

# The Celestial Mechanic

The Official Newsletter of the Astronomy Associates of Lawrence



## Coming Events

### Monthly Meeting

April 28, 2024, 7:00PM

Baker Wetlands Discovery Center

### Public Observing

April 28, 2024, 8:00PM

Baker Wetlands Discovery Center

### Club Officers

#### President

Rick Heschmeyer [email](#)

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#### NSN Coordinator

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#### Faculty Advisor

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## Report From the Officers

By Rick Heschmeyer

April has arrived and with it the anticipation for the April 8th Total Solar Eclipse. Several club members will be travelling to the center line in multiple states, and we look forward to hearing from them about their trips and future meetings. This will be the last total eclipse visible in the lower 48 states until 2044. For those of you who are unable to travel to see the eclipse, the KU Department of Physics and Astronomy will be hosting an event from Noon until 3:30 PM on the 8th. The location is the Marching Band Practice Tarmac, just west of the Dole Center. Attendees will be able to safely view the 90% eclipsed Sun at this event. Any club members that would like to help should reach out to me and let me know.

For our March club meeting, AAL member Howard Edin gave an interesting talk about the Global Meteor Network and his two camera setups, which happen to be the only GMN stations in Kansas. He also discussed how to create a new GMN station. It sounded as if he may have interested a couple other club members into setting up their own GMN station! Unfortunately, the rainy weather that evening meant that they was no public observing following Howard's talk.

In April, Dr. Humberto Campins, a mission scientist for the OSIRIS-Rex asteroid sample return mission, and a former AAL member, will reprise his February 2021 presentation concerning the mission with a talk about some of the initial scientific returns from the mission. He will be joining us via Zoom. I will send a link out to club members, so that everyone can join, live or online.

We have a few upcoming outreach events to announce, in addition to the Solar Eclipse, both at Baker Wetlands Discovery Center. On Saturday, May 4 (Star Wars Day!) we will once again be participating in the Discovery Center's Family Fun Day from 9-Noon. We will be doing solar observing if the weather permits. If not, we will have a table set up inside the Discovery Center. Then on Saturday, May 18 we will join the Discovery Center in celebrating International Astronomy Day. Details for the event are coming soon. Please mark your calendars for both events.

Hoping for clear skies so everyone can successfully observe the eclipse on April 8th!



# The first U.S. lunar lander since 1972 touches down on the moon



By Christopher Crockett and Adam Mann  
SCIENCE NEWS, FEBRUARY 23, 2024

After a nail-biting descent, the United States took one small step back to the surface of the moon.

A spindly robotic lander named Odysseus — designed and built by a private U.S. company — touched down near the moon’s south pole at about 6:23 p.m. Eastern time. The probe, which is carrying six NASA payloads plus a few other odds and ends, is the first U.S. vehicle to perform a controlled descent to the lunar soil since [Apollo 17](#) landed in 1972.

“I know this was a nail-biter but we are on the surface and we are transmitting and welcome to the moon,” Intuitive Machines CEO Steve Altemus said during a live NASA broadcast of the touchdown. “Houston, Odysseus has found its new home.”

Data collected after the touchdown suggests the lander ended up tipped on its side as it sat on the lunar surface with its solar arrays deployed and its battery charged to 100 percent, Altemus said during a NASA news conference February 23. The team believes the spacecraft might have caught some of its landing gear on the ground or possibly in a crevice, tipping the lander gently over, where it came to rest on a rock.

Houston-based private company Intuitive Machines is overseeing the mission, which launched from Kennedy Space Center in Florida on February 15. Odysseus’ destination was a flat region near the Malapert A crater, about 300 kilometers from the moon’s south

pole. The spot is near one of several potential landing sites for future NASA astronauts.

Engineers had to deal with several unexpected problems during the landing attempt, most prominently the fact that the spacecraft’s laser range finder, part of its autonomous landing system, stopped functioning. Mission planners decided to stay in orbit for an extra two hours and then were able to use two backup lasers that were part of a NASA payload to complete the descent.

“What we can confirm without a doubt is that our equipment is on the moon and we are transmitting,” mission director Tim Crain, chief technology officer of Intuitive Machines said shortly after touchdown. Communication with the spacecraft was patchy, and it was unclear immediately what shape it was in.

Odysseus, which stands about 4 meters tall and 1.5 meters wide, is hauling a half dozen NASA instruments designed to demonstrate equipment for future landings and better understand the environment near the south pole in service of planned astronaut missions. The payloads will test precision landing technologies, try out a new way of knowing how much lander fuel is left, investigate the radio environment near the moon’s surface, and plop a set of retroreflectors on the ground that will serve as a permanent location marker.

Though NASA is the company’s main customer, the space agency’s instruments aren’t the only passengers. Payloads from several private companies and groups are along for the ride as well. They include a camera designed by students and faculty at Embry-Riddle Aeronautical University in Daytona Beach, Fla. The camera was to be jettisoned from the lander about 30 meters above the surface to capture the first images of a lunar touchdown from outside the incoming spacecraft. And Odysseus is delivering the first art installation on the moon: A cube of 125 miniature sculptures that commemorate human curiosity.

