



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 31, No. 2 **Three-Time Winner of the Astronomical League's Mabel Sterns Award** ☼ 2006, 2009 & 2016 February 2023

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Caroline's Rose (NGC 7789)



Original Astrophotography by CCAS President Dave Hockenberry. Image acquired 1/9/2023. For more details about the image, see page 14 of this month's newsletter.

Membership Renewals Due

02/2023	Murphy Ruggeri Sutton Tronel
03/2023	Angelini Colosimo DellaPenna Fulton Rainville Sterrett Zibinski
04/2023	Chisholm Hepler Imburgia Kataria Miles Miller, D. Richey Rossomando Family

February 2023 Dates

- 3rd** • The Moon, Castor and Pollux for a line
- 5th** • Full Moon, the Full Snow Moon or the Full Frog Moon, 1:18 p.m. EST
- 13th** • Last Quarter Moon, 11:00 a.m. EST
- 20th** • New Moon, 2:05 a.m. EST
- 21st-23rd** • The Moon passes near Jupiter and Venus, forming a brilliant trio
- 27th** • First Quarter Moon and Mars is close to the Moon
- 28th** • Jupiter is just above Venus as night descends



CCAS Upcoming Nights Out

In addition to our monthly observing sessions at the Myrick Conservancy Center, BRC (see pg. 7), 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.

- ☼ Thursday March 9th, 7:00 – 8:00, Greenwood Elementary School night sky observing.
- ☼ Wednesday March 15th, 5:30 – 7:30, Great Valley School District.
- ☼ Friday, March 17th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

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

Winter/Spring Society Events

February 2023

10th • Planetarium show at the Mather Planetarium at WCU, "Asteroid: Mission Extreme." For more information, visit the [WCU Public Planetarium Shows](#) webpage.

14th • CCAS Monthly Meeting, Merion Science Center, Room 112. Guest Speaker: Dr. Marco Raveri, University of Genoa, "New Developments in Our Understanding of Dark Matter and Dark Energy."

16th • The von Kármán Lecture Series: [Perseverance: Two Years on Mars](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech starting at 10:00 p.m. EST.

24th • Live planetarium show at the Mather Planetarium at WCU, "Black Holes Don't Suck." For more information, visit the [WCU Public Planetarium Shows](#) webpage.

20th • Open call for articles and photographs for the March 2023 edition of [Observations](#).

26th • Deadline for newsletter submissions for the March 2023 edition of [Observations](#).

March 2023

3rd • Planetarium show at the Mather Planetarium at WCU, "Birth of Planet Earth." For more information, visit the [WCU Public Planetarium Shows](#) webpage.

9th • CCAS Observing Event: Greenwood Elementary School night sky observing. 7:00 – 8:00 pm – this is part of a larger event at the school. If the weather is bad, we will set up telescopes inside the school to demonstrate their use and demonstrate astronomy software (Mitaka tour of the universe).

14th • CCAS Monthly Meeting, Merion Science Center, Room 112. Guest Speaker: Dr. Scott Gaudi, Ohio State University, "Completing the Census of Exoplanets ('Hot and Cold') in the Galaxy using the Nancy Grace Roman Space Telescope."

15th • CCAS Observing Event: Great Valley School District. 5:30 – 7:30 pm – this is part of a larger event at the school. We will be inside with telescopes set up to demonstrate their use.

17th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

20th • Open call for articles and photographs for the April 2023 edition of [Observations](#).

24th • Planetarium show at the Mather Planetarium at WCU, "Astronaut." For more information, visit the [WCU Public Planetarium Shows](#) webpage.

26th • Deadline for newsletter submissions for the April 2023 edition of [Observations](#).

30th • Live planetarium show at the Mather Planetarium at WCU, "Our Amazing Sun." For more information, visit the [WCU Public Planetarium Shows](#) webpage.

