Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 33, No. 3 ***Three-Time*** *Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016* *March 2025*

In This Issue

Messier 51, the Whirlpool Galaxy

See "Through the Eyepiece: M51, the Whirlpool Galaxy" on page 6.
Image credit: David Hockenberry, Astrophotographer & CCAS President

Membership Renewals Due

03/2025	Angelini
	DellaPenna
	Fulton
	Rainville
	Sterrett
04/2025	Dennis
	Hepler
	Kataria
	McCabe
	Miller
	Noland
	Rossomando
05/2025	Blessing
	Cunningham
	Haas
	Kagel
	Mulhall
	Nigro
	O'Hara
	Ostanek

March 2025 Dates

6th • First Quarter Moon, 11:31 a.m. EST

8th • The Moon passes 1.7° north of Mars, 7 p.m. EST.

14th • Full Moon, the Worm Moon, 2:56 a.m. EDT.

14th • Total lunar eclipse, 3 a.m. EDT.

20th • Vernal Equinox (northern spring/southern autumn begins), occurs at 5:01 a.m. EDT.

22nd • Last Quarter Moon, 7:29 a.m. EDT.

29th • New Moon, 6:57 a.m. EDT.

29th • Partial solar eclipse, 7 a.m. EDT.

30th • Venus passes 10° north of Saturn, 2 a.m. EDT.

CCAS Upcoming Nights Out

In addition to our monthly observing sessions at the Myrick Conservancy Center, BRC (for directions, see pg. 13), CCAS schedules special "nights out" throughout the year. Members are encouraged to help out during these events any way they can. See below for more information.

- ☼ Thursday, March 6, 2025 - Kennet Middle School - STEM Night. Landenberg, PA.
- ☼ Monday, March 17, 2025 - Solar Observation, 10:30 a.m. to 1:30 p.m. WCU campus near Student Center.
- ☼ Monday, March 31, 2025 - Solar Observation, 12 to 1 p.m. Middletown Free Library Homeschool.

For more information about future observing opportunities, contact our Observing Chair, Don Miller.

Winter/Spring Society Events

March 2025

6th • Kennet Middle School - STEM Night. Landenberg, PA. Event scheduled for 6:00 p.m. to 8:00 p.m. (with a 5:00 p.m. arrival for setup).

11th • CCAS Monthly Meeting, in person (as well as via Zoom) at West Chester University's Merion Science Center, Room 112. Guest Speaker: Dr. Marc Gagné, Professor & Assistant Chair, Dept. of Earth and Space Sciences, WCU, "Of Exoplanets and Cosmology: how JWST is probing exoplanet habitability and searching for the first stars and galaxies."

17th • Solar Observation, 10:30 a.m. to 1:30 p.m. WCU campus near Student Center.

20th • Open call for articles and photographs for the April 2025 edition of Observations.

26th • Deadline for newsletter submissions for the April 2025 edition of Observations.

28th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

28th • West Chester University Planetarium Show: "Eclipse Lite: A Partial Solar Eclipse," in the Schmucker Science Building. Visit WCU Public Planetarium Shows for more information and reservations.

31st • Solar Observation, 12 to 1 p.m. Middletown Free Library Homeschool.

April 2025

2nd • Introduction to Astronomy Class: Other Kids on the Block—The Planets. Room C106, Peirce Middle School, West Chester, 7 p.m. EDT.

9th • Introduction to Astronomy Class: Observing Basics, Star Charts, and Planetarium Software. Room C106, Peirce Middle School, West Chester, 7 p.m. EDT.

11th • CCAS Monthly Meeting, in person (as well as via Zoom) at West Chester University's Merion Science Center, Room 112. Featured Speaker: Dr. Roger Kennedy, CCAS member, solar astronomer, and science educator. "Bringing Solar Science to the General Public."

16th • Introduction to Astronomy Class: Observing Equipment, Binoculars, and Telescopes. Room C106, Peirce Middle School, West Chester, 7 p.m. EDT.

20th • Open call for articles and photographs for the March 2025 edition of Observations.

21st • West Chester University Planetarium Show: "Exoplanets and the Search for Life," in the Schmucker Science Building. The show starts at 7 p.m. Visit WCU Public Planetarium Shows for more information and reservations.

23rd • Introduction to Astronomy Class: Beyond Naked-Eye Observing. Room C106, Peirce Middle School, West Chester, 7 p.m. EDT.

25th - CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

26th • Deadline for newsletter submissions for the May 2025 edition of Observations.

28th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

February 2025 Meeting Minutes

by Bea Mazziotta, CCAS Secretary

- The February 2025 meeting was held on February 11, 2025. It was solely online via Zoom and YouTube due to the inclement weather.
- The meeting began at 7:00 p.m. (30 minutes earlier than usual) with the introduction of the evening's guest speaker, Gurbir Singh.
  - He is a UK-based writer whose keen interest in aviation led to a second career in space writing, public speaking, and education.
  - Gurbir Singh joined the meeting via Zoom from his home in the United Kingdom.
  - His presentation, *India in Space: Past, Present and Future*, was a journey through India's long tradition of scientific endeavor and achievement.
  - Its rich scientific past has led to India's inclusion among a handful of nations capable of designing, building, launching and operating space-based services.
- Following the presentation various board members addressed club business, including upcoming executive meetings, viewing events and CCAS scholarship updates.
- The CCAS scholarship program achieved another milestone, collecting enough donations to fund a third award. Recipients will be announced at a later date.
- Go to ccas.us for information on upcoming events and club membership.

March 2025 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on March 11, 2025, in person at West Chester University's Merion Science Center, Room 112. The Science Center is located at 720 S. Church St., West Chester, PA. Our guest speaker is Dr. Marc Gagné, Professor & Assistant Chair, Dept. of Earth and Space Sciences, West Chester University, "Of Exoplanets and Cosmology: how JWST is probing exoplanet habitability and searching for the first stars and galaxies."

Please note that inclement weather or changes in speakers' schedules may affect the program. In the event there is a change, CCAS members will be notified via e-mail with as much advance notice as possible.

As for future meetings, we are looking for presenters for beyond our 2024-2025 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

March 2025 Guest Speaker Information

by Bruce Ruggeri, CCAS Program Chair

Our in-person and Zoom monthly CCAS meeting scheduled for Tuesday, March 11, 2025, will commence at 7:30 p.m. EDT. If you are able to join us in person, our meetings are held at West Chester University's (WCU) Merion Science Center, Room 112. The Science Center is located at 720 S. Church St. in West Chester.

Our guest speaker is Dr. Marc Gagné, Professor & Assistant Chair of the Dept. of Earth and Space Sciences, West Chester University. The title of his presentation is "Of Exoplanets and Cosmology: How JWST is probing Exoplanet Habitability and Searching for the First Stars and Galaxies." A presentation synopsis and biodata immediately follow.

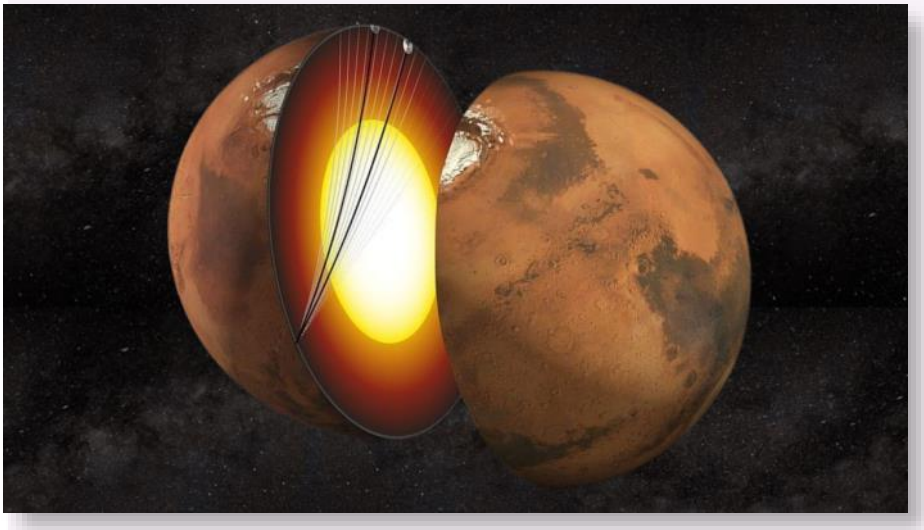
Dr. Marc Gagné

Synopsis: Join us for an update and exploration of the JWST's two prime science drivers. The Webb Space Telescope's infrared instruments are ideally suited for studying extremely high-redshift stars and galaxies, and for probing the atmospheres of exoplanets. In this presentation we'll see how the amplification due to gravitational lensing has allowed astronomers to see individual stars and supernovae in very distant galaxies, pushing back the clock on the first generation of stars and galaxies to a few hundred million years after the dawn of time, challenging our understanding of how stars and galaxies formed so soon after the Big Bang. Infrared imaging and spectroscopy have revealed the presence of many important molecules in the protoplanetary disks of young stars and in the atmospheres of few key exoplanets. These studies, along with continued monitoring with the TESS satellite, are necessary for determining the conditions for habitability outside our solar system.

