



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 32, No. 2 **Three-Time Winner of the Astronomical League's Mabel Sterns Award** ☼ 2006, 2009 & 2016 February 2024

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CCAS Member Original Astrophotography



CCAS member Mayukh Das captured this image with a Canon DSLR camera.

Membership Renewals Due

02/2024	Buki Ruggeri Sutton Tronel
03/2024	Angelini DellaPenna Fulton Han Rainville Sterrett Zibinski
04/2024	Erickson Hepler Kataria McCabe Miles Richey Richter Rossomando Sah

February 2024 Dates

- 2nd • Last Quarter Moon, 6:18 P.M. EST.
- 8th • The Moon passes 4° south of Mars, 2 a.m. EST.
- 9th • Super New Moon, 5:59 P.M. EST.
- 10th • The Moon passes 1.8° south of Saturn, 8 p.m. EST.
- 15th • The Moon passes 3° north of Jupiter, 3 a.m. EST.
- 15th • The Moon passes 3° north of Uranus, 9 p.m. EST.
- 16th • First Quarter Moon, 10:01 A.M. EST.
- 24th • Micro Full Moon, (7:30 P.M. EST).
- 28th • Mercury is in superior conjunction, 4 a.m. EST.



CCAS Upcoming Nights Out

In addition to our monthly observing sessions at the Myrick Conservancy Center, BRC (see pg. 9), CCAS has several special "nights out" scheduled over the next few months. Members are encouraged to help out during these events any way they can. See below for more information.

- ☼ Wednesday, February 7, 2024 - STEM Night at Kennett Middle School, Landenberg, PA 19350.
- ☼ Friday, March 8, 2024 - CCAS Monthly Observing Session, Myrick Conservancy Center, Brandywine Red Clay Alliance. The observing session is from 7:00 p.m. to 9:00 p.m. EDT.
- ☼ Friday, March 29, 2024 - Star Party at Tyler Arboretum, Media, PA. The event is scheduled 8 p.m. to 10 p.m. EDT.

For more information about future observing opportunities, contact our [Observing Chair](#), Michael Manigly.

Winter/Spring Society Events

February 2024

7th • 2024 STEM Night at Kennett Middle School, Landenberg, PA 19350.

13th • CCAS Monthly Meeting, in person (as well as via Zoom) at West Chester University's Merion Science Center, Room 113. Member meet & greet, 7:00-7:30 pm. Meeting starts at 7:30 pm. Guest Speaker: Dr. Ashley Spindler, University of Hertfordshire, United Kingdom, "Role of AI and Machine Learning (ML) Approaches in Astronomy—Studies of Galactic Evolution."

20th • Open call for articles and photographs for the March 2024 edition of [Observations](#).

23rd • West Chester University Planetarium Show: "Raining Stars," in the Mather Planetarium. The show starts at 7 p.m. and runs approximately one hour in length. For more information and reservations, visit [WCU Public Planetarium Shows](#).

26th • Deadline for newsletter submissions for the March 2024 edition of [Observations](#).

March 2024

8th • CCAS Monthly Observing Session, Myrick Conservancy Center, Brandywine Red Clay Alliance. The observing session is from 7:00 p.m. to 9:00 p.m. EDT.

10th • [Start Daylight Saving Time](#) - Set Clocks Ahead 1 Hour at 2:00 a.m. ET.

12th • CCAS Monthly Meeting, in person (as well as via Zoom) at West Chester University's Merion Science Center, Room 113. Member meet & greet, 7:00-7:30 pm. Meeting starts at 7:30 pm. CCAS Member Speaker: Dr. Don Miller, NASA Ambassador & CCAS Member, "Could Extraterrestrial Life Exist in the Universe?—Scientific & Philosophical Considerations (Part 2)."

12th • Vernal Equinox (northern spring/southern autumn begins), occurs at 11 p.m. EDT. The Sun will shine directly on the equator and there will be nearly equal amounts of day and night throughout the world.

20th • Open call for articles and photographs for the April 2024 edition of [Observations](#).

20th • Introduction to Astronomy Class: Spaceship Earth—the Sun and its effects on the Earth, Peirce Middle School, West Chester, 7 p.m. EDT.

26th • Deadline for newsletter submissions for the April 2024 edition of [Observations](#).

26th • West Chester University Planetarium Show: "Fire In The Sky," in the Mather Planetarium. The show starts at 7 p.m. and runs approximately one hour in length. For more information and reservations, visit [WCU Public Planetarium Shows](#).

27th • Introduction to Astronomy Class: Our Moon—Phases and Faces, Peirce Middle School, West Chester, 7 p.m. EDT.

29th • CCAS Special Observing Event: Star Party at Tyler Arboretum, Media, PA. The event is scheduled 8 p.m. to 10 p.m. EDT.

January 2024 Monthly Meeting Minutes

by Bea Mazziotta, CCAS Secretary

- The first monthly meeting for 2024 was held on January 9, 2024.
- Owing to heavy rain and winds the meeting was changed to YouTube and Zoom only. Also owing to anticipated power outages no club business was discussed prior to Bruce Ruggeri's introduction of the evening's speaker Don Miller.
 - Dr. Miller has a doctorate in chemical engineering and pursued a career in the pharmaceutical industry. All the while he maintained and nurtured his love of stars and astronomy.
 - Don became a NASA Solar System Ambassador in 2022 to encourage all of us, especially children, to "look up."
- Dr. Miller's presentation was entitled "Could Extraterrestrial Life Exist? Or What is the Probability That Life Exists Beyond the Earth?"
 - "Are we alone?" is a question many of us ask at some point. So far no one has a definite answer, but it isn't for lack of trying to find out.
 - Dr. Miller presented a history of how some in the astronomy community have approached this mission, including what to look and listen for, the formation of SETI, the Drake Equation, METI (our active signaling in hopes of a reply) and the results to date of these and other efforts.
- Unfortunately, the meeting was cut short due to a power outage. When the presentation is rescheduled members will be notified and information will be posted on the CCAS website www.ccas.us.

February 2024 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on February 13, 2024, in person at West Chester University's Merion Science Center, Room 113. The Science Center is located at 720 S. Church St., West Chester, PA. Guest Speaker: Dr. Ashley Spindler, Centre for Astrophysics Research at the University of Hertfordshire. She will present "AI, Machine Learning and Astronomy—Teaching Computers to Study the Stars."

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 our 2024-2025 season and beyond. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

February 2024 Monthly Meeting Presenter Bio

by Bruce Ruggeri, CCAS Program Chair

Our February CCAS meeting (in person and Zoom) is on Tuesday, February 13th, commencing at 7:30 pm ET. Our February speaker is Dr. Ashley Spindler, Centre for Astrophysics Research at the University of Hertfordshire. The CCAS meeting presentation will commence at approximately 7:50-8:00 pm ET. Our meetings are held at West Chester University's (WCU) Merion Science Center, Room 113. The Science Center is located at 720 S. Church Street, across from Sykes Student Union on Rosedale Avenue.

The presentation title, synopsis and bio sketch for Dr Spindler are provided below:

Title: AI, Machine Learning and Astronomy—Teaching Computers to Study the Stars.

Abstract: The next generation of astronomy is upon us, with



Dr. Ashley Spindler

JWST now collecting data and not long until the Vera Rubin Observatory opens its eyes to the heavens. In this brave new world, astronomers face one very massive problem—data. With

the prospect of hundreds of petabytes of images and catalogues to search through, Artificial Intelligence is becoming the go-to tool for tackling the big data challenges of the future. From scanning the skies for unusual objects to classifying the shapes and properties of distant galaxies, this talk will show you the how and the why of AI in Astronomy.

Bio sketch: Dr Ashley Spindler is Senior Lecturer in Astronomy and Data Science, and is member of the Centre for Astrophysics Research at the University of Hertfordshire, Hertfordshire, UK. Her interests lie in the novel application of machine learning technologies to next-generation astronomical surveys, and she has previously used these approaches to study the evolution of galaxy morphology.

Exploring the Galactic Habitable Zone

by Paul M. Sutter, *Universe Today*



Artist depiction of the Milky Way galaxy. Credit: Andrew Z. Colvin

Our planet sits in the habitable zone of our sun, the special place where water can be liquid on the surface of a world. But that's not the only thing special about us: we also sit in the galactic habitable zone, the region within the Milky Way where the rate of star formation is just right.