Monthly Meeting Minutes: January 10, 2023

by Bea Mazziotta, CCAS Secretary

- Dave Hockenberry welcomed members and guests to the meeting which was held in person at WCU and online via Zoom and YouTube. There were 30 total in attendance.
- He announced plans to start a CCAS scholarship. Bruce Ruggeri, Program Chair, will take the lead on this important new club outreach.
- Don Knabb discussed some upcoming club events. Look for more details in the CCAS Newsletter. www.ccas.us.
- There will be a planetarium show about Asteroid Missions at WCU's Mather Planetarium on February 10. Details on tickets and times as well as future planetarium public events are on the WCU website, Mather Planetarium page.
- CCAS members are once again offering a Beginner Astronomy course. Classes will start on March 20, 2023 at Stetson Middle School in West Chester. For details about registration, class times and subject matter, visit <https://chestercountynightschool.org/CourseStatus.awp?&course=23SSC1201>
- The speaker for the January meeting was Dr. Carol Paty. She has an appointment in the University of Oregon's Clark Honors College and teaches in the Earth Sciences Dept.
 - She is a planetary and space physicist who studies moon magnetosphere interactions and icy moon interiors using simulations and spacecraft observations. She is a co-investigator on NASA's Europa Clipper Mission.
 - She received her BS in physics and astronomy from Bryn Mawr College and her PhD in Earth and Space Science from the University of Washington.
 - She has worked on many projects in her field including the Trident Discovery Mission, the Neptune Odyssey Planetary Mission and the Outer Planets Assessment Group.
 - Her presentation topic was titled "Exploring the Magnetosphere of the Ice Giant Planets - revisiting Uranus and Neptune."

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February 2023 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on February 14, 2023, in person (as well as via Zoom) at West Chester University's Merion Science Center, Room 112. The Science Center is located at 720 S. Church St., West Chester, PA. This month's guest speaker is Dr. Marco Raveri, from the University of Genoa. His presentation is entitled, "New Developments in Our Understanding of Dark Matter and Dark Energy."

Please note that inclement weath-

er 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 2023-2024 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 2023 Speaker Profile

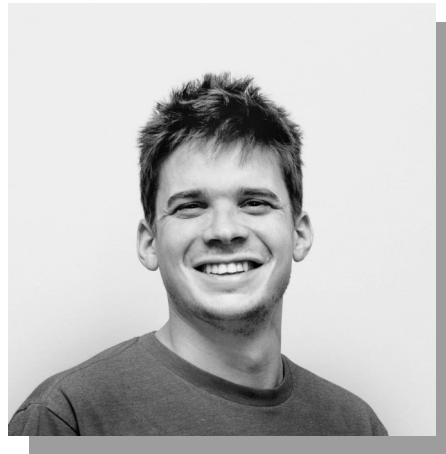
by Bruce Ruggeri, CCAS Program Chair

Join us on Valentine's Day for our monthly CCAS meeting in West Chester University's Merion Science Center, Room 112 or online via Zoom/YouTube. This month's guest speaker is Dr. Marco Raveri from the University of Genoa. His presentation is titled "Is this the end of the cosmological standard model of the Universe's expansion?"

Abstract: Dr. Marco Raveri will discuss the status of discrepancies between predictions of the standard cosmological model and current state-of-the-art observations. After describing the leading theories concerning the expansion rate of the Universe and the growth of cosmic structures, Dr. Raveri will review different attempts that have been made to reconcile these differences. In particular, Dr. Raveri will show what the im-

plications could be for our understanding of fundamental physics, particularly the nature of Dark Matter and Dark Energy.

Biosketch: Dr. Raveri is an Assistant Professor in the Department of Physics at the National Institute for Nuclear Physics at



Marco Raveri, Ph.D.

the University of Genova, Italy. He completed post-doctoral studies at the University of Pennsylvania, Center for Particle Cosmology, as well as post-doctoral work at the University of Chicago, Kavli Institute for Cosmological Physics. Dr. Raveri received his Ph.D. in Astrophysics at the SISSA/ISAS International School for Advanced Studies, Trieste, Italy.