“We couldn’t be more thrilled,” says Steve Durst, director of the International Lunar Observatory, a private company based in Kamuela, Hawaii, that sent a small telescope as one of the payloads on Odysseus. The telescope, named ILO-X, expects to take scientific images of the Milky Way from the lunar surface that will be used by researchers to study our galaxy.

The sculptural art installation was on a panel on the lander that is facing toward the ground. But most of the payloads are on the sides of the lander that are facing up, the team said, and the instruments appear to be operational and able to send information back to Earth. Because of the difficulties in landing, though, the Embry-Riddle-built camera wasn't deployed during the descent as planned. Engineers are still hopeful that they'll be able to fire it away from the spacecraft and take images at a later date.

The Intuitive Machines venture is part of NASA's Commercial Lunar Payload Services program, wherein the agency hires companies to scout the moon in support of [the Artemis lunar program](#) (SN: 11/16/22). Under Artemis, NASA aims to reestablish a human presence on the moon, with the first crewed landing no earlier than late 2026.

It's been more than 50 years since astronaut Eugene Cernan left the last U.S. footprints on the moon. In recent years, [a string of robotic landing attempts have been made](#) by private companies and countries alike, though most failed (SN: 8/23/23). The landing by Odysseus today has moved the United States closer to its next giant leap in space exploration.

"Today, for the first time in more than a half century, the U.S. has returned to the moon," said NASA administrator Bill Nelson during the NASA broadcast. "Today is a day that shows the power and promise of NASA's commercial partnerships. Congratulations to everyone involved in this great and daring quest."

Intuitive Machines expects that the lander will remain operational for another nine to 10 days before the region that it's in passes into the cold lunar night, which lasts two weeks. Odysseus is solar-powered and won't be able to charge its batteries enough to keep the spacecraft warm for that long. Most of the vehicle's electronics will have a hard time with the plunging temperatures and aren't expected to survive, though engineers will check once Odysseus is back in daylight.

"You're gonna bring a tear to my eye," Crain said when asked about the prospect of Odysseus' demise during the Feb. 23 NASA briefing. But he was also jubilant when reflecting about his team's accomplishments.

"To look at the moon every night now and know that we have new hardware there that we had a hand in building, it really was a magical, magical day," he said.

## NASA's Hubble Traces 'String of Pearls' Star Clusters in Galaxy Collisions

HUBBLESITE, FEBRUARY 8, 2024



### Summary

Long Trail of Clumpy Stars Follows Galaxy Interactions

When galaxies go bump in the night, they cook up new generations of stars that might otherwise have never been born. These close encounters between galaxies cause a gravitational tug-of-war, and gas and dust are drawn out into large streamers. The Hubble Space Telescope's vision is so sharp that it can see clusters of newborn stars strung along these tidal tails. They form when knots of gas gravitationally collapse to create about 1 million newborn stars per cluster. These "string of pearls" features are probably more common in the early universe when galaxies collided more frequently.

Contrary to what you might think, galaxy collisions do not destroy stars. In fact, the rough-and-tumble dynamics trigger new generations of stars, and presumably accompanying planets.

Now NASA's Hubble Space Telescope has homed in on 12 interacting galaxies that have long, tadpole-like tidal tails of gas, dust, and a plethora of stars. Hubble's exquisite sharpness and sensitivity to ultraviolet light have uncovered 425 clusters of newborn stars along these tails, looking like strings of holiday lights. Each cluster contains as many as 1 million blue, newborn stars.

Clusters in tidal tails have been known about for decades. When galaxies interact, gravitational tidal forces pull out long streamers of gas and dust. Two popular examples are the Antennae and Mice galaxies with their long, narrow, finger-like projections.

A team of astronomers used a combination of new observations and archival data to get ages and masses of tidal tail star clusters. They found that these clusters are very young — only 10 million years old. And they seem to be forming at the same rate along tails stretching for thousands of light-years.

"It's a surprise to see lots of the young objects in the tails. It tells us a lot about cluster formation efficiency," said lead author Michael Rodruck of [Randolph-Macon College](#) in Ashland, Virginia. "With tidal tails, you will build up new generations of stars that otherwise might not have existed."

The tails look like they are taking a galaxy's spiral arm and stretching it out into space. The exterior part of the arm gets pulled like taffy from the gravitational tug-of-war between a pair of interacting galaxies.

Before the mergers, the galaxies were rich in dusty clouds of molecular hydrogen that simply may have remained inert. But the clouds got jostled and bumped into each other during the encounters. This compressed the hydrogen to the point where it precipitated a firestorm of star birth.

The fate of these strung-out star clusters is uncertain. They may stay gravitationally intact and evolve into globular star clusters — like those that orbit outside the plane of our Milky Way galaxy. Or they may disperse to form a halo of stars around their host galaxy, or get cast off to become wandering intergalactic stars.