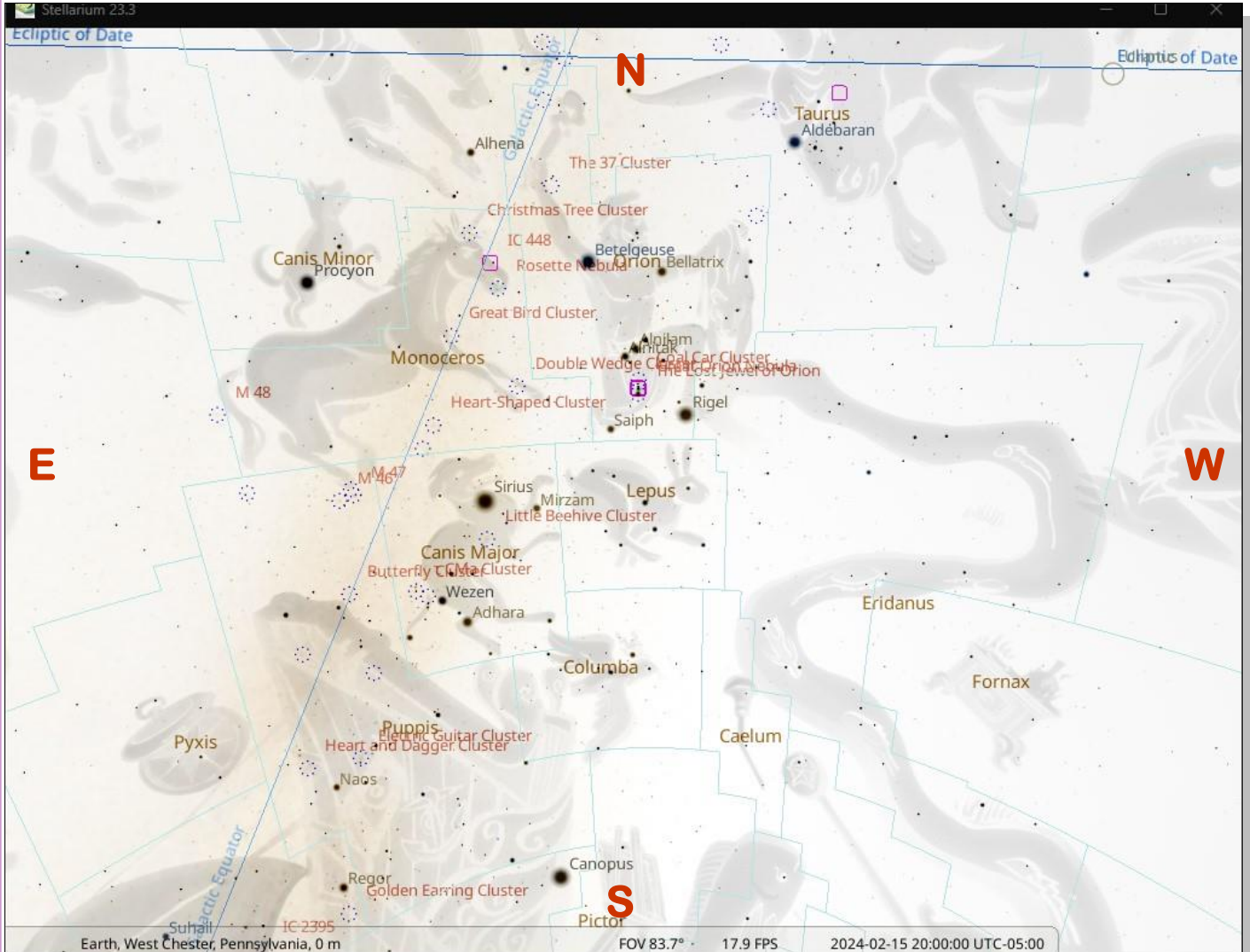
The Earth was born with all the ingredients necessary for life—something that most other planets lack. Water as a solvent. Carbon, with its ability to form long chains and bind to many other atoms, a scaffold. Oxygen,

(Continued on page 14)

The Sky Over Chester County

February 15, 2024 at 8:00 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
02/01/2024	6:42 a.m. EST	7:11 a.m. EST	5:21 p.m. EST	5:49 p.m. EST	10h 09m 56s
02/15/2024	6:28 a.m. EST	6:55 a.m. EST	5:37 p.m. EST	6:05 p.m. EST	10h 42m 07s
02/29/2024	6:09 a.m. EST	6:36 a.m. EST	5:53 p.m. EST	6:20 p.m. EST	11h 17m 26s

Moon Phases					
Last Quarter	02/02/2024	6:18 p.m. EST	New Moon	02/09/2024	5:59 p.m. EST
First Quarter	02/16/2024	10:00 a.m. EST	Full Moon	02/24/2024	7:30 a.m. EST

February 2024 Observing Highlights
by Michael Manigly, CCAS Observing Chair

1	Spica stands south of the Moon after Midnight.
2	Last or Third Quarter Moon 6:18 pm EST. Groundhog's Day.
4	Antares stands to the lower left of the Moon at first light.
5	Antares appears to the upper right of the Moon.
6	Venus is to the lower left of the Moon in early twilight.
7	Venus appears to the north of the waning crescent Moon this morning.
9	New Moon 5:59 pm EST. The Moon passes 4° south of Mars around 2:00 am EST.
11	Saturn is sitting 1.8° below the Moon this evening.
12	Neptune appears 0.7° below the Moon around 2:00 am EST this evening.
14	Waxing crescent Moon and Jupiter in conjunction during overnight hours of the 14th and 15th.
15	Jupiter appears 3° below the Moon 3:00 am EST and the Moon passes north of Uranus at 9:00 pm EST this evening.
16	First Quarter Moon 10:01 am EST. The Pleiades star cluster is situated to the lower right of the Moon at nightfall. Binoculars can aid in viewing.
20	Pollux is close to the Moon at nightfall with Castor standing to their upper left.
22	Venus and Mars in conjunction in morning hours.
23	Regulus is situated to the right of the Moon at nightfall.
24	Full Moon 7:30 am EST.
27	Spica rises close and below the Moon around 10:30 pm EST.
28	Mercury in superior conjunction 4:00 am EST.

The best sights this month: February finds Venus in the predawn morning and Jupiter at night with Saturn and Mercury making short appearances. Several comets make their way across the sky in February. If you dress for cold weather conditions, February is a great month to view the winter constellations and Messier/deep sky objects. Several comets make appearances too. See below for additional details.

Mercury is visible with increased difficulty in the morning sky during the first half of the month. not observable this month. The planet achieves superior conjunction on the 28th.

Venus is still the most prominent object in the morning sky at morning twilight. It appears extremely low in the southeast during morning twilight. The planet drops in altitude throughout the month of February. Look for the waning crescent Moon to cruise by south of the planet on the 7th.

Mars is beginning to show up in morning twilight among the stars of Capricornus. The planet appears around close to Venus on the 22nd.

Jupiter is high in the southern sky at the beginning of the month in Aries the Ram shining at Mag -2.3. The planet sets earlier each night throughout February. The North and South equatorial belts that straddle the planets equator are visible with the Great Red Spot viewable every other day if viewing at the right time of the 10-hour cycle of the planet. Look for transits and occultations of the Galilean moons all month. The waxing crescent Moon passes to the north of the planet on the 15th.

Saturn is viewable shortly after sunset on the 1st when it appears around 12° high in the western sky. The last opportunity to view the planet may be on the 10th when the Moon stands to its south. Binoculars are helpful to view. Saturn reaches superior conjunction on the 28th. The planet will not be visible again until late March when it reappears in the morning sky.

Uranus is visible all evening in Aries and is best viewed with binoculars or a telescope. The planet appears about 12° southwest of the Pleiades (M45) and dims to Mag 5.8. On the 16th, Uranus appears 3° below the Moon around 10:00 pm EST and is in conjunction this evening as well.

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Through the Eyepiece: Messier 41, The Little Beehive Cluster in Canis Major

by Don Knabb, CCAS Treasurer & ALCOR



Image credit: NOIRLab / NSF / AURA - <https://noirlab.edu/public/es/images/noao-M 41/>

Messier 41 (also known as M 41 or NGC 2287) is an open cluster in the Canis Major constellation. It was discovered by Giovanni Batista Hodierna before 1654 and was perhaps known to Aristotle about 325 BC. M 41 lies about four degrees

almost exactly south of Sirius (the brightest star in the night sky). The cluster itself covers an area around the size of the full moon. It contains about 100 stars including several red giants.