(Continued on page 13)

Mars May Have a Solid Inner Core Just Like Earth

by Samantha Mathewson, courtesy Space.com



An artist's concept of seismic waves detected by NASA's InSight mission from Marsquakes traveling through the Red Planet's core (Image credit: NASA/JPL-Caltech/University of Maryland)

Scientists have identified another possible commonality between Earth and Mars: a solid inner core. New research from the University of Bayreuth and the European Synchrotron Radiation Facility (ESRF) conducted here on Earth found that an iron and sulfur mixture mirroring the Red Planet's inner core crystallized under high heat and pressure. This suggests that the deep interior of Mars could, in fact, be solid, too.

This research contradicts previous studies using Marsquake data from NASA's InSight Mars Lander, which supported the belief that the Red Planet has a liquid core. Many geoscientists also argue that Mars' molten center is too hot and consists of lighter elements like sulfur, making it less likely to solidify.

Using diamond anvil cells — a technique that uses two diamonds to squeeze material to create extreme pressures — and laser heating, the researchers subjected iron-sulfur samples to extreme conditions resembling the deep interior of Mars.

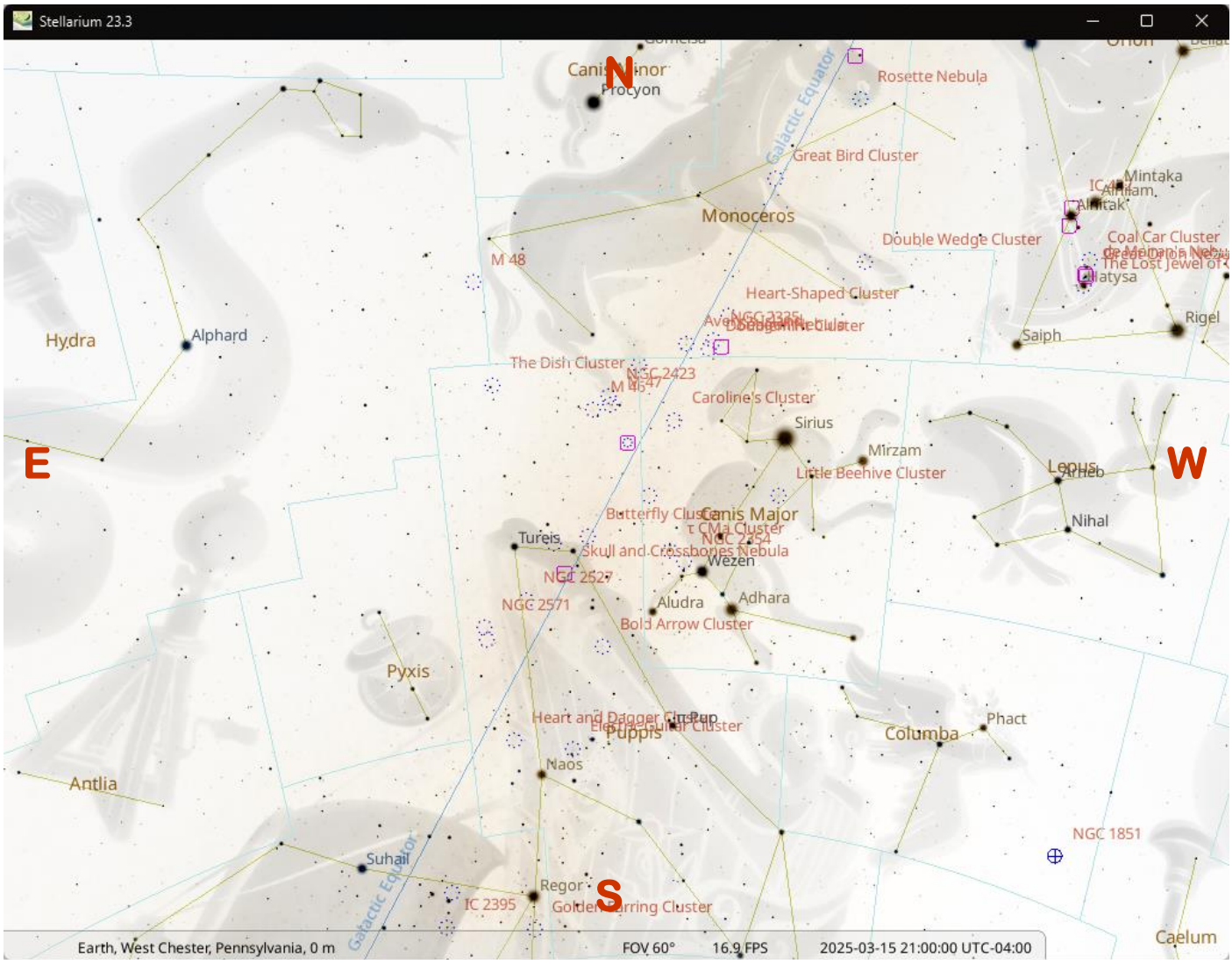
According to an ESRF statement, this, in turn, created a novel iron-sulfide crystal phase called Fe4+xS3.

(Continued on page 16)

The Sky Over Chester County

March 15, 2025 at 9:00 p.m. ET

Note: This screen capture is taken from Stellarium, the free planetarium software available for download at www.stellarium.org.

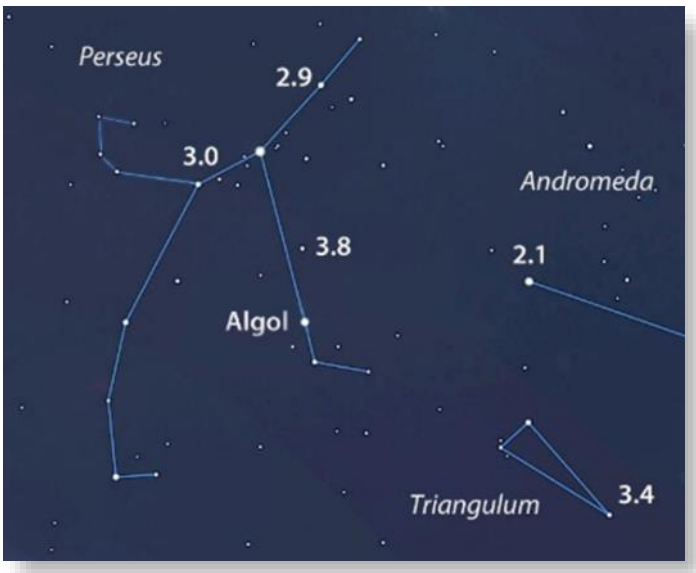


Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
03/01/2025	6:08 a.m. EST	6:35 a.m. EST	5:54 p.m. EST	6:21 p.m. EST	11h 19m 24s
03/15/2025	6:46 a.m. EDT	7:13 a.m. EDT	7:09 p.m. EDT	7:36 p.m. EDT	11h 56m 11s
03/31/2025	6:20 a.m. EDT	6:47 a.m. EDT	7:25 p.m. EDT	7:53 p.m. EDT	12h 38m 25s

Moon Phases					
First Quarter	03/06/2025	11:31 a.m. EST	Full Moon	03/14/2025	2:56 a.m. EDT
Last Quarter	03/22/2025	7:29 a.m. EDT	New Moon	03/29/2025	6:57 a.m. EDT

March 2025 Observing Highlights

by Don Miller, CCAS Observing Chair



Algol, the Demon Star, in the Constellation of Perseus

Key Events This Month:

A total lunar eclipse will occur March 13th to 14th. For our area, the eclipse will begin on March 13th at 11:57 p.m. (deep penumbral). The partial eclipse phase will begin at 1:09 a.m. on the 14th, with totality beginning at 2:26 a.m. on the 14th. The full eclipse ends at 3:31 a.m. on the 14th, with the partial phase ending at 4:48 a.m. on the 14th.

A Partial Solar Eclipse will occur on March 29th. See below.

Discussion:

The current weather forecast for our area in March is for warmer days and nights, finally (in the 60's by month's end). I know that many of you are waiting for nicer conditions to get your scopes out, me too.