This string-of-pearls star formation may have been more common in the early universe when galaxies collided with each other more frequently. These nearby galaxies observed by Hubble are a proxy for what happened long ago, and therefore are laboratories for looking into the distant past. ☀

## Oldest 'dead' galaxy ever seen defies current models of the ancient universe

By Samantha Mathewson

SPACE.COM, MARCH 8, 2024

This galaxy stopped forming stars more than 13 billion years ago.



Astronomers have discovered the oldest known "dead" galaxy in recent observations from the [James Webb Space Telescope](#) (JWST). This galaxy appears to challenge current models of the early universe.

The newly discovered [galaxy](#), named JADES-GS-z7-01-QU, stopped forming stars more than 13 billion years ago, when the universe was only 700 million years old. However, astronomers are puzzled by the galaxy's sudden halt in star formation because, at that time, the dust and gas necessary to form stars was abundant in the universe.

"The first few hundred million years of the universe was a very active phase, with lots of gas clouds collapsing to form new stars," Tobias Looser, lead author of the study from the University of Cambridge, said in [a statement](#). "Galaxies need a rich supply of gas to form new stars, and the early universe was like an all-you-can-eat buffet."

Data from the JWST Advanced Deep Survey (JADES) shows that the galaxy most likely had a quick burst of [star formation](#) that lasted between 30 million to 90 million years, and then stopped suddenly between 10 million and 20 million years before the point in time observed by the JWST, according to the statement.

Dead galaxies — those that no longer form stars — have been observed in the early universe before, But JADES-GS-z7-01-QU is the oldest such galaxy yet recorded at only 700 million years after the [Big Bang](#) that formed the universe 13.8 billion years ago. It is also much smaller than other dormant galaxies previously observed in the early [universe](#) — a benefit of the JWST's improved sensitivity that can detect smaller and fainter galaxies.

"Until now, to understand the early universe, we've used models based on the modern universe," Roberto Maiolino, co-author of the study from the University of Cambridge, said in the statement. "But now that we can see so much further back in time, and observe that the star formation was quenched so rapidly in this galaxy, models based on the modern universe may need to be revisited."

The recent observations of JADES-GS-z7-01-QU are the deepest views into the distant universe made to date by the JWST. The rapid burst of star formation observed in the galaxy may have exhausted the galaxy's reservoir of dust and gas from which new stars are formed.

"Everything seems to happen faster and more dramatically in the early universe, and that might include galaxies moving from a star-forming phase to dormant or quenched," Looser said in the statement.

Given astronomers are still unsure why exactly the galaxy's star formation stopped — or if the galaxy ever came back to life — they plan to find a greater number of old galaxies to help piece together galactic evolution in the early universe and create more accurate models of that time period. ☀

## Earth-sized planet discovered in 'our solar backyard'

SCIENCENEWS, JANUARY 14, 2024

A team of astronomers has discovered a planet closer and younger than any other Earth-sized world yet identified. It's a remarkably hot world whose proximity to our own planet and to a star like our sun mark it as a unique opportunity to study how planets evolve.

The new planet was described in a new study published this week by The Astronomical Journal. Melinda Soares-Furtado, a NASA Hubble Fellow at the University of Wisconsin-Madison who will begin work as an astronomy professor at the university in the fall, and recent UW-Madison graduate Benjamin Capistrant, now a graduate student at the University of Florida, co-led the study with co-authors from around the world.

"It's a useful planet because it may be like an early Earth," says Soares-Furtado.

### Here is what scientists know about the planet:

- The planet is known as HD 63433d and it's the third planet found in orbit around a star called HD 63433.
- HD 63433d is so close to its star, it completes a trip all the way around every 4.2 days.
- "Even though it's really close-orbiting, we can use follow-up data to search for evidence of outgassing and atmospheric loss that could be important constraints on how terrestrial worlds evolve," Soares-Furtado says. "But that's where the similarities end -- and end *dramatically*."
- Based on its orbit, the astronomers are relatively certain HD 63433d is tidally locked, which means one side is perpetually facing its star.
- That side can reach a brutal 2,300 degrees Fahrenheit and may flow with lava, while the opposite side is forever dark.

### What you should know about the planet's star:

- HD 63433 is roughly the same size and star type as our sun, but (at about 400 million years old) it's not even one-tenth our sun's age.
- The star is about 73 light years away from our own sun and part of the group of stars moving together that make up the constellation Ursa Major, which includes the Big Dipper.
- "On a dark night in Madison," Soares-Furtado says, "you could see [HD 63433] through a good pair of binoculars."

### How the scientists found the planet:

- The study's authors are collaborating on a planet-hunting project called THYME. In 2020, they used data from NASA's Transiting

Exoplanet Survey Satellite to identify two mini-Neptune-sized planets orbiting HD 63433.

- Since then, TESS took four more looks at the star, compiling enough data for the researchers to detect HD 63433d crossing between the star and the satellite.