His research interests span several areas including dark matter, dark energy, and neutrinos; large scale structure probes of fundamental physics; statistical and computational methods in cosmology and cosmological perturbation theory; and non-standard models of cosmic acceleration. A large portion of his work is focused on aspects of fundamental physics that we can investigate using cosmological observations.

CCAS Scholarship Established!

by Dave Hockenberry, CCAS President

It is with great pleasure that the Executive Committee has launched the Chester County Astronomical Society Scholarship Fund. The purpose of the fund is to provide two yearly scholarships, each for \$1,500.00, to deserving West Chester University (WCU) students who are engaged in Astronomy, Physics or other Earth Science/STEM majors who have expressed a major interest in astronomy and or planetary sciences as a future career. We are VERY excited about this initiative for several reasons.

First, CCAS has enjoyed a close association with West

Chester University since the founding of the Society when Hugh Harber got the University to grant us access to the Mather Planetarium for our meetings and gave us use of the University's Observatory. In addition, WCU Earth and Space Science department faculty have often presented topics at numerous CCAS meetings and have been supportive of our efforts to continue meeting on the WCU campus. Recently, CCAS was involved in helping to fund the new University Planetarium, providing educational movies for the Planetarium AV equipment, and helped with the WCU stu-

dent Astronomy Club as well. The new Scholarship Fund builds upon this wonderful and beneficial relationship between WCU and the CCAS.

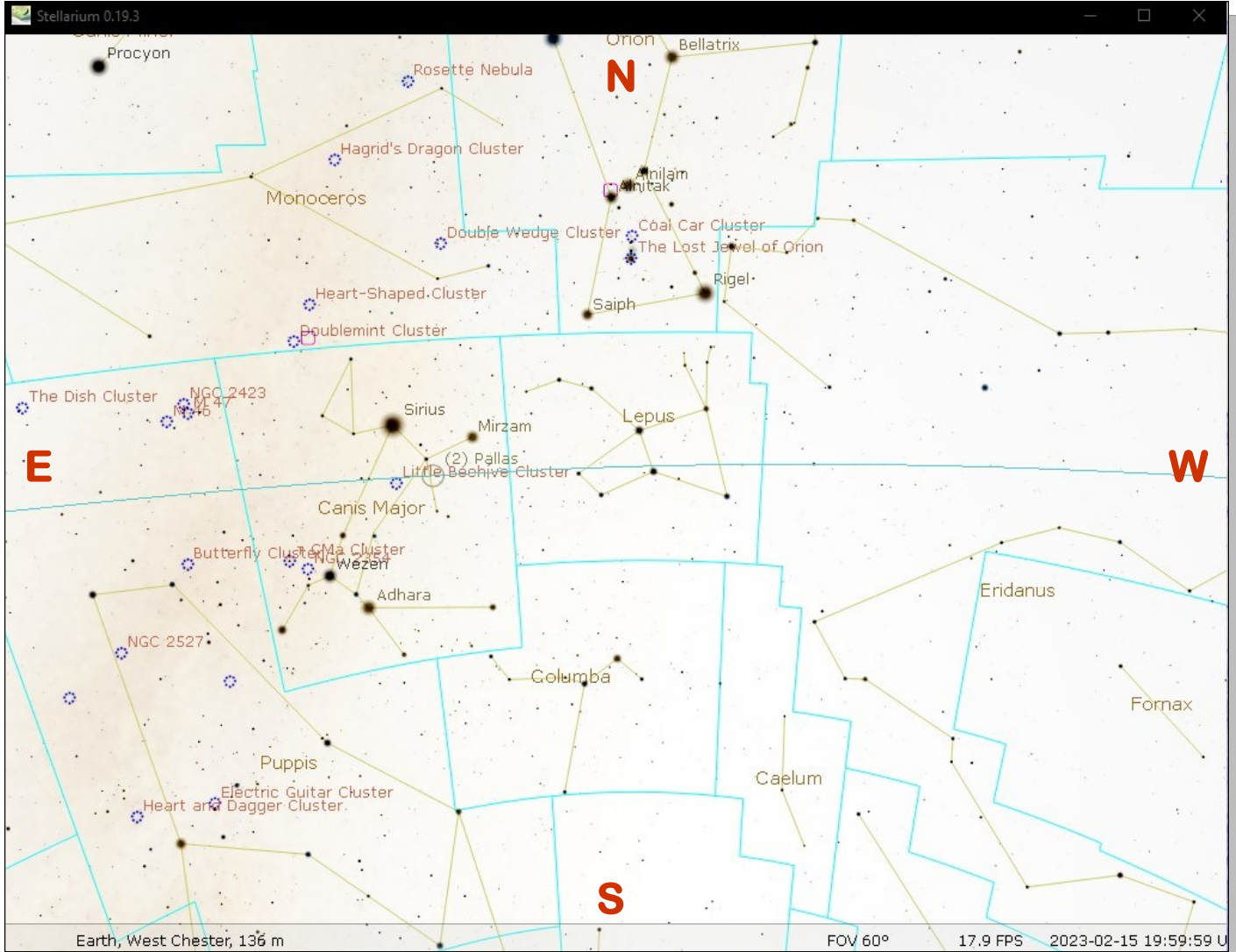
Second, establishing and supporting this Scholarship Fund is completely consistent with the CCAS's core outreach mission for the education and advancement of astronomy, and especially to promote interest and greater awareness of astronomy, planetary, and space science to students who may aspire to future careers in these fields. Different astronomy clubs have di-