Sun:

A partial solar eclipse will occur on March 29th. Greenland and Canada will enjoy the best views of this event but here in the Philly area we'll just catch the very end of it at sunrise. For us, the partial eclipse begins at 6:48 a.m. and ends at 7:03 a.m.

Moon:

1st quarter on the 6th; full on the 14th; last quarter on the 22nd and new on the 29th. The details on the total lunar eclipse on the 13th and 14th is given above. NASA has a nice web description of the eclipse: https://science.nasa.gov/solar-system/moon/what-you-need-to-know-about-the-march-2025-total-lunar-eclipse/ .

The Planets:

Mercury will have its greatest elongation on the 8th (18 °) and will be above the western horizon for more than an hour in the early evening.

Venus will reach solar inferior conjunction on March 22nd but there will be two conjunctions of this planet with the moon this month; the first on the 1st and the second on the 27th.

Mars continues to fade this month as we're now 2 months past opposition, but it's still prominent in the constellation of Gemini.

Jupiter will be prominent in the constellation Taurus this month.

Saturn will be lost this month in the Sun's glare. We will reach the "ring plane crossing" point on the 23rd when the rings appear to disappear. The rings will be presenting themselves almost edge on and given their thinness (there are conflicting data on the thickness of the rings but NASA states that they are less than 300 ft thick).

Uranus will be a nice visible night sky object this month, also in the constellation Taurus.

Neptune will also be lost this month in the Sun's glare.

Select Night Sky Objects and Events:

The triple star Algol in Perseus is at minimum on the 3rd, 6th, 9th, 12th, 15th, 17th, 20th, 23rd, 26th, and 29th.

NGC 869 – The famous double cluster in Perseus is always a beautiful sight in binoculars or a low-power, wide-field view in a telescope. It's always above the horizon for our location so enjoy the view.

M34 – A nice open cluster which is also in Perseus and easily seen in binoculars or a wide-field view in a telescope (it's larger than the full moon).

The Pinwheel Cluster (M36) – Continuing our open cluster tour, this is a concentrated grouping of about 60 stars. Messier also included two other clusters in this constellation.

Through the Eyepiece: Messier 51, the Whirlpool Galaxy

by Don Knabb, CCAS Treasurer & ALCOR

During springtime the handle of the Big Dipper is high in the sky and one of the few galaxies whose spiral structure can be glimpsed in a backyard telescope is also in good viewing position. M51, the Whirlpool Galaxy, can be seen about halfway up the eastern sky late in the evening. As seen in the sky map below, M51 is under Alkaid, the star at the end of the handle of the Big Dipper, the asterism that makes up part of the constellation Ursa Major.

To visually see the spiral structure of M51 you need a fairly large telescope, preferably 8 inches or larger. But one of the new automated telescopes such as the Seestar or Dwarf will yield a photo such as on the opposite page, which is what you might see in the eyepiece of a large telescope:

However, the true magnificence of M51 only shows up in long exposure photographs such as the one taken by CCAS President Dave Hockenberry appearing on the cover of this month's newsletter.

No, you won't see anything that looks remotely like the photograph on the cover, but knowing that the photons being perceived by your eye left the Whirlpool Galaxy 27 million years ago makes whatever you see amazing.

Wait for a night when the Moon is not visible in the sky or is just a sliver setting in the west. Try different eyepieces until you find the best image. Averted vision is a good tool in our Chester County skies to help you pick out these faint and fuzzy objects since light pollution will make this dim object fade quite a bit. Take your time

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Image credit: Sky map generated with Stellarium, the free planetarium program

Through the Eyepiece (Cont'd)

M51 taken with a Seestar telescope. Image credit: Don Knabb

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and give your eyes the chance to adjust to the dark skies.

The Whirlpool Galaxy was discovered by Charles Messier in 1773 when observing a comet, and described it as a "very faint nebula, without stars". Its companion galaxy, NGC 5195, was discovered in 1781 by Pierre Méchain.

However, it was not until 1845 that the Whirlpool became the first galaxy to be recognized as a spiral. This was achieved by Lord Rosse employing a 72-inch reflecting telescope which he constructed at Birr Castle, Ireland. This telescope was called the Leviathan of Parsonstown, which was the largest telescope in the world from 1845 until the construction of the 100-inch Hooker Telescope in California in 1917

Most astronomers feel that the pronounced spiral structure is a result of M51's current encounter with its neighbor, NGC 5195. Due to this interaction, the gas in the galaxy was disturbed and compressed in some regions, resulting in the formation of new young stars.

Information credits:

- Dickinson, Terence 2006. *Nightwatch: a practical guide to viewing the universe*. Buffalo, NY. Firefly Books
- Hewitt-White, Ken. *Night Sky Magazine*, The Whirlpool Galaxy
- http://www.seds.org/messier/m/m051.html
- http://en.wikipedia.org/wiki/Messier_51

Night Sky Notes: Messier Madness

by Kat Troche

This article is distributed by the NASA Night Sky Network, a coalition of hundreds of astronomy clubs across the US dedicated to astronomy outreach.

Visit nightsky.jpl.NASA.gov to find local clubs, events, stargazing info and more.

March is the start of spring in the Northern Hemisphere; with that, the hunt for Messier objects can begin!

What Are Messier Objects? During the 18th century, astronomer and comet hunter Charles Messier wanted to distinguish the 'faint fuzzies' he observed from any potential new comets. As a result, Messier cataloged 110 objects in the night sky,

ranging from star clusters to galaxies to nebulae. These items are designated by the letter 'M' and a number. For example, the Orion Nebula is Messier 42 or **M42**, and the Pleiades are Messier 45 or **M45**. These are among the brightest 'faint fuzzies' we can see with modest backyard telescopes and some even with our eyes.

Stargazers can catalog these items on evenings closest to the new moon. Some even go as far as having "Messier Marathons," setting up their telescopes and binoculars in the darkest skies available to them, from sundown to sunrise, to catch as many as

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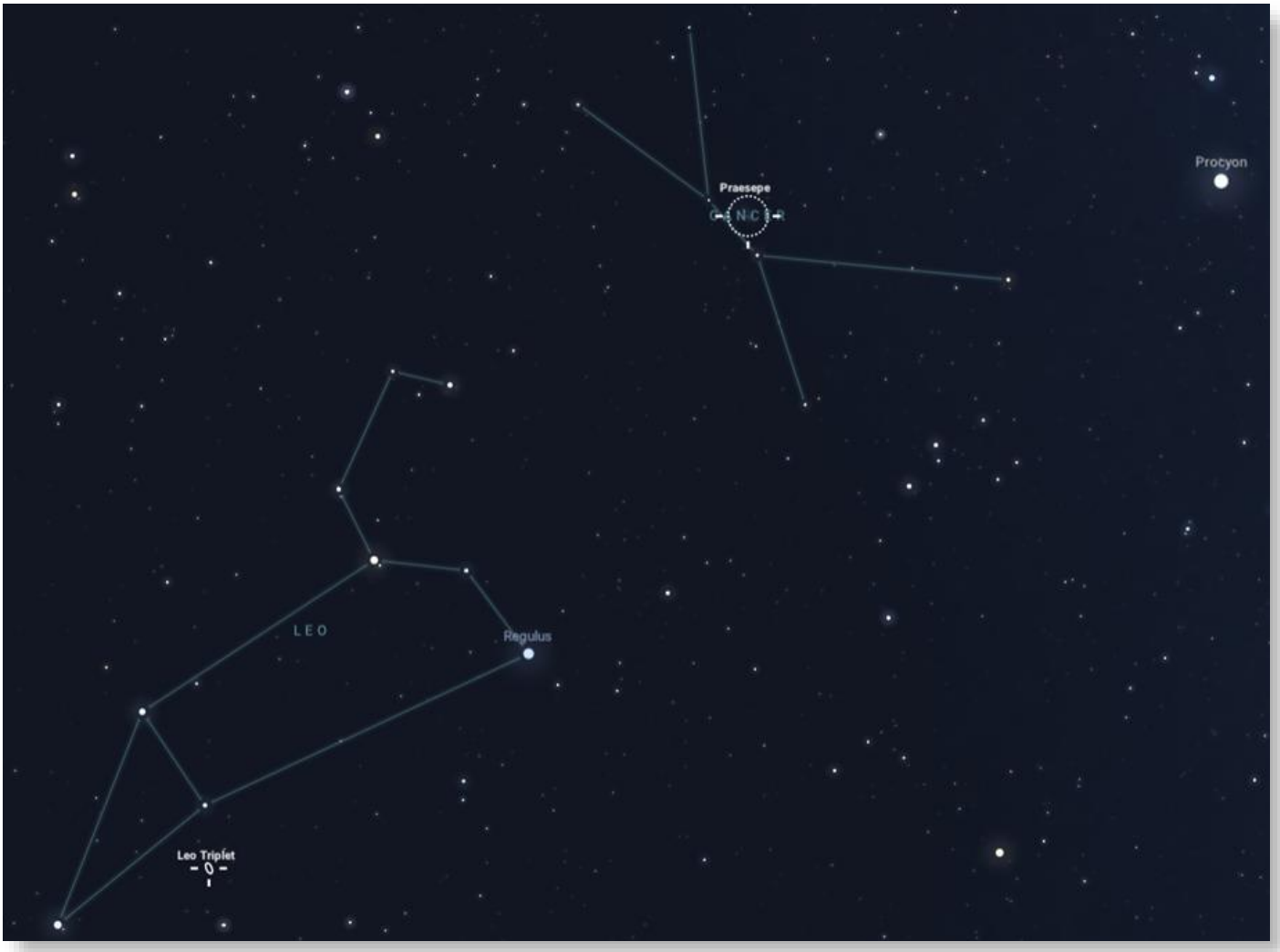