**What comes next:**

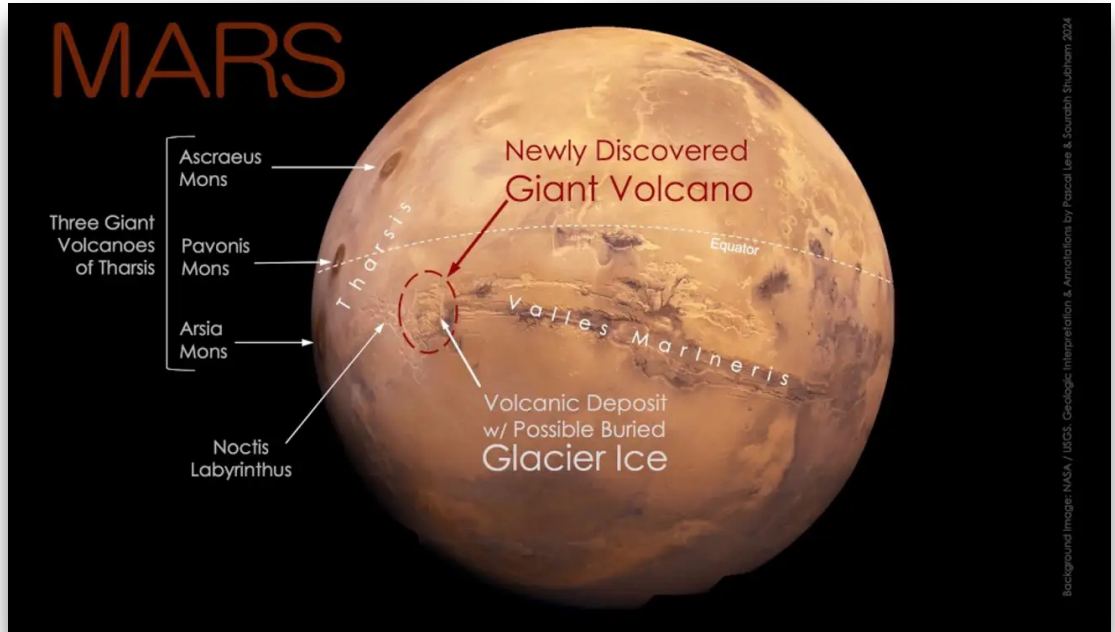
- The researchers, including UW-Madison study co-authors graduate student Andrew C. Nine, undergraduate Alyssa Jankowski and Juliette Becker, a UW-Madison astronomy professor, think there is plenty to learn from HD 63433d.
- The planet is uniquely situated for further study. Its peppy young star is visible from both the Northern and Southern hemispheres, increasing the number of instruments, like the South African Large Telescope or WIYN Observatory in Arizona (both of which UW-Madison helped design and build) that can be trained on the system.
- And the star is orders of magnitude closer than many Soares-Furtado has studied, possibly affording opportunities to develop new methods to study gasses escaping from the planet's interior or measure its magnetic field.

"This is our solar backyard, and that's kind of exciting," Soares-Furtado says. "What sort of information can a star this close, with such a crowded system around it, give away? How will it help us as we move on to look for planets among the maybe 100 other, similar stars in this young group it's part of?" ☀

# Giant Volcano 'Hiding in Plain Sight' on Mars

By Isaac Schultz

SPACE.COM, MARCH 14, 2023



A giant volcano has been found in Mars' Tharsis plateau, making it the fourth known volcano in the region. Heavily eroded, the 29,600-foot (9,022-meter) volcano has been hiding in plain sight, sneaking its mug into images of the Tharsis region but never actually being seen. Until now.

The volcano's discovery was announced this week at the 55th Lunar and Planetary Science Conference in Texas. Abutting the maze-like geology of Noctis Labyrinthus, the giant volcano has been provisionally named Noctis Mons. You can read the paper initially describing the discovery [here](#). The volcano was found with data from multiple Mars orbiters, including NASA's Viking orbiters and the Mars Reconnaissance Orbiter, and ESA's Mars Express orbiter.

"It's an ancient and long-lived volcano so deeply eroded that you could hike, drive, or fly through it to examine, sample, and date different parts of its interior to study Mars' evolution through time," Pascal Lee, a planetary scientist at the SETI Institute and the lead author of the new study, said in an institute [release](#). "It has also had a long history of heat interacting with water and ice, which makes it a prime location for astrobiology and our search for signs of life.

The volcano is on the western edge of [Valles Marineris](#), a vast canyon system on Mars that is 10 times longer, 20 times wider, and five times deeper than the Grand Canyon. It was spotted “hiding near Mars’ equator in plain sight,” according to the [press release](#). The team believes the volcano is a shield composed of layered lava, ice, and pyroclastic material. As faults and fractures formed in the volcano, lava rose, causing thermal erosion and, ultimately, the collapse of swaths of the volcano.

While the newly discovered volcano just edges out Mount Everest (29,000 feet, or 8,839 meters) in the height department, it’s comfortably dwarfed by Mars’ largest volcano, Olympus Mons, which is the size of Arizona and an imposing 16 miles (25.75 kilometers) high.

Last year, the [team found a relict glacier](#) in the geologically young region, a hopeful sign for future human habitation on a cold, arid, generally inhospitable world. That finding was announced at last year’s Lunar and Planetary Science conference. Upon further investigation, “we realized we were inside a huge and deeply eroded volcano,” Lee said.