Here is Charles Messier's observing report for M 41: *"In the night of January 16 to 17, 1765, I have observed below Sirius and near the star Rho of Canis Major a star cluster; when examining it*

(Continued on page 7)

Eyepiece (Cont'd)



Star map generated with Stellarium, the free planetarium software

(Continued from page 6)

with a night refractor, this cluster appeared nebulous; instead, there is nothing but a cluster of small stars.” Following suit, other historical astronomers also observed M 41 – including Sir John Herschel, to include it in the NGC catalog. While none found it particularly thrilling, their notes range from a “coarse collection of stars” to “very large, bright, little compressed.”

Walter Scott Houston, an American popularizer of ama-

teur astronomy who wrote the “Deep-Sky Wonders” column in *Sky and Telescope* magazine from 1946 to 1993, describes the appearance of the cluster in small telescopes: “Many visual observers speak of seeing curved lines of stars in M 41. Although they seem inconspicuous on photographs, the curves stand out strongly in my 10-inch reflecting telescope, and the bright red star near the center of the cluster is prominent.”

M 41 is easy to find in the win-

ter sky. It will be low in the south during February, under Sirius in Canis Major. To the left is a sky map I generated using Stellarium, the free planetarium software.

Because Messier 41 is a large star cluster, remember to use the lowest magnification to see as much of the cluster as possible. Higher magnification can always be used once the star cluster is identified to study individual members. M 41 is quite bright and easily resolved and makes a wonderful target for urban skies and moonlit nights!

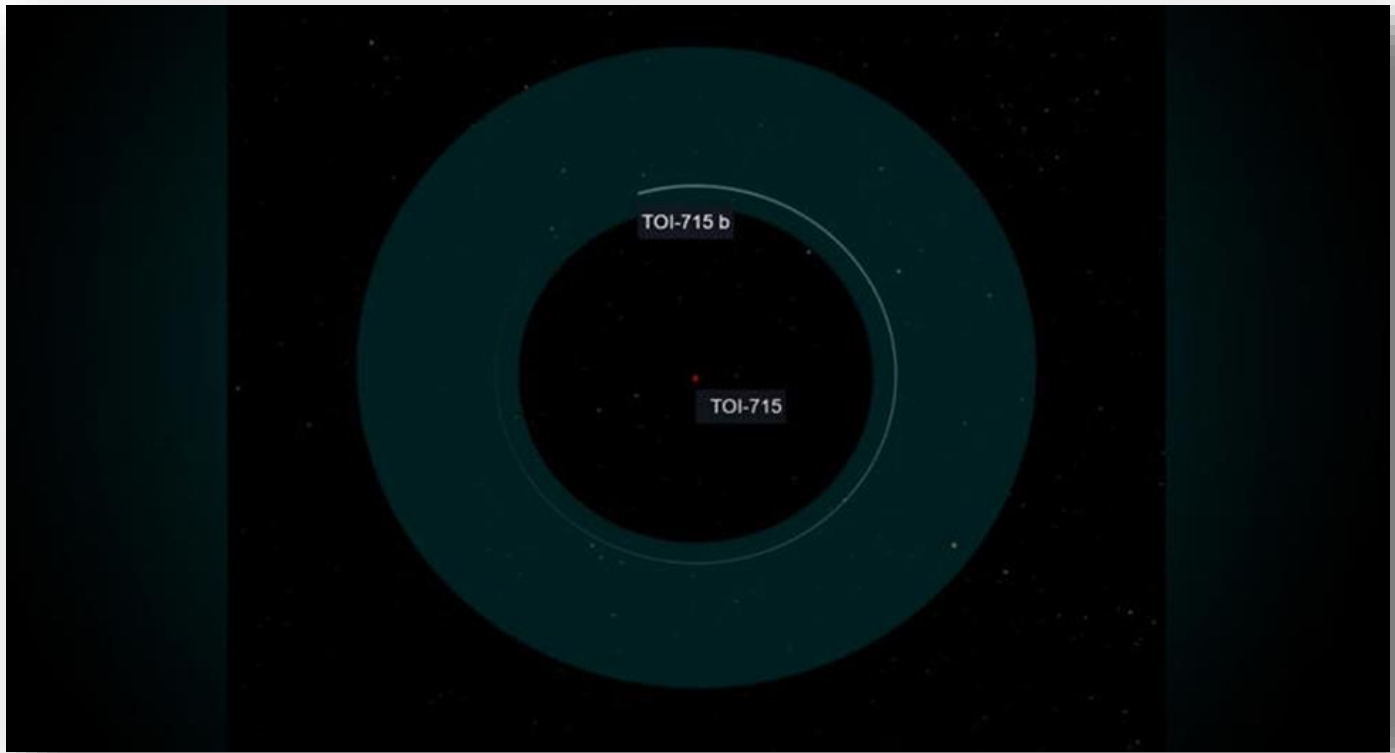
An open cluster is a group of up to a few thousand stars that were formed from the same giant molecular cloud and are still loosely gravitationally bound to each other in contrast to globular clusters which are very tightly bound by gravity.

Open clusters are very important objects in the study of stellar evolution. Because the stars are all very similar age and chemical composition, the effects of other more subtle variables on the properties of stars are much more easily studied than they are for isolated stars. Several open clusters, such as the Pleiades, Hyades or the Alpha Persei Cluster are readily visible with the naked eye. Some others, such as the Double Cluster, are barely perceptible without instruments, while many more can be seen in binoculars or telescopes.

Messier 41 contains about one hundred stars, including several bright red giants (which appear orange, as do all red giants). The bright star in the SE corner (lower left) is a foreground blue

Researchers Discover Super-Earth with a 19-Day Year

by Scripps News Staff



Researchers discover super-Earth with a 19-day year © Image Provided by Scripps News

NASA says researchers studying exoplanets in space using the TESS space telescope have discovered a super-Earth orbiting its red star's habitable zone. Scientists say one "year" of its orbit would take just 19 days, if comparing time on that planet to time on our own.

On Wednesday, January 31st, NASA said the newly discovered planet is an exciting find for researchers hoping to investigate the super-Earth that orbits a "small, reddish" star said to be considered "fairly close" to our Earth — from an astronomical perspective, that is.

The planet, called TOI-715 b, is about 137 light-years away from Earth and is thought to be in a system that could hold a second Earth-sized planet, NASA said. The discovery was made by an international team of scientists led by Georgina Dransfield of

the University of Birmingham in the United Kingdom.

The team used a list of facilities around the globe to make the discovery, including the Gemini-South, Las Cumbres Observatory telescopes, the ExTrA tele-

scopes, the SPECULOOS network, and the TRAPPIST-south telescope, NASA said.

Astronauts have opened a new chapter in their search for exoplanets, which are planets that

(Continued on page 11)

Eyepiece (Cont'd)

(Continued from page 7)

giant, not part of the cluster. Roughly 2300 light-years away and around 25 light-years across, M 41 is about 200 million years old. The approximately true-color picture on the first page was created from eleven images taken in September 1997 at the Burrell Schmidt telescope of Case Western Reserve University's Warner and Swasey Observatory located on Kitt Peak, near Tucson, Arizona. The image size is 42.3 arc minutes.

Information credits

- http://en.wikipedia.org/wiki/Open_clusters
- https://en.wikipedia.org/wiki/Messier_41
- <http://www.ipac.caltech.edu/2mass/>
- <http://www.universetoday.com/34750/messier-41/>

Observing (Cont'd)

(Continued from page 5)

Neptune sets around 8:30pm EST during the first week in February. The planet shines at Mag 7.8 and is located in Pisces the Fish.