M44 in Cancer and M65 and 66 in Leo can be seen high in the evening sky 60 minutes after sunset. Credit: Stellarium Web

Night Sky Notes (Cont'd)

Locate M3 and M87 rising in the east after midnight. Credit: Stellarium Web

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possible. Here are some items to look for this season:

Messier 44 **in Cancer:** The Beehive Cluster, also known as Praesepe, is an open star cluster in the heart of the Cancer constellation. Use Pollux in Gemini and Regulus in Leo as guide stars. A pair of binoculars is enough to view this and other open star clusters. If you have a telescope handy, pay a visit two of the three galaxies that form the Leo Triplet - **M65** and **M66**. These items can be seen one hour after sunset in dark skies.

Messier 3 **Canes Venatici:** M3 is a globular cluster of 500,000 stars. Through a telescope, this object looks like a fuzzy sparkly ball. You can resolve this cluster in an 8-inch telescope in moderate dark skies. You can find this star cluster by using the star Arcturus in the Boötes constellation as a guide.

Messier 87 **in Virgo:** Located just outside of Markarian's Chain, M87 is an elliptical galaxy that can be spotted during the late evening hours. While it is not possible to view the supermassive black hole at the core of this galaxy, you can see M87 and several other Messier-labeled galaxies in the Virgo Cluster using a medium-sized telescope.

Messier 76 **in Perseus:** For a challenge, spot the Little Dumbbell Nebula, a planetary nebula between the Perseus and Cassiopeia constellations. With an apparent magnitude of 12.0, you will need a large telescope and dark skies. You can find both M76 and the famous Andromeda Galaxy (M31) one hour after sunset, but only for a limited time, as these objects disappear after April. They will reappear in the late-night sky by September.

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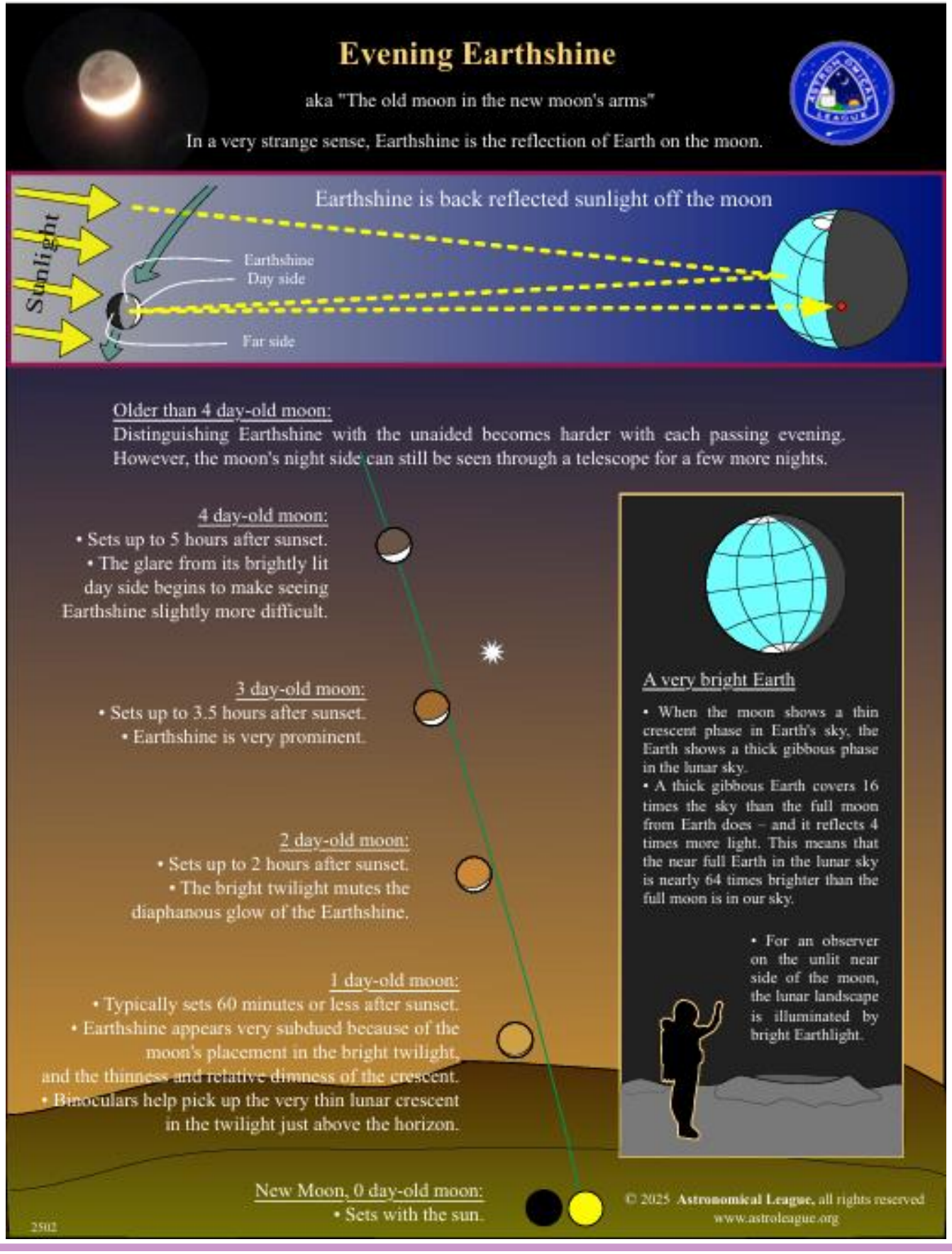
Evening Earthshine
courtesy of Astronomical League



Night Sky Notes (Cont'd)

Locate M76 and M31 setting in the west, 60 minutes after sunset. Credit: Stellarium Web

(Continued from page 9)

It is important to plan ahead. When gearing up for a long stargazing session, there are several things to remember, such as equipment, location, and provisions:

- **Do you have enough layers to be outdoors for several hours?** You would be surprised how cold it can get when sitting or standing still behind a telescope!
- **Are your batteries fully charged?** If your telescope runs on power, be sure to charge everything before you leave home and pack any additional batteries for your cell phone. Most people use their mobile devices for astronomy apps, so their batteries may deplete faster. Cold weather can also impact battery life.
- Determine the **apparent magnitude** of what you are trying to see and the **limiting magnitude** of your night sky. You can learn more about apparent and limiting magnitudes with our Check Your Sky Quality