“Finally, with glacier ice likely still preserved near the surface in a relatively warm equatorial region on Mars, the place is looking very attractive for robotic and human exploration,” he added.

If ice were preserved near the Martian surface, it would be a compelling venue for human habitation. How to produce food, water, and even [air on Mars](#) will be critical problems to solve if aspirations of [human exploration of other planets](#) (and beyond!) is to occur.

Mars’ volcanoes don’t have Vesuvian outbursts—at least none that scientists have observed. But the planet *is* seismically active: in 2022, the since-decommissioned InSight lander [spotted potential signs of magma](#) in seismic data. ☀

## Constant Companions: Circumpolar Constellations, Part II

By Kat Troche

NIGHTSKYNETWORK, MARCH 2024

As the seasons shift from Winter to Spring, heralding in the promise of warmer weather here in the northern hemisphere, our circumpolar constellations remain the same. Depending on your latitude, you will be able to see up to nine circumpolar constellations. This month, we’ll focus on: Lynx, Camelopardalis, and Perseus. The objects within these constellations can all be spotted with a pair of binoculars or a small to medium-sized telescope, depending on your Bortle scale – the darkness of your night skies.



In the appearance of left to right: constellations Perseus, Camelopardalis, and Lynx in the night sky. Also featured: Cassiopeia as a guide constellation, and various guide stars. Credit: Stellarium Web

- **Double Stars:** The area that comprises the constellation Lynx is famous for its multiple star systems, all of which can be separated with a telescope under dark skies. Some of the notable stars in Lynx are the following:

- **12 Lyncis** – a triple star that can be resolved with a medium-sized telescope.
- **10 Ursae Majoris** – a double star that was once a part of Ursa Major.
- **38 Lyncis** – a double star that is described as blue-white and lilac.
- **Kemble's Cascade:** This asterism located in Camelopardalis, has over 20 stars, ranging in visible magnitude (brightness) and temperature. The stars give the appearance of flowing in a straight line leading to the Jolly Roger Cluster (NGC 1502). On the opposite side of this constellation, you find the asterism Kemble's Kite. All three objects can be spotted with a pair of binoculars or a telescope and require moderate dark skies.

time. For a visual representation of this, revisit NASA's What's Up: November 2019.

From constellations you can see all year to a once in a lifetime event! Up next, find out how you can partner with NASA volunteers for the April 8, 2024, total solar eclipse with our upcoming mid-month article on the [Night Sky Network](#) page through NASA's website! 🌑



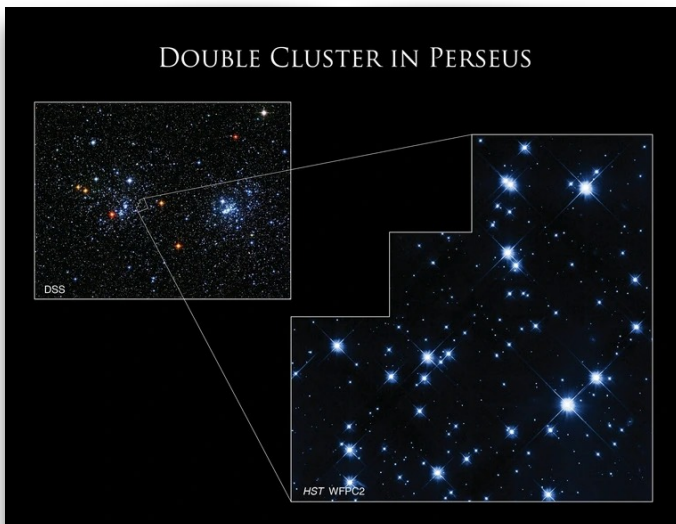
**ALCON 2024**  
STARS AND ALL THAT JAZZ!  
JULY 17-20, 2024

To register for ALCon, first click on the link, then choose "buy tickets."  
<https://www.tickettailor.com/events/astronomicalsocietyofkansascity/1187693#>

It's ASKC's 100th anniversary! We are honored to be the official host for this year's Astronomical League Convention – ALCon 2024 – this July.  
*Held at the beautiful Overland Park DoubleTree Hotel*

**See you at ALCon!**

**Astronomical Society of Kansas City**



A ground-based image from the Digitized Sky Survey (DSS) in the upper left shows Caldwell 14, the Double Cluster in Perseus, with an outline of the region imaged by Hubble's Wide Field and Planetary Camera 2 (WFC2).

- **Double Cluster:** The constellation Perseus contains the beautiful Double Cluster, two open star clusters (NGC 869 and 884) approximately 7,500 light-years from Earth. This object can be spotted with a small telescope or binoculars and is photographed by amateur and professional photographers alike. It can even be seen with the naked eye in very dark skies. Also in Perseus lies **Algol, the Demon Star**. Algol is a triple-star system that contains an eclipsing binary, meaning two of its three stars constantly orbit each other. Because of this orbit, you can watch the brightness dim every two days, 20 hours, 49 minutes – for 10-hour periods at a

COME SEE THE ECLIPSE SAFELY WITH THE ASTRONOMERS AT KU!

