Camera), allowing scientists to image this early star forming region in both short and long wavelengths.



But stars aren't the only items photographed here. In June 2023, JWST's NIRCam and MIRI (mid-infrared instrument) imaged a developing star system with a planetary disk forming around it. That's right – a solar system happening in real time – located within the edges of a section called the [Orion Bar](#). Scientists have named this planet-forming disk **d203-506**, and you can learn more about the chemistry found [here](#). By capturing these objects in multiple wavelengths of light, we now have even greater insight into what other objects may be hiding within these hazy hydrogen regions of our night sky.

In addition to our Dark Sky Wheel, a fun presentation you can share with your astronomy club would be our Universe Discovery Guide: Orion Nebula, Nursery of Newborn Stars activity. This will allow you to explain to audiences how infrared astronomy, like JWST, helps to reveal the secrets of nebulae. Or, you can use public projects like the NASA-funded MicroObservatory to capture M42 and other objects.

Learn more about what to spy in the winter sky with our upcoming mid-month article on the Night Sky Network page through NASA's website!



Commemorative eclipse glasses are available **NOW!** Visit a Lima Astro meeting or event to get yours!



The club just received a new shipment of glasses, as they are going fast. **BULK DISCOUNTS** are available.
Email: info@limaastro.com

Our eclipse glasses are ISO certified safe for solar observing and made in the USA.

Your donations help the club with outreach-associated expenses, guest speakers and programs, maintaining technology and equipment, administrative and operational fees, supporting membership benefits, and large initiatives like new club observing facilities.

Observing Lists

Top ten deep-sky objects for December

M 34	NGC 891
M 45	NGC 1023
M 77	NGC 1232
NGC 869	NGC 1332
NGC 884	NGC 1360

Top ten binocular objects for December

M 34	NGC 884
M 45	NGC 1027
Mel 15	NGC 1232
Mel 20	St 2
NGC 869	St 23

Challenge deep-sky object for December

vdB 14

vdB 14 is a small reflection nebulae illuminated by the blue variable supergiant HD 21291, part of the Cam OB1 group in the constellation Camelopardalis.

The Planets in December

Mercury: Achieves maximum eastern elongation of 21° on the 4th, when it shines at mag. -0.3 . Continues to fade thereafter as it sweeps toward Earth, becoming increasingly challenging even for the more-favored southern observers. Lost from view by mid-month, it achieves inferior conjunction on the 22nd.

Venus: Remains prominent in the morning sky through the end of the year as it gradually recedes from Earth. Now in the less-appealing gibbous phase, which will persist for the entirety of 2024. The waning crescent Moon passes 4° to the south on the 9th.

Mars: Too close to the Sun to be seen.

Jupiter: Now in the evening sky and prominently placed in the eastern sky as evening twilight begins. Still in retrograde motion, it continues its westward drift against the stars of Aries. The waxing gibbous Moon joins the scene on the 22nd. There are two instances of double shadow transits on the 23rd and 30th.

Saturn: Continues to recede from Earth, passing beyond 10.0 au distant in mid-month and setting by mid-evening local standard time. Its last conjunction with the Moon of 2023 occurs on the 17th.

Uranus: Now well past opposition, Uranus is well placed in the evening sky at the onset of darkness. With a good finder chart, it can be detected with the unaided eye under dark skies.

Neptune: In the southwestern evening sky in extreme northeastern Aquarius, setting before midnight local standard time. Reaches its second stationary point on the 7th, and gradually resumes prograde motion thereafter, returning to Pisces before mid-month.

Astronomy History This Month

- Giovanni Cassini discovered the Saturnian satellite Rhea on December 23, 1672.
- Nicolas Louis de Lacaille discovered NGC 2070 (the Tarantula Nebula) on December 5, 1751.
- The bright spiral galaxies M81 and M82 in Ursa Major were discovered by Johann Bode on December 31, 1774.
- William Herschel discovered the galaxy pair NGC 3166 and NGC 3169 in Sextans on December 19, 1783.
- Caroline Herschel discovered Comet 35P/Herschel-Rigoliet on December 21, 1788.
- Caroline Herschel discovered Comet C/1791 X1 (Herschel) on December 15, 1791.
- The Jovian satellite Himalia was discovered by Charles Perrine on December 3, 1905.
- Audouin Dolfus discovered the Saturnian satellite Janus on December 15, 1966.
- The Saturnian satellite Epimetheus was discovered by Richard Walker on December 18, 1966.