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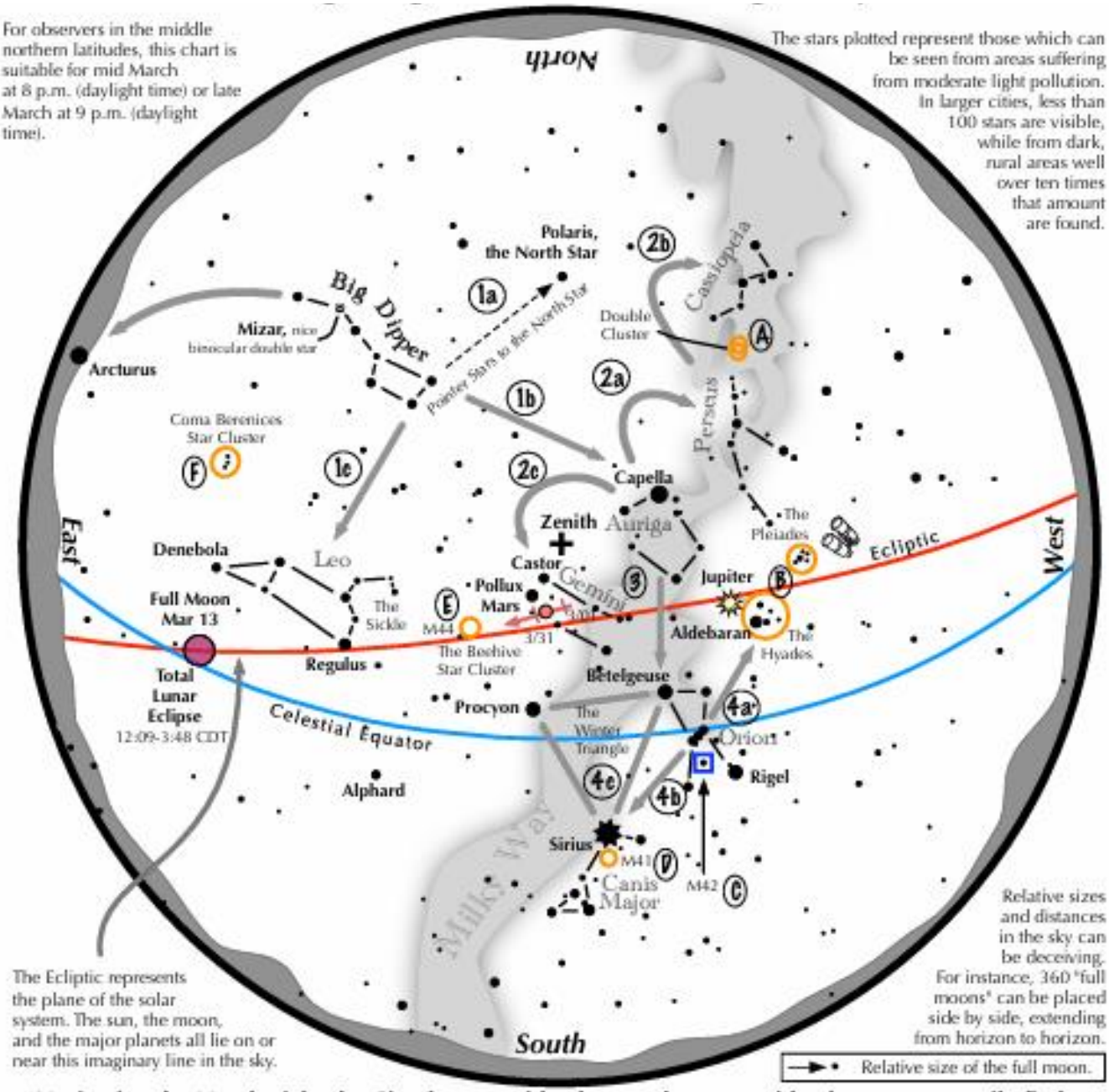
Navigating the Mid-March 2025 Night Sky

courtesy of the Astronomical League



Navigating the March 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. Its top bowl stars point west to Capella in Auriga, nearly overhead. Leo reclines below the Dipper's bowl.
2. From Capella jump northwestward along the Milky Way 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. It is a member of the Winter Triangle.

Binocular Highlights

A: Between the "W" of Cassiopeia and Perseus lies the Double Cluster. **B:** Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **C:** M42 in Orion is a star forming nebula. **D:** Look south of Sirius for the star cluster M41. **E:** M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux. **F:** Look high in the east for the loose star cluster of Coma Berenices.

Speaker Bio (Cont'd)

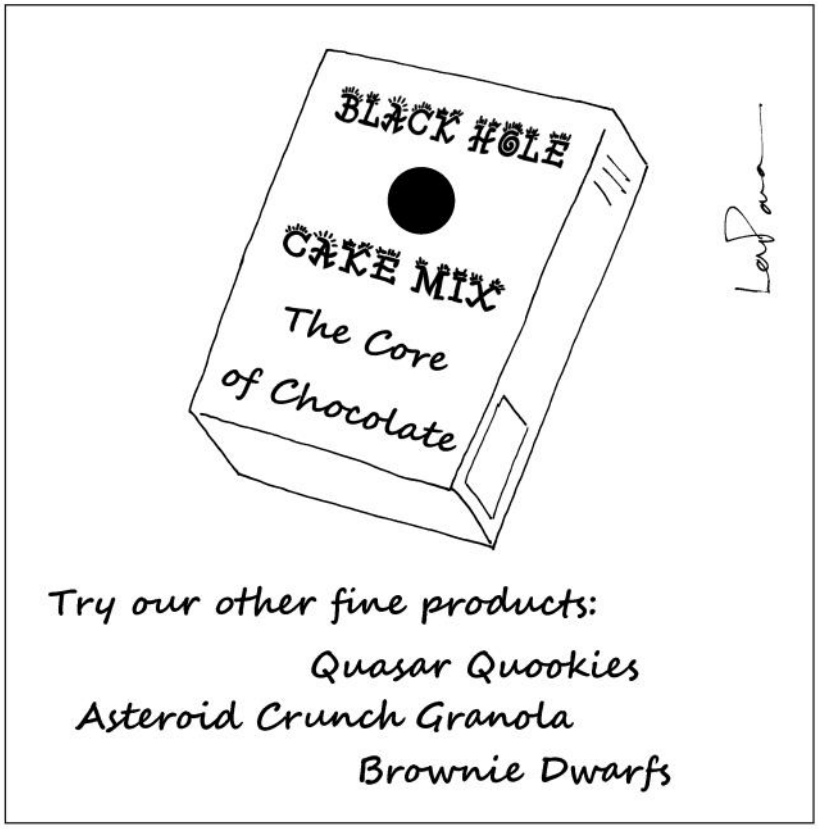
(Continued from page 3)

Bio sketch: Marc Gagné is a professor of astronomy in the Department of Earth and Space Sciences at West Chester University. He earned his B.S. in Physics from the University of Montréal, his Ph.D. in Physics from the University Georgia, and held research and teaching appointments at Villanova University, Rutgers, and the University of Colorado prior to coming to West Chester University in 1999.

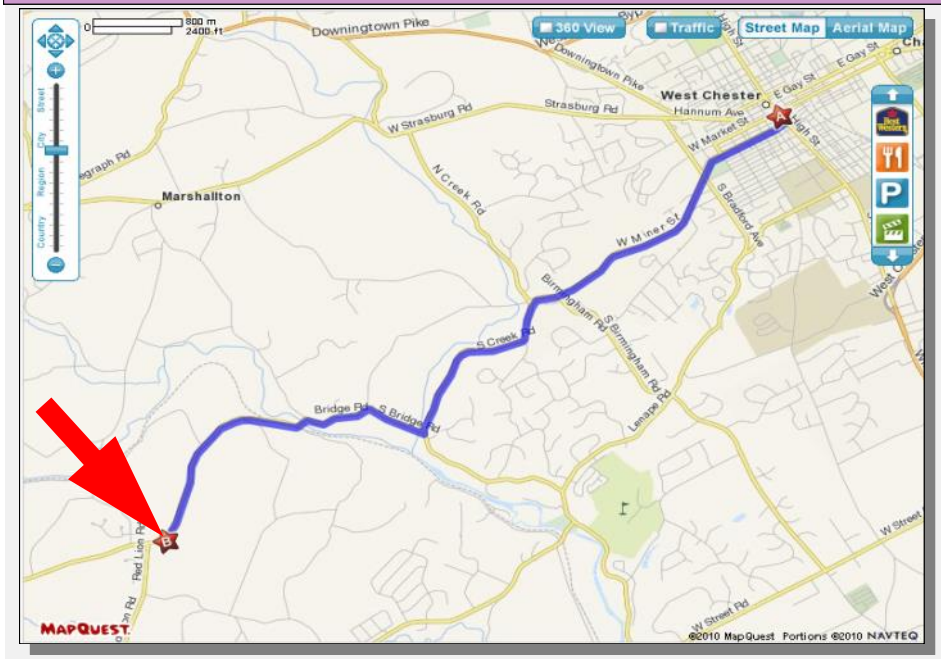
His research is in the area of massive stars, magnetic stars, star formation, X-ray astronomy, high-performance computing and Martian geology. He has become the expert for CCAS on all things related to the JWST mission and its new discoveries and revelations changing our understanding of the universe.

Classic La Para

by Nicholas La Para



CCAS Directions



Brandywine Red Clay Alliance
1760 Unionville Wawaset Rd
West Chester, PA 19382
(610) 793-1090
http://brandywinewatershed.org/

BRC was founded in 1945 and is committed to promoting and protecting the natural resources of the Brandywine Valley through educational programs and demonstrations for all ages.