**SOLAR ECLIPSE**

**APRIL 8TH, 2024**

12:00-3:30 | MARCHING BAND PRACTICE TARMAC WEST OF THE DOLE INSTITUTE

Join the KU astronomers in viewing the **Solar Eclipse** through our solar telescopes at the Marching Band Practice Tarmac west of the Dole Institute! Lawrence is in the path of 90% totality! We'll begin at noon with fun activities, telescope viewings, and more!

Come get a **free pair of eclipse glasses** to view the eclipse and see the last total solar eclipse in the U.S. until 2044!

**What is a solar eclipse?**

A solar eclipse happens when the Moon passes between the Sun and Earth. In totality, the Moon's shadow covers the sun causing the sky to darken. In totality you can see the Sun's corona, which is typically unobservable. In a partial solar eclipse the Moon will block out part of the Sun giving a crescent shape for the Sun when observed!



Scan this QR code to stay up-to-date!



Credit: NASA



# The Backyard Observer, April 2024

By Rick Heschmeyer

## URSA MAJOR

High overhead on April nights shines the constellation Ursa Major, the Greater Bear. Ursa Major is the largest constellation in the northern sky, and the third largest constellation overall. Its brightest stars form one of the most recognized asterisms in the heavens, The Big Dipper. The stars of the Big Dipper can be used to help locate other constellations. The two stars that form the side of the bowl opposite the handle are known as “The Pointers.” Draw a line through these two stars and follow it to the North and the first bright star is Polaris, the North Star, and the brightest star in Ursa Minor, the Lesser Bear. Follow the stars in the handle of the dipper and “Arc to Arcturus” then “Speed to Spica.” Arcturus is the Alpha star in the Constellation Bootes. Spica is the Alpha star in the constellation Virgo. Can you find your own star hops from the Big Dipper to other constellations?

Ursa Major is also home to many wonderful stars and deep sky objects.

Zeta Ursae Majoris is more commonly known as Mizar. Mizar is a system composed of two double stars set in the middle of the Big Dippers handle. It was also the first star found to be a visual binary, in 1650, by the Italian astronomer Giovanni Battista Riccioli and the first double star to ever be photographed. The other two stars in the system were discovered spectroscopically.

Alcor, or 80 Ursae Majoris is a visual companion to Mizar. The pair have been called the “Horse and Rider.” This pair, visible without any optical aid, was often used as an eye test in early cultures. If you lived in the time of the early Romans and could split the pair, you would be eligible to be an archer in the Roman army. Alcor is itself a double star, so together with Mizar they form a six-star system.

Messier 81 is a large spiral galaxy about 12 million light years from Earth. It is also known as Bode’s Galaxy. It is a popular target for beginning stargazers as it is visible from dark skies in binoculars and small telescopes. It was discovered by Johann Bode in 1774 and independently discovered by Charles Messier, who added it to his catalog in 1779. This is the largest galaxy in a group of galaxies known as the “M 81 Group.”

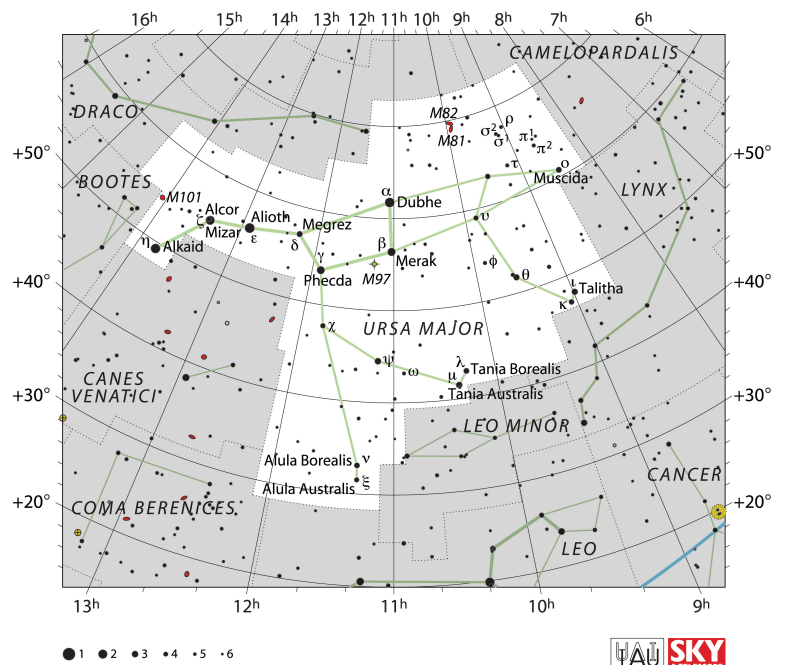
Messier 81 interacts with the nearby galaxies Messier 82 and NGC 3077. M 82 is also called the “Cigar Galaxy” as we see it edge-on from Earth. It is also a good target for small to medium amateur telescopes. It was also discovered by Bode on New Year’s Eve 1774.