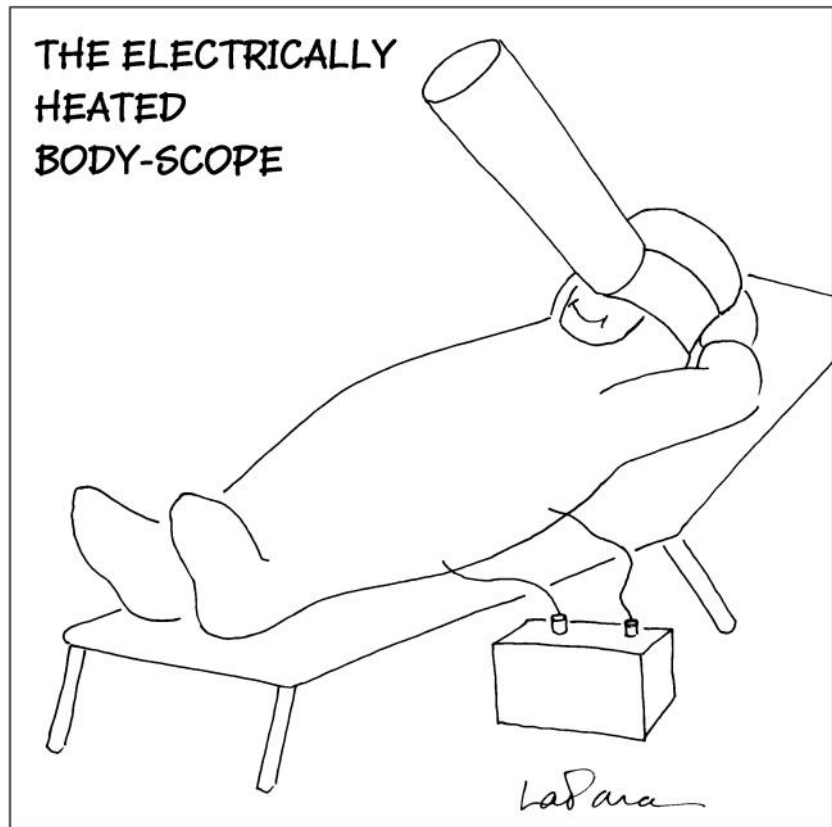
The Moon: On the 10th, the Moon at perigee (222,506 miles from Earth) 1:53pm EST. Also, the young crescent Moon appears in the west shortly after sunset. On the 16th, the Lunar X is near crater Werner around 8:00 pm EST. On the 17th, the Lunar Straight Wall in the evening. The Moon is at apogee (252,470 miles from Earth) 9:59 am EST on the 25th.

The Full Moon is on the 24th. This month's Full Moon is called the Snow Blinding Moon. Other names are the Wolf Moon, Hun-

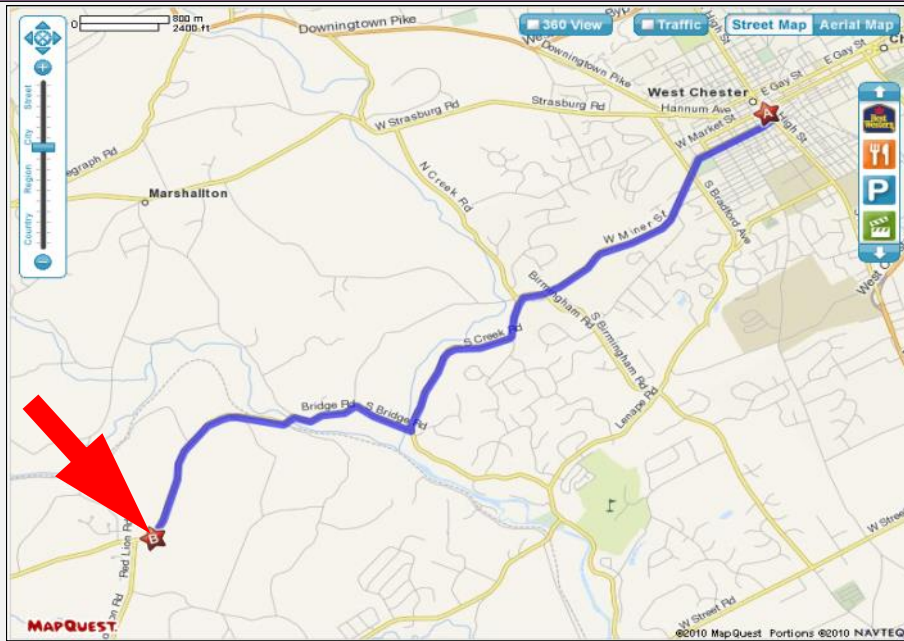
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Classic La Para

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).

Night Sky Network: Constant Companions—Circumpolar Constellations, Part I

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.

Winter in the northern hemisphere offers crisp, clear (and cold!) nights to stargazers, along with better views of several circumpolar constellations. What does circumpolar mean when referring to constellations? This word refers to constellations that surround the north and south celestial poles without ever falling below the horizon. Depending on your latitude, you will be able to see up to nine circumpolar constellations in the northern hemi-



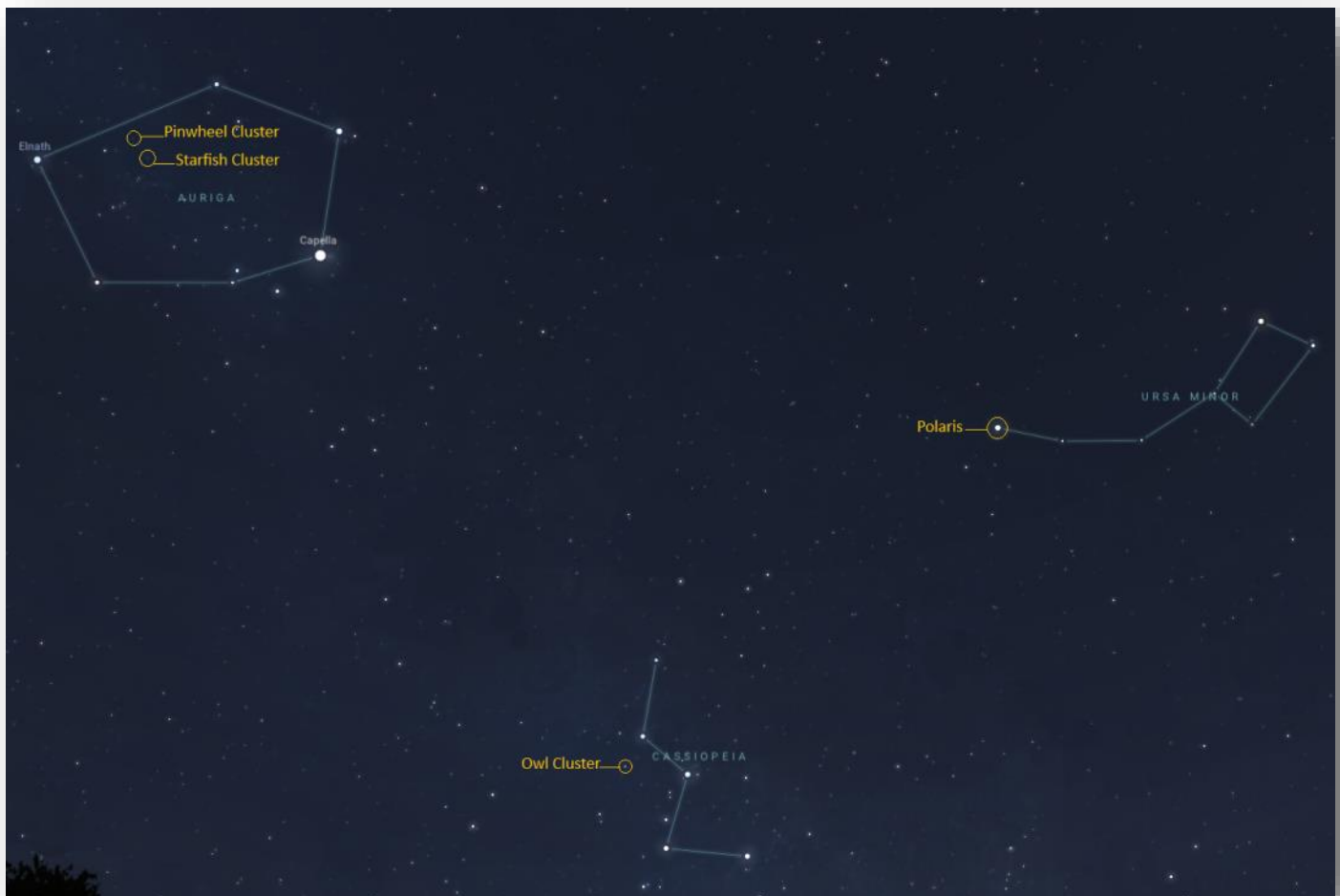
sphere. Today, we'll focus on three that have gems within: **Auriga**, **Cassiopeia**, and **Ursa Minor**. These objects can all be spotted with a pair of binoculars

or a small to medium-sized telescope.

- **The Pinwheel Cluster:** Located near the edge of Auriga, this open star cluster is easy to spot with a pair of binoculars or small telescope. At just 25 million years old, it contains no red giant stars and looks similar to the Pleiades. To find this, draw a line between the stars Elnath in Taurus and Menkalinan in Auriga. You will also find the **Starfish Cluster** nearby.