Brandywine Red Clay Alliance

The monthly observing sessions (held February through November) are held at the Myrick Conservation Center of the Brandywine Red Clay Alliance.

To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BRC property, turn left off Route 842 into the parking lot by the office: look for the signs to the office along Route 842. From that parking lot, go left through the gate and drive up the farm lane about 800 feet to the top of the hill. The observing area is on the right.

If you arrive after dark, *please turn off your headlights and just use parking lights* as you come up the hill (so you don't ruin other observers' night vision).

Odd X-ray Signal Was "Death Knell" of Planet Destroyed by Zombie Star

by Robert Lea, courtesy Space.com

Using NASA's Chandra observatory and Europe's XMM-Newton spacecraft, astronomers may have solved a 45-year-old cold case. The team of cosmic homicide detectives determined a strange X-ray signal is the dying scream of a planet destroyed by a superdense stellar corpse called a white dwarf.

The signal, which originates from the heart of the Helix Nebula, was first detected by X-ray telescopes in 1980. This planetary nebula is the remains of a star similar to the sun, which shed most of its mass at the end of its life, with its core becoming a smoldering white dwarf shrouded by this ex-stellar material. The signal was a puzzle, because white dwarfs like the one at the heart of the Helix Nebula, designated WD 2226-210, don't normally give off strong X-ray signals.

"We think this X-ray signal could be from planetary debris pulled onto the white dwarf, as the death knell from a planet that was destroyed by the white dwarf in the Helix Nebula," team leader Sandino Estrada-Dorado of the National Autonomous University of Mexico said in a statement. "We might have finally found the cause of a mystery that's lasted over 40 years."

Even before this research, there may have been a witness to the planetary homicide committed by the white dwarf WD 2226 -210. Astronomers had already suspected that a orbits the destructive dead star so closely that its year lasts just three Earth days.

This new research suggests that this planet once had a Jupiter-sized sibling that orbited even closer to the white dwarf. This doomed planet may have

(Continued on page 15)

An image of the Helix Nebula, the wreckage of a star surrounding a white dwarf core. (Image credit: X-ray: NASA/CXC/SAO/Univ Mexico/S. Estrada-Dorado et al.; Ultraviolet: NASA/JPL; Optical: NASA/ESA/STScI (M. Meixner)/NRAO (T.A. Rector); Infrared: ESO/VISTA/J. Emerson; Image Processing: NASA/CXC/SAO/K. Arcand;)

Death Knell (Cont'd)

An illustration of NASA's Chandra X-ray Observatory, one of the cosmic detectives that cracked the case of a planetary homicide. (Image credit: NASA/CXC)

(Continued from page 14)

begun life much further away from WD 2226-210, gradually migrating inward toward the dead star as a result of gravitational interactions with other planets in this system. Once this migrating world was close enough to the white dwarf, the immense gravity of the dead star would have ripped it apart.

"The mysterious signal we've been seeing could be caused by the debris from the shattered planet falling onto the white dwarf's surface and being heated to glow in X-rays," said study team member Martin Guerrero, a researcher at the Institute of Astrophysics of Andalusia, Spain. "If confirmed, this would be the first case of a planet seen to be destroyed by the central star in a planetary nebula."

Using data collected by ROSAT (the ROentgen SATellite), Chandra and XMM-Newton, the team discovered that the X-say signal first spotted in 1980 from the Helix Nebula remained approximately constant in brightness between 1992, 1999 and 2002.

However, what the scientists also discovered was a subtle and regular change in the X-ray signal around every three hours. This served as the "smoking gun" evidence of the wreckage of a planet extremely close to WD 2226-210. The team then eliminated the possibility that the X-ray signal may have originated from a small companion star destroyed by the white dwarf rather than a planet.

They reasoned that, while a small star could be around the size of Jupiter, it would have a great deal more mass, which would have enabled it to resist complete destruction by the white dwarf.

The X-ray signal from WD 2226-210 is similar to the X-ray emissions of two other white dwarfs that do not sit within cocoons of shed stellar material, known as planetary nebulae (a misleading name, as these nebulae don't usually involve planets).

One of these white dwarfs is thought to be stripping material from a planetary companion, destroying it albeit in a slower fashion than WD 2226-210 did its planetary meal. This means this planet hasn't yet been completely destroyed. The other white dwarf with a similar X-ray profile to WD 2226-210 appears to be feasting on the remains of an already obliterated planet.

Thus, these three white dwarfs feeding on planets could represent a new class of changing or "variable" stars.

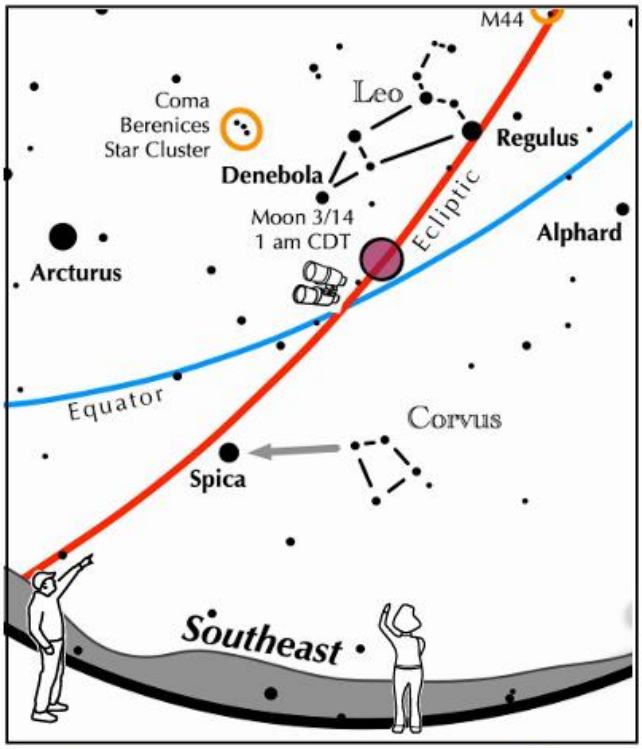
"It's important to find more of these systems, because they can teach us about the survival or destruction of planets around stars like the sun as they enter old age," team member and University of Mexico researcher Jesús Toala said.

The team's research is published as a pre-peer reviewed paper on the research repository site arXiv.

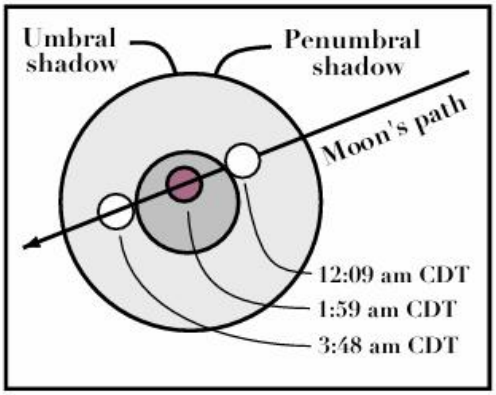
Total Lunar Eclipse March 2025

courtesy of the Astronomical League

If you can observe only one celestial event in the evening this March, see this one.



View to the southeast on March 14 at 1 am CDT



The Moon slides through a total eclipse

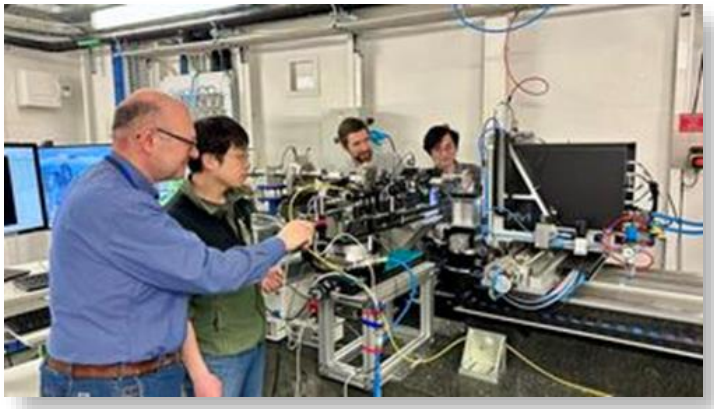
In the hours just after midnight on March 14, the brilliant full moon slides into Earth's shadow.

- Even though the partial umbral eclipse begins at 12:09 am CDT, darkening might not be noticed for another 5 minutes.
- When totality is reached, the full moon's brilliance is gone, allowing the stars to appear. Can you see that the moon lies mid-way between Regulus to the upper right and Spica to the lower left?
- At mid eclipse, what color is the moon? How red is it?
- During the partial phases, can you notice that the shadow's edge is not straight, but curved?