Messier 97, the Owl Nebula, is a bright planetary nebula in Ursa Major. It was discovered by Messier’s contemporary Pierre Mechain, in 1781. It got its moniker due to the appearance of two large owl-like eyes visible in large telescopes. It lies about 2,600 light years distant. About 4 billion years from now our Sun will shed off its outer layers to become the central star of a planetary nebula just like M 97.

Messier 101 is another spiral galaxy in UMa. It is also called the Pinwheel Galaxy as we see it face-on.

Messier 108 is yet another Messier galaxy, this one a barred spiral galaxy similar to our own Milky Way. Unlike M 101 we view M 108 nearly edge on.

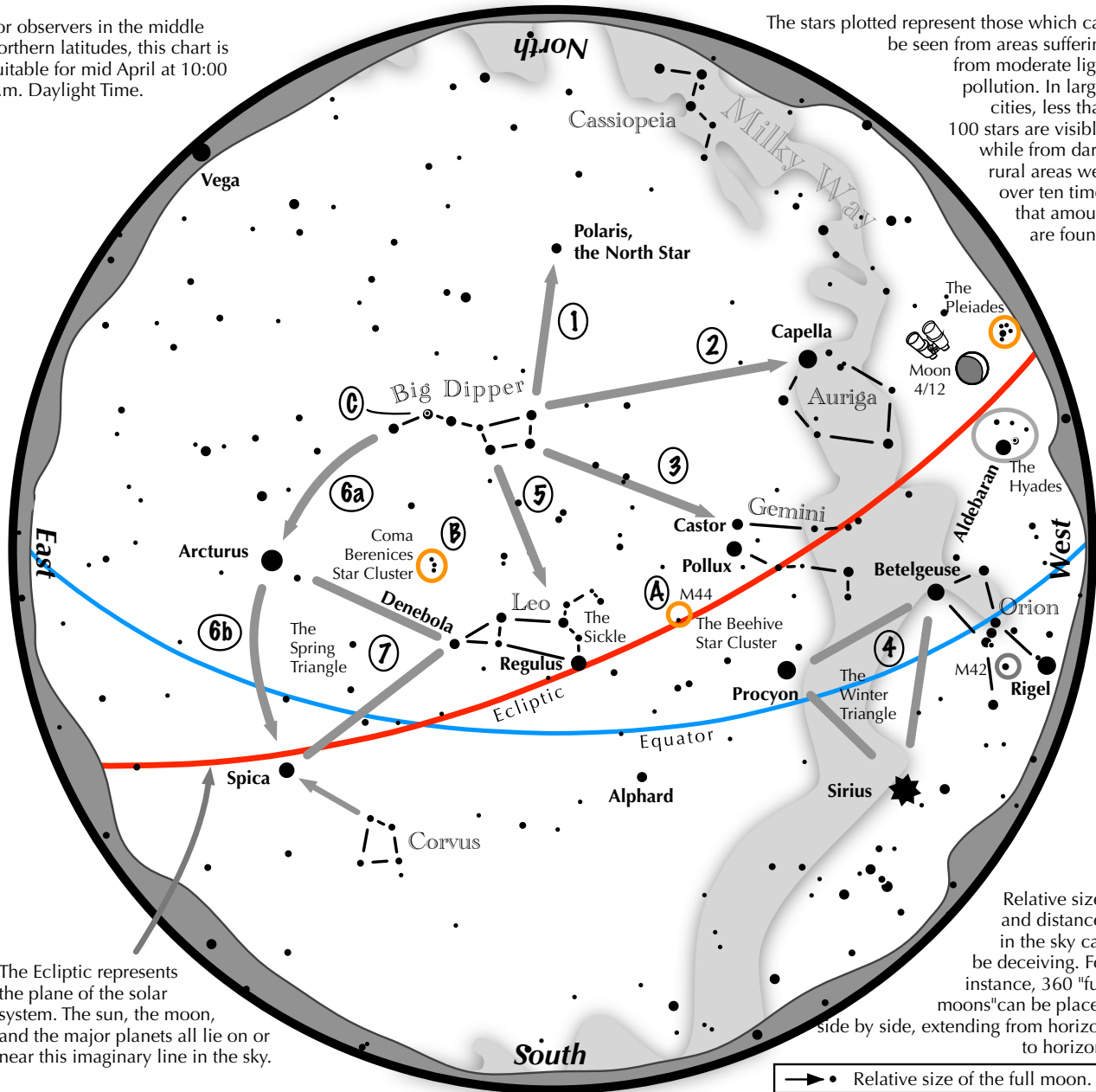
To round out the Ursa Major Messier galaxies we finally arrive at Messier 109, another barred spiral galaxy, once again discovered by Pierre Mechain.



# Navigating the April Night Sky, Northern Hemisphere

For observers in the middle northern latitudes, this chart is suitable for mid April at 10:00 p.m. Daylight Time.

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 April night sky: Simply start with what you know or with what you can easily find.