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The Sky Over Chester County

February 15, 2023 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
02/01/2023	6:42 a.m. EST	7:10 a.m. EST	5:21 p.m. EST	5:50 p.m. EST	10h 10m 27s
02/15/2023	6:27 a.m. EST	6:55 a.m. EST	5:38 p.m. EST	6:05 p.m. EST	10h 42m 21s
02/28/2023	6:10 a.m. EST	6:37 a.m. EST	5:52 p.m. EST	6:20 p.m. EST	11h 15m 28s

Moon Phases					
			Full Moon	02/05/2023	1:28 p.m. EST
Last Quarter	02/13/2023	11:00 a.m. EST	New Moon	02/20/2023	2:05 a.m. EST
First Quarter	02/27/2023	3:05 a.m. EST			

February 2023 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

3	The Moon, Castor and Pollux for a line
5	Full Moon, the Full Snow Moon or the Full Frog Moon, 1:18 p.m. EST
13	Last Quarter Moon, 11:00 a.m. EST
13-27	The Zodiacal Light is visible from dark sky sites
20	New Moon, 2:05 a.m. EST
21-23	The Moon passes near Jupiter and Venus, forming a brilliant trio
26	The Moon is between the Pleiades and the Hyades in Taurus
27	First Quarter Moon and Mars is close to the Moon
28	The Lunar Straight Wall is visible this evening and Jupiter is just above Venus as night descends

Comet ZTF will be the highlight of February night skies! This comet is all over the news and will be passing through the constellation Taurus the Bull through February, so it will be visible during evening hours. Grab your binoculars and lie back in a lounge chair and enjoy this visitor from the distant reaches of our solar system. It will be thousands of years until it returns.

Mercury: Mercury is only visible in the pre-dawn hours early in February.

Venus: Our sister planet is rising higher into the evening every day. On February 1st Venus and Jupiter are almost 30° apart but on February 28th they are only 1° apart!

Mars: On February 10th and 11th Mars passes close to Comet ZTF! This will be a nice view in binoculars. Then on February 27th near midnight Mars is very close to the Moon.

Jupiter: Jupiter is falling into the west as if falls behind in our race around the Sun, a race the Earth will always win. On February 21st to the 23rd the Moon, Jupiter and Venus form a nice trio in the evening sky. On February 28th Jupiter and Venus are only 1° apart.