Molten Core (Cont'd)

(Continued from page 3)

Subsequent experiments showed that the iron-sulfide could crystallize from liquid even when subjected to lower temperatures within the estimated range of Mars's core. Therefore, if Mars' deep interior were on the cooler side, then a solid core seems perfectly feasible, the researchers said in the statement.



The research team experimenting with iron-sulfide at ESRF. (Image credit: ESRF)

Mars and Earth share many similarities, including geographic features like polar ice caps, volcanoes, and canyons. Similarities between Earth and Mars also include a roughly 24-hour day, an axial tilt that creates distinct seasons, weather patterns, and a rocky composition.

Having a solid core would be yet another characteristic that makes Mars one of the most Earth-like planets in our solar system. While Mars is believed to have once been home to flowing rivers and lakes billions of years ago — much like Earth — the planet has become a cold, dry desert today. Studying Mars' internal structure is key to better understanding this evolution; however, further research is required to determine if the Red Planet's core is solid or not.

The findings were published Feb. 25 in the journal Nature Communications.

[Editor's Note: Read the original article online.]

Runaway Stars Reveal Hidden Black Hole in Milky Way's Nearest Neighbor

by Harvard-Smithsonian Center for Astrophysics

Artist's impression of a hypervelocity star ejected from the Large Magellanic Cloud (shown on right). When a binary star system ventures too close to a supermassive black hole, the intense gravitational forces tear the pair apart. One star is captured into a tight orbit around the black hole, while the other is flung outward at extreme velocities—often exceeding millions of miles per hour—becoming a hypervelocity star. The inset illustration depicts this process: the original binary's orbital path is shown as interwoven lines, with one star being captured by the black hole (near center of inset) while the other is ejected into space (lower right). Credit: CfA/Melissa Weiss

Astronomers have discovered strong evidence for the closest supermassive black hole outside of the Milky Way galaxy. This giant black hole is located in the Large Magellanic Cloud, one of the nearest galactic neighbors to our own.

To make this discovery, researchers traced the paths with ultra-fine precision of 21 stars on the outskirts of the Milky Way. These stars are traveling so fast that they will escape the gravitational clutches of the Milky Way or any nearby galaxy. Astronomers refer to these as "hypervelocity" stars.

Similar to how forensic experts recreate the origin of a bullet based on its trajectory, researchers determined where these hypervelocity stars come from. They found that about half are linked to the supermassive black hole at the center of the Milky Way. However, the other half originated from somewhere else: a previously-unknown giant black hole in the Large Magellanic Cloud (LMC).

"It is astounding to realize that we have another supermassive black hole just down the block, cosmically speaking," said Jesse Han of the Center for Astrophysics | Harvard & Smithsonian (CfA), who led the new study. "Black holes are so stealthy that this one has been practically under our noses this whole time."

The researchers found this secretive black hole by using data from the European Space Agency's Gaia mission, a satellite that has tracked more than a billion stars throughout the Milky Way with unprecedented accuracy. They also used an improved understanding of the LMC's orbit around the Milky Way recently obtained by other researchers.

"We knew that these hypervelocity stars had existed for a while, but Gaia has given us the data we need to figure out where they actually come from," said co-author Kareem El-Badry of Caltech in Pasadena, California. "By combining these data with our new theoretical models for how these stars travel, we made this remarkable discovery."

Hypervelocity stars are created when a double-star system ventures too close to a supermassive black hole. The intense gravitational pull from the black hole rips the two stars apart, capturing one star into a close orbit around it. Meanwhile, the other orphaned star is jettisoned away at speeds exceeding several million miles per hour—and a hypervelocity star is born.

A significant piece of the team's research was a prediction by their theoretical model that a supermassive black hole in the LMC would create a cluster of hypervelocity stars in one corner of the Milky Way because of how the LMC moves around the Milky Way. The stars ejected along the direction of the LMC's motion should receive an extra boost in speed. Indeed, their data revealed the existence of such a cluster.

The team found that the properties of the hypervelocity stars cannot be explained by other mechanisms, such as stars being ejected when their companions undergo a supernova explosion, or stars being ejected by a mechanism like that described above for a double star system, but without a supermassive black hole being involved.

"The only explanation we can come up with for this data is the existence of a monster black hole in our galaxy next door," said co-author Scott Lucchini, also of CfA. "So in our cosmic neighborhood it's not just the Milky Way's supermassive black hole evicting stars from its galaxy."

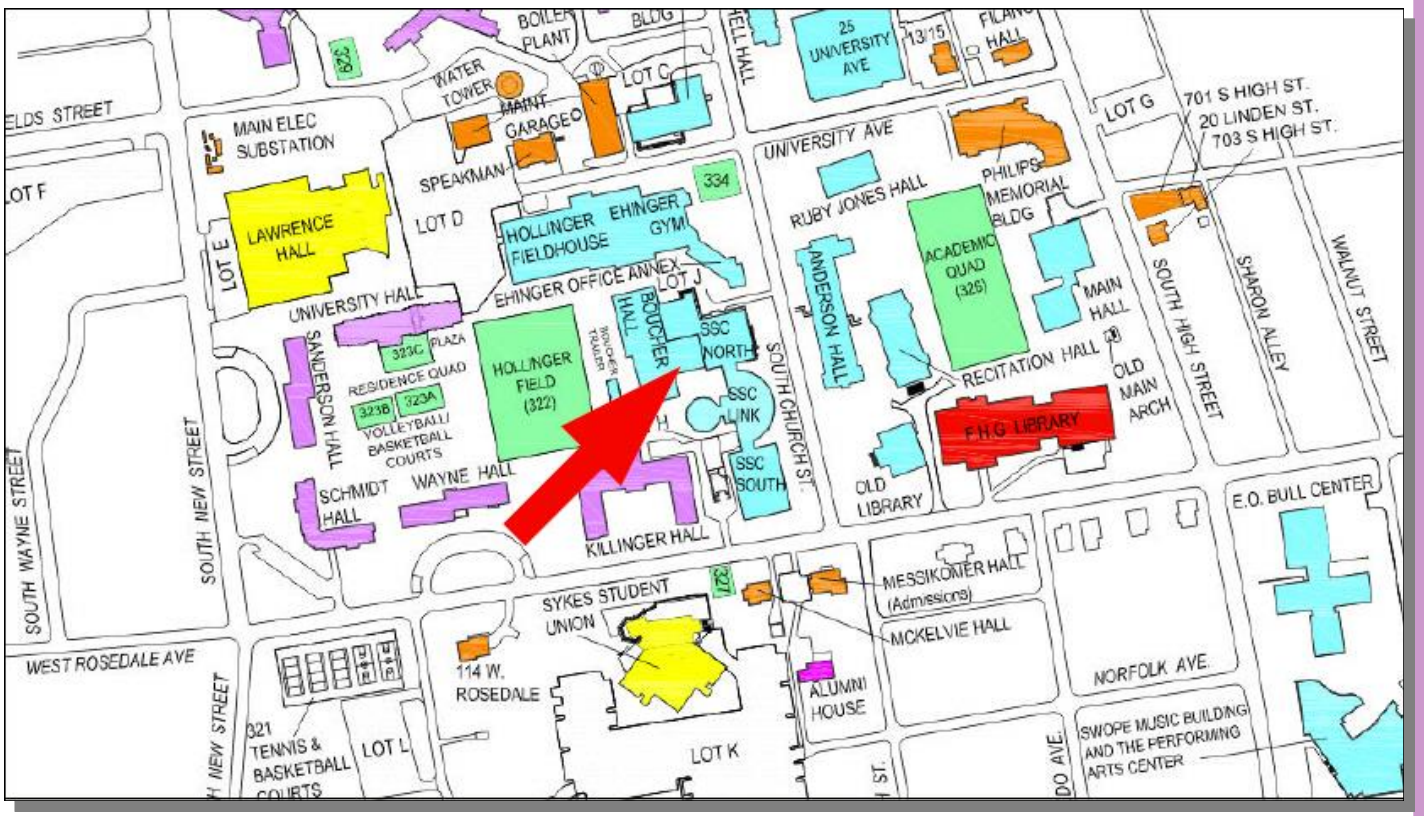
Using the speeds of the stars and the relative number of ones ejected by the LMC and Milky Way supermassive black holes, the team determined that the mass of the LMC black hole is about 600,000 times the mass of the sun. For comparison, the supermassive black hole in the Milky Way has about 4 million solar masses. Elsewhere in the universe, there are supermassive black holes with billions of times more mass than the sun.

A paper describing these results has been accepted for publication in *The Astrophysical Journal*. A preliminary version appears on the *arXiv* preprint server.