- **The Owl Cluster:** Located

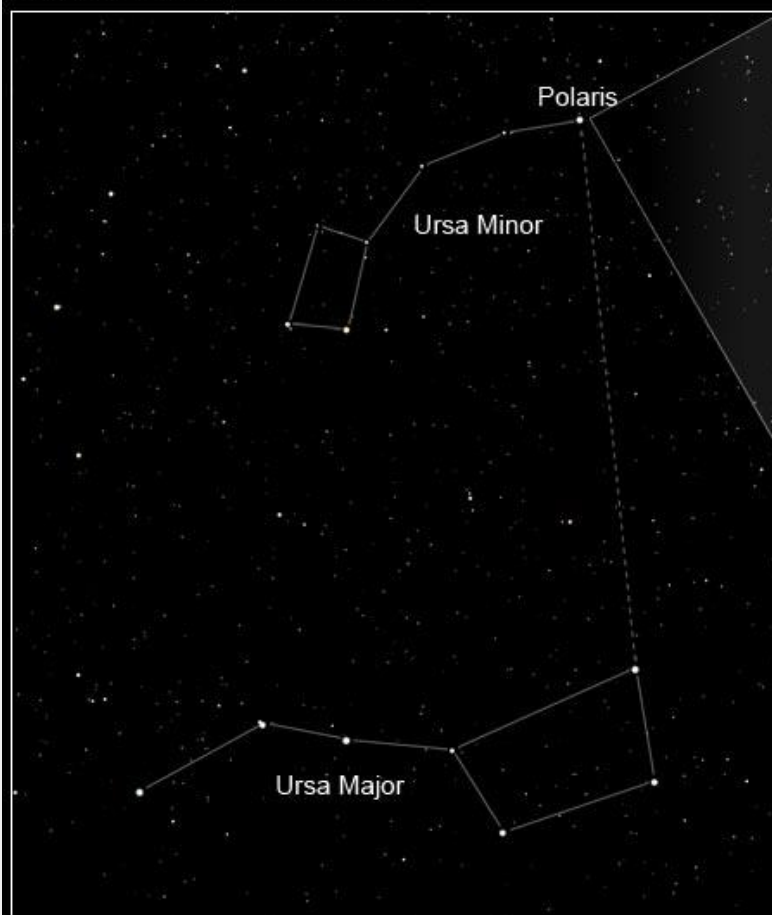
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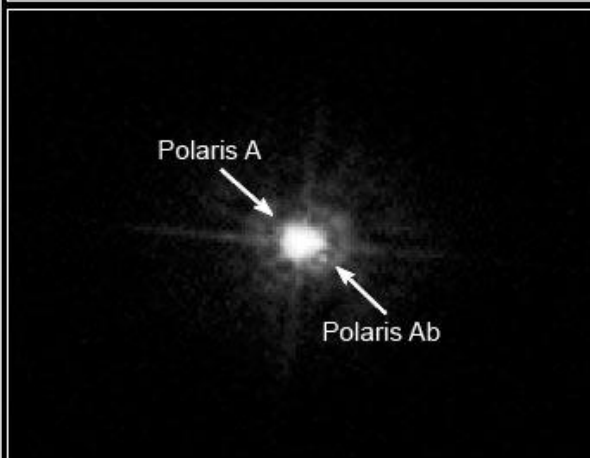
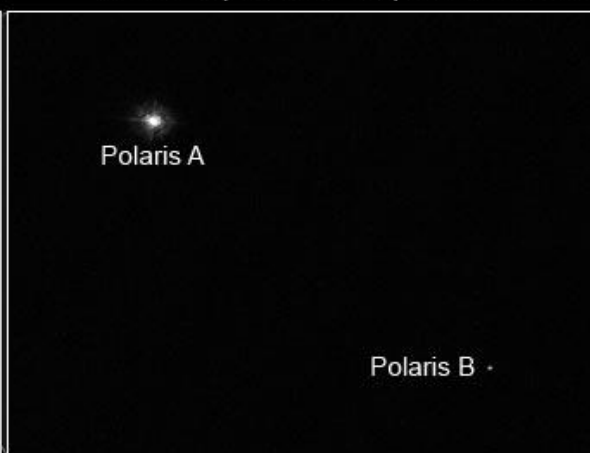
The counterclockwise circumpolar constellations Auriga, Cassiopeia, and Ursa Minor in the night sky, with four objects circled in yellow labeled: Pinwheel Cluster, Starfish Cluster, Owl Cluster, and Polaris. Credit: Stellarium Web

Night Sky Network (Cont'd)

Polaris ■ α Ursae Minoris



Hubble Space Telescope ■ ACS/HRC



NASA, ESA, N. Evans (Harvard-Smithsonian CfA), and H. Bond (STScI)

STScI-PRC06-02a

*A black and white image from the Hubble Telescope of the Polaris star system, showing three stars: Polaris A, Ab, and Polaris B.
Credit: NASA, ESA, N. Evans (Harvard-Smithsonian CfA), and H. Bond (STScI)*

(Continued from page 10)

in the 'W' or 'M' shaped constellation Cassiopeia, is the open star cluster known as the **Owl Cluster**. Sometimes referred to as the E.T. Cluster or Dragonfly Cluster, this group of stars never sets below the horizon and can be spotted with binoculars or a small telescope.

- **Polaris:** Did you know that [Polaris is a triple star system](#)? Look for the North Star on the edge of Ursa Minor, and with a medium-sized telescope, you should be able to

separate two of the three stars. This star is also known as a [Cepheid variable star](#), meaning that it varies in brightness, temperature and diameter. It's the closest one of its kind to Earth, making it a great target for study and [conceptual art](#).

Up next, catch the King of the Planets before its gone for the season with our upcoming mid-month article on the [Night Sky Network](#) page through NASA's website!

Super-Earth (Cont'd)

(Continued from page 8)

lie beyond our own solar system. And NASA's James Webb Space Telescope and the MIT-led NASA mission for the Transiting Exoplanet Survey Satellite are helping to write that story with new discoveries.

TOI-715 b's red dwarf parent star is smaller and cooler than our sun. It is the comparison of these new environments that helps scientists understand how

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CCAS Member Original Astrophotography