- 1 Extend an imaginary line north from the two stars at the tip of the Big Dipper's bowl. It passes Polaris, the North Star.
- 2 Draw another imaginary line west across the top two stars of the Dipper's bowl. It strikes Capella low in the northwest.
- 3 Through the two diagonal stars of the Dipper's bowl, draw a line pointing to the twin stars of Castor and Pollux in Gemini.
- 4 Look in the west-southwest for the bright Winter Triangle stars of Sirius, Procyon, and Betelgeuse.
- 5 Directly below the Dipper's bowl reclines the constellation Leo with its primary star, Regulus.
- 6 Follow the arc of the Dipper's handle. It first intersects Arcturus, then continues to Spica.
- 7 Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.

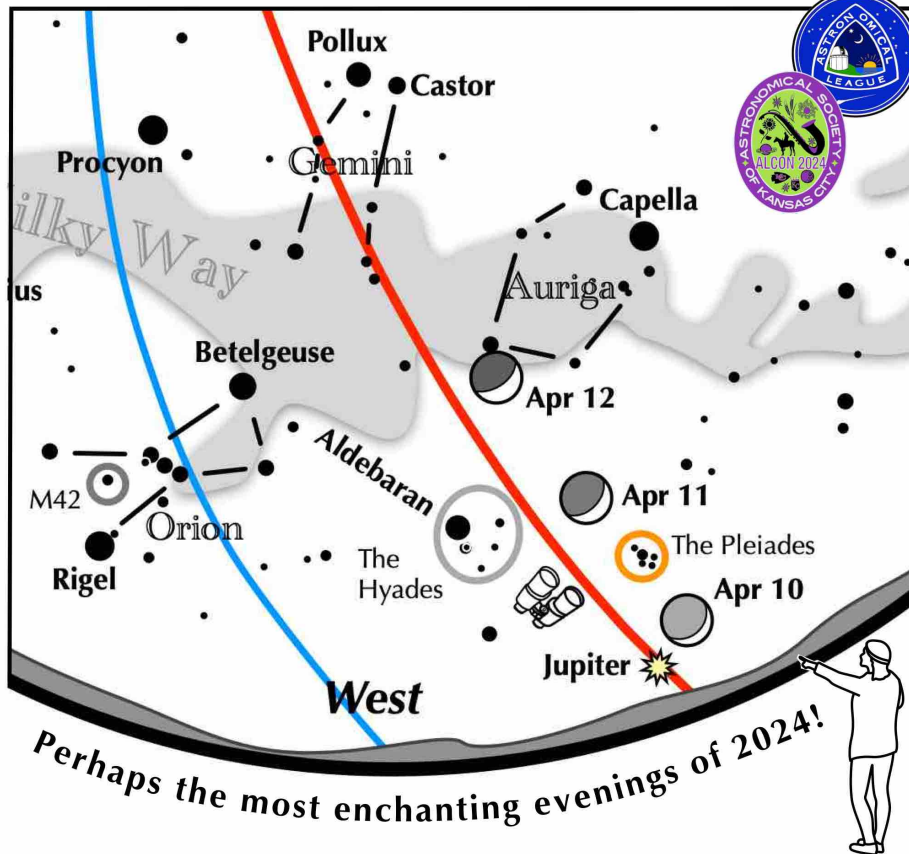
### Binocular Highlights

- A:** M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux.
- B:** Look nearly overhead for the loose star cluster of Coma Berenices.
- C:** In the Big Dipper's handle shines Mizar next to a dimmer star, Alcor.

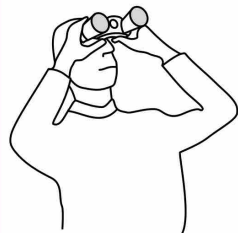


Duplication allowed and encouraged for all free distribution.

**If you can see only one celestial event this April,  
see this one.**



*Perhaps the most enchanting evenings of 2024!*



**Enhance the scene –  
use binoculars!**

[www.astroleague.org](http://www.astroleague.org)

On April 10, 11, and 12, look low in the west-northwest 60 minutes after sunset.

- The crescent moon, glowing full with earthshine, floats just above the horizon in the bright twilight on April 10. Next to it shines Jupiter, and above it lies the pretty Pleiades star cluster.
- On April 11, the slightly thicker, but more pronounced crescent moon moves between the Pleiades and the Hyades star clusters.
- On the third night, the crescent moon stands commandingly above the scene.

## About Astronomy Associates

The club is open to all people interested in sharing their love for astronomy. Monthly meetings are typically on the last Sunday of each month and often feature guest speakers, presentations by club members, and a chance to exchange amateur astronomy tips. These meetings and the public observing sessions that follow are scheduled at the Baker Wetlands Discovery Center, south of Lawrence. All events and meetings are free and open to the public. Periodic star parties are scheduled as well.

Because of the flexibility of the schedule due to holidays and alternate events, it is always best to check the [Web site](#) for the exact Sundays when events are scheduled.

Copies of the Celestial Mechanic can also be found on the web at [newsletter](#).

Annual Dues for the club are: \$12 for regular members; \$6 for students Membership forms can be accessed at the club website [form](#).