December 2023 Astronomy Events Calendar

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
					1 Meeting, Program and Observing starting @ 8pm Pollux 1.6° N of Moon	2
3	4 Mercury greatest elongation E (21°) Moon at apogee	5 Last quarter Moon	6	7 Neptune stationary	8 Moon at descending node	9 Venus 4° N of Moon
10	11	12 New Moon	13 Mercury stationary	14 Mercury 4° N of Moon Geminid meteors peak	15	16 Mercury at ascending node Moon at perigee
17 Saturn 2° N of Moon	18	19 First quarter Moon Venus at greatest heliocentric lat. N Neptune 1.3° N of Moon	20 Mercury at perihelion	21 Moon at ascending node Vesta at opposition	22 December Solstice Jupiter 3° S of Moon Mercury in inferior conjunction	23 Ursid meteors peak Uranus 3° S of Moon Double Shadows on Jupiter
24 Moon 1.0° S of Pleiades (M45)	25	26 Venus at perihelion	27 Full Moon	28 Pollux 1.7°N of Moon	29	30 Mercury at greatest heliocentric lat. N Double Shadows on Jupiter
31 Jupiter stationary						

ASTRONOMY CALENDAR TERMINOLOGY

Aphelion – The point in the orbit of a planet, asteroid, or comet at which it is furthest from the Sun.

Apogee – The point in the orbit of the Moon, planet, or satellite at which it is furthest from the Earth.

Ascending Node – The point along a planet's orbit where it crosses the ecliptic (Earth's orbital plane) from S to N.

Conjunction – When the Moon or a planet appears especially close to another planet or bright star.

Descending Node – The point along a planet's orbit where it crosses the ecliptic (Earth's orbital plane) from N to S.

Elongation – The angular distance the Moon or a planet is from the Sun. Mercury and Venus are best seen when at "greatest" elongation, and will appear at their highest position above the horizon before sunrise or sunset.

Heliocentric Latitude – The longitude of a heavenly body, as seen from the Sun's center (the Sun is at the center in the heliocentric model of the solar system). Essentially, if you could stand in the center of the Sun and draw a plane straight out in front of you (this would be 0.0°), heliocentric latitude is the number of degrees above or below that plane where the planet appears.

Inferior Conjunction – When a planet (Mercury or Venus) passes between the Earth and the Sun.

Occultation – When the Moon or a planet passes directly in front of a more distant planet or star. (*Occult, as a verb, means to obscure the view of an object.*)

Opposition – When a planet or asteroid is directly *opposite* the Sun in the sky. Just like the Full Moon, a planet will appear brighter and fully lit during this time.

Perigee – the point in the orbit of the Moon, planet, or satellite at which it is nearest to the Earth.

Perihelion – the point in the orbit of a planet, asteroid, or comet at which it is closest to the Sun.

Superior Conjunction – When a planet (Mercury or Venus) passes behind the Sun, out of our view.

Transit – When a smaller object passes in front of a larger object. Such as when Mercury or Venus pass in front of the Sun, silhouetting them against the disc; or when one of Jupiter's Galilean moons pass in front of the planet.

Zodiacal Light – Sunlight that is reflected off celestial dust that is concentrated in the plane of the Solar System. It appears as a faint glow in the sky extending from the horizon visible during certain times of the year, and requires the darkest skies to be observed. In the darkest sky conditions, zodiacal light can cast very faint shadows.

Examples

Mars 1.1° S of Moon, occultation

On this night, Mars would appear in the sky very close to the Moon – only 1.1 degrees away from it. At a point during this night the Moon would pass in front of Mars, hiding it from view.

Double shadow transit on Jupiter

On this night, two of Jupiter's Galilean moons will cast shadows on the surface of Jupiter simultaneously, appearing as two dark discs moving across the face of the planet. If you were standing on the surface of Jupiter as one of these shadows passed over, you would witness a solar eclipse.

Mercury greatest elongation E

On this night, Mercury will be at a point in its orbit where it appears highest in the sky. From our point of view, this is the furthest apart Mercury and the Sun will appear from each other. E or W indicate which side of the Sun the planet appears on in its orbital cycle, and can also tell you when to look for Mercury. The planet can be found in the evening sky during the greatest elongation E, and in the morning sky in the greatest elongation W.