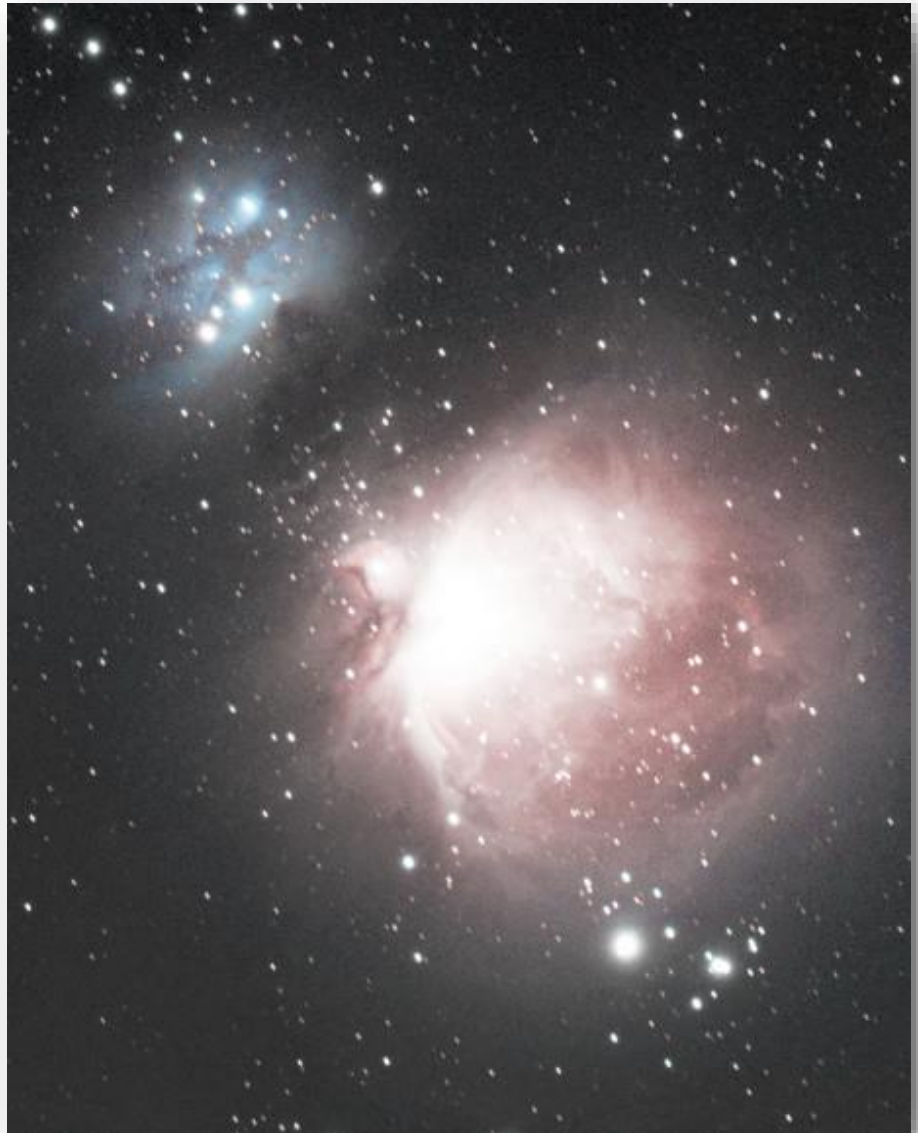
by Brooke Okpaku

I captured this picture using my Redcat 51 telescope and my eq6r mount. I used NINA and PHD2 to get the image. I stacked the pictures on Deep Sky Stacker and edited them in Adobe Photoshop. I've been doing astrophotography for a bit now but this was my first time taking a picture of this nebula.

Compared to what I'm used to, it was very hard not to go overboard with the editing as there was so much detail after just stretching the images. I made the mistake of doing five-minute exposures instead of thirty-second exposures. I ended up getting my favorite picture with just the thirty-second exposures as the five minute pictures just seemed too bright to fix at the center of the nebula. I'm happy with how it came out, but I'm looking forward to having a telescope with a much larger focal length soon, I'd like to retry this target before 2024 if the weather is willing!

I haven't had much time to edit pictures I've gotten recently as finals, college applications, and other commitments have

(Continued on page 15)



The Orion Nebula, M42. Original astrophotography by CCAS Member Brooke Okpaku

Spring 2024 Introductory Astronomy Classes

by Dennis O'Leary, CCAS Education Co-Chair

CCAS has partnered with [Chester County Lifelong Learning](#) to offer a six-week program that meets on Wednesday nights. The one-hour classes are in-person at Pierce Middle School, West Chester, PA, starting at 7:00 p.m. ET. The cost for the six-week course is \$64.00 per person.

The classes run from March 20,

2024, through May 1, 2024. Visit the Chester County Lifelong Learning website to [register online](#).

- March 20th: Spaceship Earth—the Sun and its effects on the Earth
- March 27th: Our Moon—Phases and Faces
- April 3rd: Other Kids on the

Block—the Planets

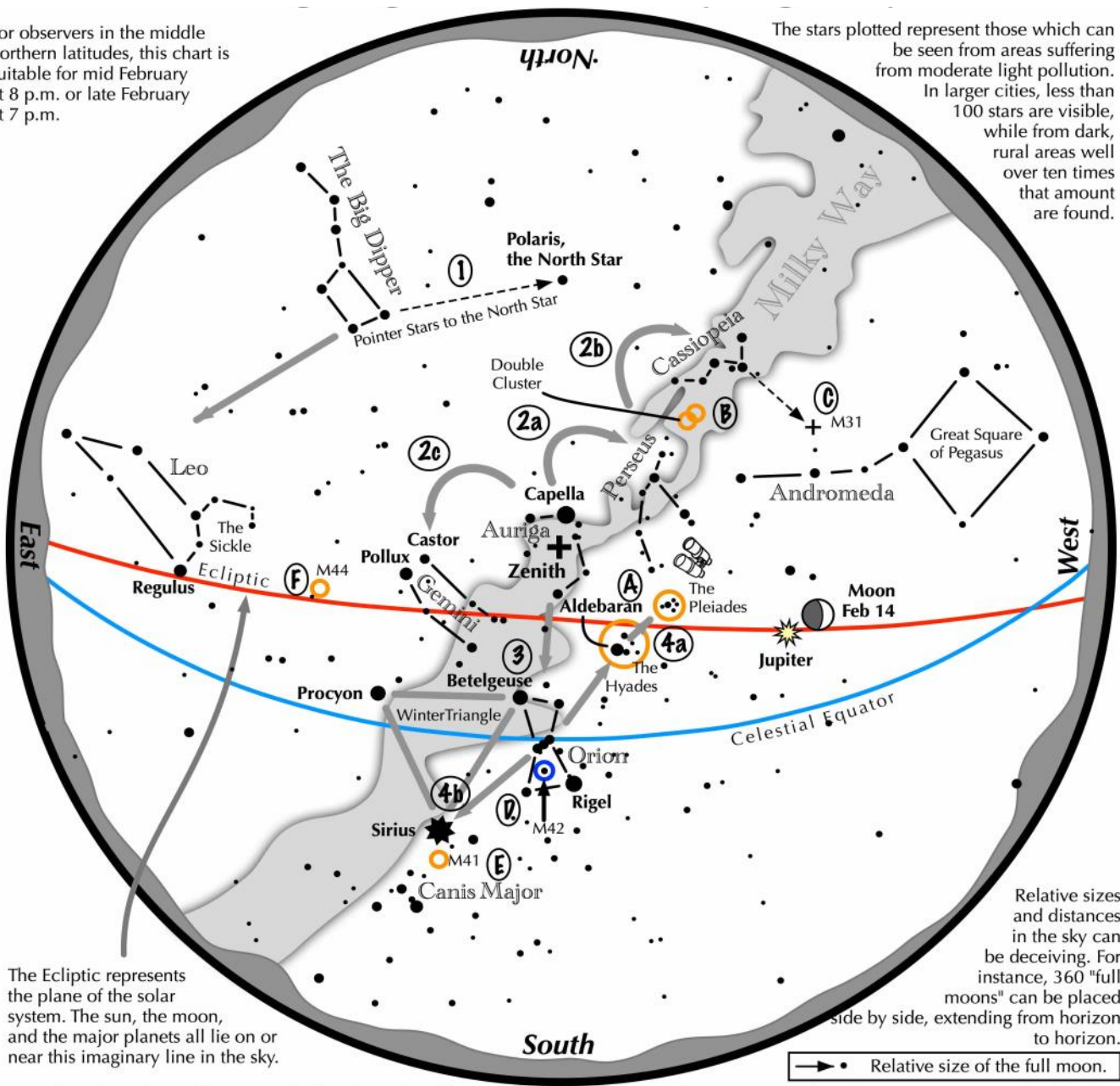
- April 17th: Observing Basics, Star Charts and Planetarium Software
- April 24th: Observing Equipment, Binoculars, and Telescopes
- May 1st: Beyond Naked Eye Observing (deep sky stuff)

Navigating the Mid February 2024 Night Sky

by *Astronomical League*

For observers in the middle northern latitudes, this chart is suitable for mid February at 8 p.m. or late February at 7 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

Navigating the February night sky: Simply start with what you know or with what you can easily find.

- 1 Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
- 2 Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next jump southeastward from Capella to the twin stars of Castor and Pollux in Gemini.
- 3 Directly south of Capella stands the constellation of Orion with its three Belt stars, its bright red star Betelgeuse, and its bright blue-white star Rigel.
- 4 Use Orion's three Belt stars to point northwest to the red star Aldebaran and the Hyades star cluster, then to the Pleiades star cluster. Travel southeast from the Belt stars to the brightest star in the night sky, Sirius, a member of the Winter Triangle.

Binocular Highlights

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



Astronomical League www.astroleague.org/outreach; duplication is allowed and encouraged for all free distribution.

Galactic Habitable Zone (Cont'd)

(Continued from page 3)

easily radicalized and transformable from element to element, to provide the chain reactions necessary to store and harvest energy. And more: hydrogen, phosphorous, nitrogen. Some elements fused in the hearts of stars, other only created in more violent processes like the deaths of the most massive stars or the collisions of exotic white dwarfs.

And with that, a steady, long-lived sun, free of the overwhelming solar flares that could drown the system in deadly radiation, providing more than 10 billion years of life-giving warmth. Larger stars burn too bright and too fast, their enormous gravitational weight accelerating the fusion reactions in their cores to a frenetic pace, forcing the stars to burn themselves out in only a few million years.