CCAS Directions

West Chester University Campus

The monthly meetings (September through May) are held in Room 112 in Merion Science Center (formerly the Boucher Building), attached to the Schmucker Science Center. The Schmucker Science Center is located at the corner of S. Church St & W. Rosedale Ave. Parking is generally available across Rosedale in the Sykes Student Union parking lot (Lot K).



Night Sky Notes (Cont'd)

(Continued from page 11)

with Orion article.

- When choosing a location to observe from, select an area you are familiar with and bring some friends! You can also connect with your local astronomy club to see if they are hosting any Messier Marathons. It's always great to share the stars!

You can see all 110 items and their locations with NASA's Explore the Night Sky interactive map and the Hubble Messier Catalog, objects that have been imaged by the Hubble Space Telescope.

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

Feb. 2025 Financial Summary

Beginning Balance	$2138
Deposits	$60
Disbursements	-$0
Ending Balance	$2198

New Member Welcome!

Welcome to new CCAS members Ishku Varada from Chester Springs, PA, and WCU student Stephanie Hire.

We're glad you decided to join us under the stars! Clear skies to you!

Membership Renewals

You can renew your CCAS membership by writing a check payable to "Chester County Astronomical Society" and sending it to our Treasurer:

Don Knabb
988 Meadowview Lane
West Chester PA 19382

The current dues amounts are listed in the *CCAS Information Directory*. Consult the table of contents for the directory's page number in this month's edition of the newsletter.

CCAS Information Directory

Join the Fight for Dark Skies!

You can help fight light pollution, conserve energy, and save the night sky for everyone to use and enjoy. Join the nonprofit International Dark-Sky Association (IDA) today. Individual memberships start at $35.00 for one year. Send to:

International Dark-Sky Association
5049 E Broadway Blvd, #105
Tucson, AZ 85711

Phone: **520-293-3198**
Fax: **520-293-3192**
E-mail: **ida@darksky.org**

For more information, including links to helpful information sheets, visit the IDA web site at:

http://www.darksky.org

Dark-Sky Website for PA

The Pennsylvania Outdoor Lighting Council has lots of good information on safe, efficient outdoor security lights at their web site:

http://www.POLCouncil.org

Find out about Lyme Disease!

Anyone who spends much time outdoors, whether you're stargazing, or gardening, or whatever, needs to know about Lyme Disease and how to prevent it. You can learn about it at:

http://www.lymebasics.org

Take the time to learn about this health threat and how to protect yourself and your family. It is truly "time well spent"!

Good Outdoor Lighting Websites

One of the biggest problems we face in trying to reduce light pollution from poorly designed light fixtures is easy access to good ones. When you convince someone, a neighbor or even yourself, to replace bad fixtures, where do you go for good lighting fixtures? Check out these sites and pass this information on to others. Help reclaim the stars! And save energy at the same time!

Light pollution from poor quality outdoor lighting wastes billions of dollars and vast quantities of valuable natural resources annually. It also robs us of our heritage of star-filled skies. Starry Night Lights is committed to fighting light pollution. The company offers the widest selection of ordinance compliant, night sky friendly and neighbor friendly outdoor lighting for your home or business. Starry Night Lights is located in Phoenix, Arizona.

Phone: **520-280-3846**

http://www.starrynightlights.com

★ ★ ★ ★ ★

LIGHTHOUSE
OUTDOOR LIGHTING

Lighthouse Outdoor Lighting is a dedicated lifetime corporate member of the International Dark-Sky Association. Lighthouse's products are designed to reduce or eliminate the negative effects outdoor lighting can have while still providing the light you need at night.

211 North Walnut St.
1st Floor
West Chester, PA 19380

Phone: **484-291-1084** or **800-737-4068**

https://www.lighthouse-lights.com/landscape-lighting-design/pa-west-chester/

Local Astronomy-Related Stores

Listing retail sites in this newsletter does not imply endorsement of any kind by our organization. This information is provided only as a service to our members and the general public.

HIGH POINT SCIENTIFIC

High Point Scientific is a retailer of telescopes, binoculars, eyepieces and telescope accessories from Meade, Celestron, Televue, Orion, StellarMate, Takahashi, and many more. They also have an extensive blog of advice and education for amateur astronomers.

High Point Scientific
442 Route 206
Montague NJ, 07827

Phone: **800-266-9590**

https://www.highpointscientific.com/

★ ★ ★ ★ ★

Spectrum Scientifics
Quality Science Products for All Ages

Located in Manayunk, Spectrum Scientifics educates and entertains customers with an array of telescopes, microscopes, binoculars, science toys, magnets, labware, scales, science instruments, chemistry sets, and much more.

4403 Main Street
Philadelphia, PA 19127

Phone: **267-297-0423**
Fax: **215-965-1524**

Hours:
Monday thru Friday: 9AM to 5PM

http://www.spectrum-scientifics.com

CCAS Information Directory

CCAS Lending Telescopes

Contact Don Knabb to make arrangements to borrow one of the Society's lending telescopes. CCAS members can borrow a lending telescope for a month at a time; longer if no one else wants to borrow it after you. Don's phone number is 610-436-5702.

Contributing to *Observations*

Contributions of articles and images relating to astronomy and space exploration are always welcome. If you have a computer, and an Internet connection, you can attach the file to an e-mail message and send it to: **newsletter@ccas.us** to:

Dr. John C. Hepler
21 Medinah Drive
Reading, PA 19607

The deadline for submissions to the monthly newsletter is the 26th of each month. Articles and images should be original or the author/artist must be given credit. Articles should be in MS Word format with 12 point Times New Roman Font with single row spacing and one-inch margins on all four sides. Images should be in JPG or PNG file format. The submission window opens on the 20th of each month.

CCAS Newsletters via E-mail

You can receive the monthly newsletter (in full color!) via e-mail. All you need is a PC or Mac with an Internet e-mail connection. To get more information about how this works, send an e-mail request to Dr. John Hepler, the newsletter editor, at: **newsletter@ccas.us**.

CCAS Website

Dr. John Hepler is the Society's Webmaster. You can check out our Website at:

http://www.ccas.us

Dr. Hepler welcomes any additions to the site by Society members. The contributions can be of any astronomy subject or object, or can be related to space exploration. The only requirement is that it is your own work—no copyrighted material! Give your contributions to Dr. Hepler at (484) 883-5033 or e-mail to webmaster@ccas.us

CCAS Purpose

The Chester County Astronomical Society was formed in September 1993, with the cooperation of West Chester University, as a non-profit organization dedicated to the education and enjoyment of astronomy for the general public. The Society holds meetings (with speakers) and observing sessions once a month. Anyone who is interested in astronomy or would like to learn about astronomy is welcome to attend meetings and become a member of the Society. The Society also provides telescopes and expertise for "nights out" for school, scout, and other civic groups.

CCAS Executive Committee

For further information on membership or society activities you may call:

President:	Dave Hockenberry 610-558-4248
Vice President:	Pete Kellerman 610-873-0162
ALCor & Treasurer:	Don Knabb 610-436-5702
Observing:	Don Miller 610-247-8712
Secretary:	Beatrice Mazziotta 610-933-2128
Program:	Bruce Ruggeri 610-256-4929
Education:	Don Knabb 610-436-5702
	Dennis O'Leary 610-701-8042
Webmaster & Newsletter:	John Hepler 484-883-0533
Public Relations:	Ann Miller 610-558-4248

CCAS Membership Information

The 2023 membership rates are as follows:

REGULAR MEMBER……$30/year
SENIOR MEMBER…….$15/year
STUDENT MEMBER……..$ 5/year
JUNIOR MEMBER……..$ 5/year
FAMILY MEMBER…….$40/year

Membership Renewals

Check the Membership Renewals on the front of each issue of *Observations* to see if it is time to renew. If you need to renew, you can mail your check, made out to "Chester County Astronomical Society," to:

Don Knabb
988 Meadowview Lane
West Chester PA 19382-2178

Phone: **610-436-5702**
e-mail: **treasurer@ccas.us**

*Sky & Tel*escope Magazine

The club membership subscription cost for *Sky and Telescope* magazine has increased to **$45.75**. This is still a good saving from the regular rate of **$57.75**.

There is no need to go through the CCAS treasurer for subscriptions or renewals. Just go to the Sky and Telescope website and select "Magazine", then under the FAQs you can subscribe at the club rate.

https://skyandtelescope.org/subscribe/

If you have **any** questions call Don Knabb at 610-436-5702.

Astronomy Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **$34.00** which is much less than the individual subscription price of **$42.95** (or $60.00 for two years).

There is no need to go through the CCAS treasurer for subscriptions or renewals. Just call customer service at 877-246-4835 and request the club rate for your new subscription or renewal.