And on the other end of the spectrum sit the smaller red dwarf stars, some capable of liv-

ing for 10 trillion years or more. But that longevity does not come without a cost. With their smaller sizes, their fusion cores are not very far from their surfaces, and any changes or fluctuations in energy result in massive flares that consume half their faces—and irradiate their systems.

And on top of it all, our neighborhood in the galaxy, on a small branch of a great spiral arm situated about 25,000 light-years from the center, seems tuned for life: a galactic habitable zone.

Too close to the center and any emerging life must contend with an onslaught of deadly radiation from countless stellar deaths and explosions, a byproduct of the cramped conditions of the core. Yes, stars come and go, quickly building up a lot of the heavy elements needed for life, but stars can be hundreds of times closer together in the core. The Earth has already suffered some extinction events likely triggered by nearby supernovae, and in

that environment we simply wouldn't stand a chance. Explosions would rip away our protective ozone layer, exposing surface life to deadly solar UV radiation, or just rip away our atmosphere altogether.

And beyond our position, at greater galactic radii, we find a deserted wasteland. Yes, stars appear and live their lives in those outskirts, but they are too far and too lonely to effectively spread their elemental ash to create a life-supporting mixture. There simply isn't enough density of stars to support sufficient levels of mixing and recycling of elements, meaning that it's difficult to even build a planet out there in the first place.

And so it seems that life would almost inevitably arise here, on this world, around this sun, in this region of the Milky Way galaxy. There's little else that we could conceivably call home.

[Editor's Note: Read the original article at phys.org]

Observing (Cont'd)

(Continued from page 9)

ger Moon and the Lenten Moon. It reaches its greatest southern declination (-28.2°) on the 7th and its greatest northern declination ($+28.3^\circ$) on the 19th.

Constellations: Although cold, February continues to be a great time for naked eye star gazing and constellation viewing. Look for Orion, Canis Major, Taurus, Ursa Major and Minor, Cassiopeia, Draco Camelopardalis, Lacerta and Lynx.

Messier/deep sky: February continues to be good for observing Messier/deep sky objects including M36, M37 and M38 Star Clusters, NGC2392 Planetary Nebula, the Beehive Cluster M44 in Cancer, Caldwell 7 (NGC2403), the Orion Nebula M42, the Horseshoe Nebula (IC434), the Pleiades M45, the Andromeda galaxy M31.

Comets: 144P/Kushida starts just to the south of Uranus and passes across the Hyades his month. 62P/Tsuchinshan dims to 8th magnitude at the start of the month and drops to 9th magni-

tude by months end. The comet moves very slowly against the background stars. C/2022E3 is viewable to the naked eye in dark sky locations. It is easily identified by its glowing coma and distinct tail. C2021 S3 (PanSTARRS) at magnitude 7.1 might be visible using binoculars on the 14th.

Asteroids: 4 Vesta may be viewable again this month. Look through binoculars or a small telescope to see.

Meteor showers: None visible in February.

CCAS Members Earn Night Sky Network Awards
by Don Knabb, CCAS Treasurer & ALCOR



CCAS Founder Ed Lurcott with this year's Night Sky Network Award Certificate
Image Credit: Don Knabb



All members who volunteered during 2023 at an outreach event or assisted with our beginner astronomy classes will be receiving a certificate and pin from the NASA Night Sky Network. The photo above shows CCAS Founder Ed Lurcott holding his certificate.

The pins are very nice this year. They commemorate the

2023 "ring of fire" annular eclipse. The Moon is pinned to the Sun, and it moves freely, simulating an eclipse! The awards will be distributed during the February meeting, which is on February 13th, 2024 at West Chester University.

More details on the meeting can be found on pages 2 and 3 of this newsletter.

Brooke's Image (Cont'd)

(Continued from page 12)

been very time-consuming. I'm very excited to graduate high school in the spring and even though the only classes I'm taking now are at a college, I went out of my way to schedule them in the evening so I can stay outside later.

The nebulosity in the Orion Nebula can very easily be seen through a telescope. Next to The Andromeda Galaxy and the Pleiades, I'd say this nebula is my favorite thing to look at through a Dobsonian telescope this time of year. The five-minute pictures I stacked I didn't edit much but I could see a lot of dust around the bottom of the image which surprised me a lot. Without a light pollution filter and being so close to Philadelphia, I didn't expect to get that much dust in the picture. I'm excited to try this target again with a different telescope!

Super-Earth (Cont'd)

(Continued from page 11)

and if they might find other "habitable" planets. Scientists have found that during the orbit of an exoplanet, it can "cross the face" of the star it orbits. This phenomenon has helped scientists detect those exoplanets with more ease when viewing with space telescopes, while these star-crossing planets are "transiting."

Last year, researchers said they had only discovered a handful of super-Earths that cross the face of their stars from their observational viewpoint. Researchers define a ce-

(Continued on page 18)

Hubble Discovers a Water-Rich Planet with a Steamy Atmosphere

by Eric Ralls, Earth.com

The quest to find life on a planet beyond Earth is intrinsically linked to the search for water in the cosmos and on other planets. As one of the universe's most abundant molecules, water is vital for all known forms of life, serving as a universal solvent essential for critical biological reactions. This understanding drives astronomers' excitement when they detect signs of water vapor on distant [exoplanets](#).

One such intriguing discovery is the [planet GJ 9827d](#). This exoplanet, no larger than twice the size of Earth, may possess a water-rich atmosphere. However, with temperatures soaring to 800 degrees Fahrenheit, similar to Venus, GJ 9827d is far from hospitable.

A recent observation by NASA's Hubble Space Telescope marks a significant milestone in [exoplanet](#) research. Hubble detected water vapor in the [atmosphere](#) of GJ 9827d, the smallest exoplanet where such a discovery has been made.

"This would be the first time that we can directly show through an atmospheric detection, that these planets with water-rich atmospheres can actually exist around other stars," said team member Björn Benneke of the [Trottier Institute for Research on Exoplanets](#) at Université de Montréal. "This is an important step toward determining the prevalence and diversity of atmospheres on rocky planets."

Laura Kreidberg of the [Max Planck Institute for Astronomy](#) in Heidelberg, Germany, adds to the enthusiasm. "Water on a planet this small is a landmark discovery. It pushes closer than ever to

characterizing truly Earth-like worlds," Kreidberg said.

The Hubble observations, spearheaded by Ian Crossfield of [Kansas University](#), aimed to not only detect atmospheric molecules but specifically to search for water vapor. Whether the detected [water](#) vapor is a dominant component or a minor element in a hydrogen-rich atmosphere, the finding is very significant.

"Until now, we had not been able to directly detect the atmosphere of such a small planet. And we're slowly getting in this regime now," added Benneke. "At some point, as we study smaller planets, there must be a transition where there's no more hydrogen on these small worlds, and they have atmospheres more like Venus (which is dominated by carbon dioxide)."

Two main theories emerge regarding GJ 9827d's atmosphere. It could be a mini-Neptune, retaining a hydrogen-rich atmosphere interspersed with water, or a larger version of Jupiter's moon [Europa](#), which harbors vast water reserves beneath its crust.

"The planet GJ 9827d could be half water, half rock. And there would be a lot of water vapor on top of some smaller rocky body," said Benneke. If the planet has maintained a water-rich atmosphere, it likely formed farther from its star, where ice was abundant, before migrating to its current, warmer location. The Hubble study involved monitoring the planet across 11 transits over three years. These transits, where the planet passed in front of its star, allowed Hubble to de-

tect the spectral signature of water molecules in the atmosphere. "Observing water is a gateway to finding other things," said Thomas Greene, astrophysicist at NASA's [Ames Research Center](#) in California's Silicon Valley.

"This Hubble discovery opens the door to future study of these types of planets by the [James Webb Space Telescope](#). JWST can see much more with additional infrared observations, including carbon-bearing molecules like carbon monoxide, carbon dioxide, and methane. Once we get a total inventory of a planet's elements, we can compare those to the star it orbits and understand how it was formed," Greene concluded.

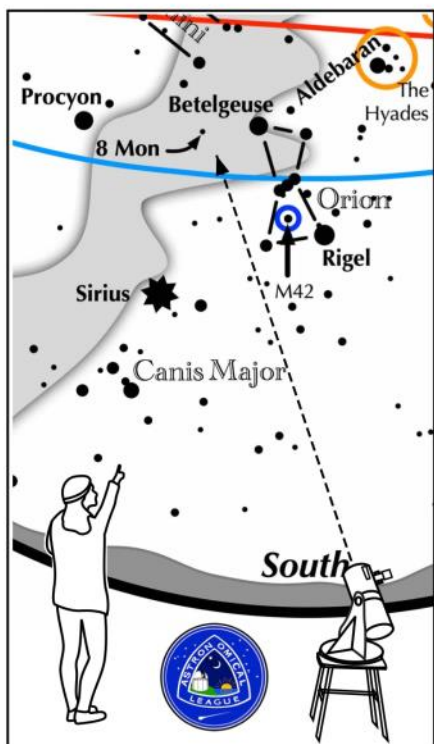
Originally discovered by NASA's [Kepler Space Telescope](#) in 2017, GJ 9827d orbits a red dwarf star, GJ 9827, located 97 light-years away in the constellation Pisces, completing an orbit every 6.2 days. This distant world provides invaluable insights into the diversity and nature of exoplanetary atmospheres, inching us closer to understanding the complexities of our universe.

In summary, the discovery of water vapor on the exoplanet GJ 9827d by NASA's Hubble is a monumental step forward in our understanding of the universe. While the harsh, steamy conditions on this planet make it inhospitable to life as we know it, this finding opens new doors in the study of exoplanetary atmospheres, particularly those resembling Earth's.

[Editor's Note: Read the full article at Earth.com]

Astronomical League Double Star Activity

by Astronomical League



Other Suns: Epsilon (8) Monocerotis

How to find Epsilon Monocerotis on a February evening

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

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

Epsilon (8) Mon

A-B separation: 12 sec

A magnitude: 4.4

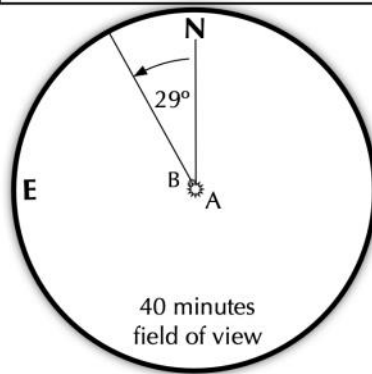
B magnitude: 6.6

Position Angle: 29°

Colors:

white

lilac



CCAS Breakfast Group

by CCAS Member Frank Angelini

The picture to the right shows recent attendees of the CCAS breakfast group. Shown in the picture from the bottom and going clockwise are CCAS founder Ed Lurcott, current CCAS President Dave Hockenberry, CCAS Vice President Pete Kellerman, Harriet Rosenblatt, CCAS Secretary Bea Mazziotta, Gary Calobrisi, Linda Taylor, Pat Angelini and Frank Angelini.

The group gathers about once a month to enjoy each other's company at various local eateries. If you would like to be added to the email list for the breakfast group, send a note to Frank Angelini at angelfj@verizon.net.

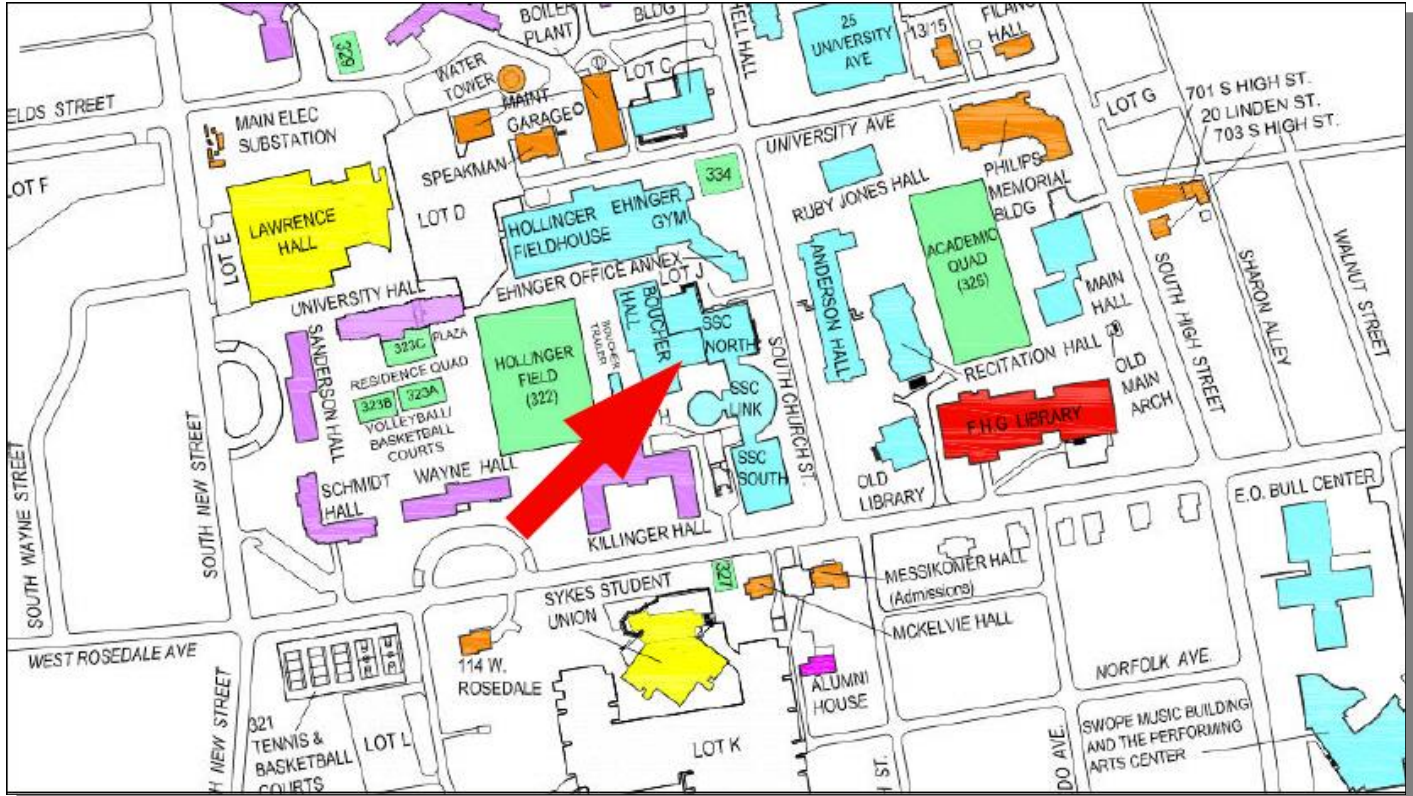


CCAS's very own Breakfast Club!

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).



Super-Earth (Cont'd)

(Continued from page 15)

restrial body as a super-Earth in terms of its size: It has to be larger than Earth and smaller than Neptune. The term doesn't necessarily suggest that the exoplanet is habitable or similar to our own Earth.

Scientists have been adding more and more discovered exoplanets to the database of discoveries since TESS was started in 2018. NASA says if the second Earth-sized exoplanet is discovered by TESS it would become the smallest habitable-zone planet to be found during the work of the TESS team so far.

[Read the original article at [Scripps News](#).]

CCAS Membership Information and Society Financials

Treasurer's Report by Don Knabb

Jan. 2024 Financial Summary

Beginning Balance	\$1817
Deposits	\$60
Disbursements	<u>-\$0</u>
Ending Balance	\$1877

New Member Welcome!

Welcome to our new CCAS member Steve Harner of West Chester, PA.

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.

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 \$30.00 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](http://www.darksky.org). 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.



Skies Unlimited is a retailer of telescopes, binoculars, eyepieces and telescope accessories from Meade, Celestron, Televue, Orion, Stellarvue, Takahashi, Vixen, Losmandy and more.

Skies Unlimited
Suburbia Shopping Center
52 Glocker Way
Pottstown, PA 19465

Phone: 610-327-3500 or 888-947-2673
 Fax: 610-327-3553
 Email: info@skiesunlimited.com

<http://www.skiesunlimited.net>



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.

CCAS Lending Library

Contact our Librarian, Barb Knabb, to make arrangements to borrow one of the books in the CCAS lending library. Copies of the catalog are available at CCAS meetings. Barb's phone number is 610-436-5702.

Contributing to *Observations*

Contributions of articles 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

Or mail the contribution, typed or handwritten, to:

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

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: Michael Manigly
484-631-6197

Secretary: Beatrice Mazziotta
610-933-2128

Librarian: Barb Knabb
610-436-5702

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 & Telescope Magazine

The club membership subscription cost for *Sky and Telescope* magazine has increased to **\$43.95**. This is still a good saving from the regular rate of **\$56.05**.

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.