Saturn: You might be able to catch a glimpse of Saturn just as the sky darkens after sunset at the start of February, but then Saturn passes behind the Sun and is not observable until emerging into the dawn sky in early spring.

Uranus and Neptune: Uranus is a nice binocular target to the lower right of the “V” of Taurus the Bull. Neptune has a close encounter with Venus in mid-February, reaching closest approach on February 14th. You will need binoculars to see Neptune.

The Moon: Full Moon is on February 5th. According to Native Americans this is the Full Snow Moon since the heaviest snow usually falls during this month. Some tribes also referred to this Moon as the Full Hunger Moon, since harsh weather conditions in their areas made hunting very difficult. Native Canadian tribes called this the Full Frog Moon or the Full Snow Blinding Moon. The Moon has numerous close encounters with stars, clusters and planets during February. They are listed in the “Event” section.

Constellations: Go outside around 8 p.m. and look south to see Orion the Hunter filling the southern sky. Above and to his right is the “V” shape of the face of Taurus the Bull with bright Aldebaran shining like one of the bull’s eyes. Just beyond the bull’s head is the Pleiades, the Seven Sisters. Running under Orion’s feet is Lepus the Rabbit and to the east (left) of Lepus is Canis Major, Orion’s “big dog” hunting companion with the brightest star in the sky, Sirius, shining like a jewel in Canis Major’s collar. The twins of Gemini are nearly overhead and glancing to the east you’ll see Leo the Lion rising, a sign of warmer spring nights to come!

Messier/deep sky: Winter is a great time to use binoculars to seek out Messier objects in the sky since the cold temperatures make it difficult to set up a telescope. Messier objects are a set of over 100 astronomical objects first listed by French astronomer Charles Messier in 1771. Messier was a comet hunter and was frustrated by objects which resembled but were not comets, so he compiled a list of them to avoid being fooled by them as he searched for comets. M42, the Orion Nebula, is easy to find in Orion’s sword. Below and to Orion’s left is M41, the Little Beehive, near Sirius in Canis Major. Harder to find because of the lack of bright stars in

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Looking Up: The Guardians of the Pole

by Don Knabb, CCAS Observing Chair & Treasurer

Ursa Minor, the Little Bear, or more commonly called The Little Dipper, can be seen any time of the year from our Pennsylvania skies because it is so close to the north celestial pole. In fact Polaris, the North Star, is part of Ursa Minor. The easiest way to find Polaris is to use the two “pointer stars” of the Big Dipper, the stars at the end of the dipper, and follow the line they make toward the north.

Continually circling around Polaris, the two stars at the end of the Little Dipper are named Kochab and Pherkad and they are sometimes called “Guardians of the Pole.” The name *Kochab* is derived from an Arabic title that apparently refers to its nearness to the north celestial pole, and in fact about 3,000 years ago it was closer to the pole than Polaris. At times Kochab and Pherkad were seen as two calves, because they keep as close to the pole as calves to their mother. The name *Pherkad* appears to be derived from an Arabic term for calf.

This historical painting of Ursa Minor and Draco the Dragon shows Polaris at the tip of the bear’s tail and Kochab and Pherkad along the bear’s front leg and shoulder.

Interestingly, these two stars were used by some as a time-piece, circling steadily as they do around Polaris like the hands of a celestial clock. Columbus mentioned these stars in the log of his famous journey across the ocean and many other navigators have found them useful in measuring the hour of the night and their place upon the sea.

We measure star brightness using apparent magnitude. Magnitude is a very confusing concept for beginning astronomers. Objects that are bright are negative numbers, and dimmer objects are positive numbers. The stars Vega and Arcturus are

magnitude 0. The Sun is magnitude -27 and the Moon is -13. Venus is the brightest planet at magnitude -5. The brightest star in the sky is Sirius at magnitude -1.5. The scale is logarithmic and defined such that a magni-

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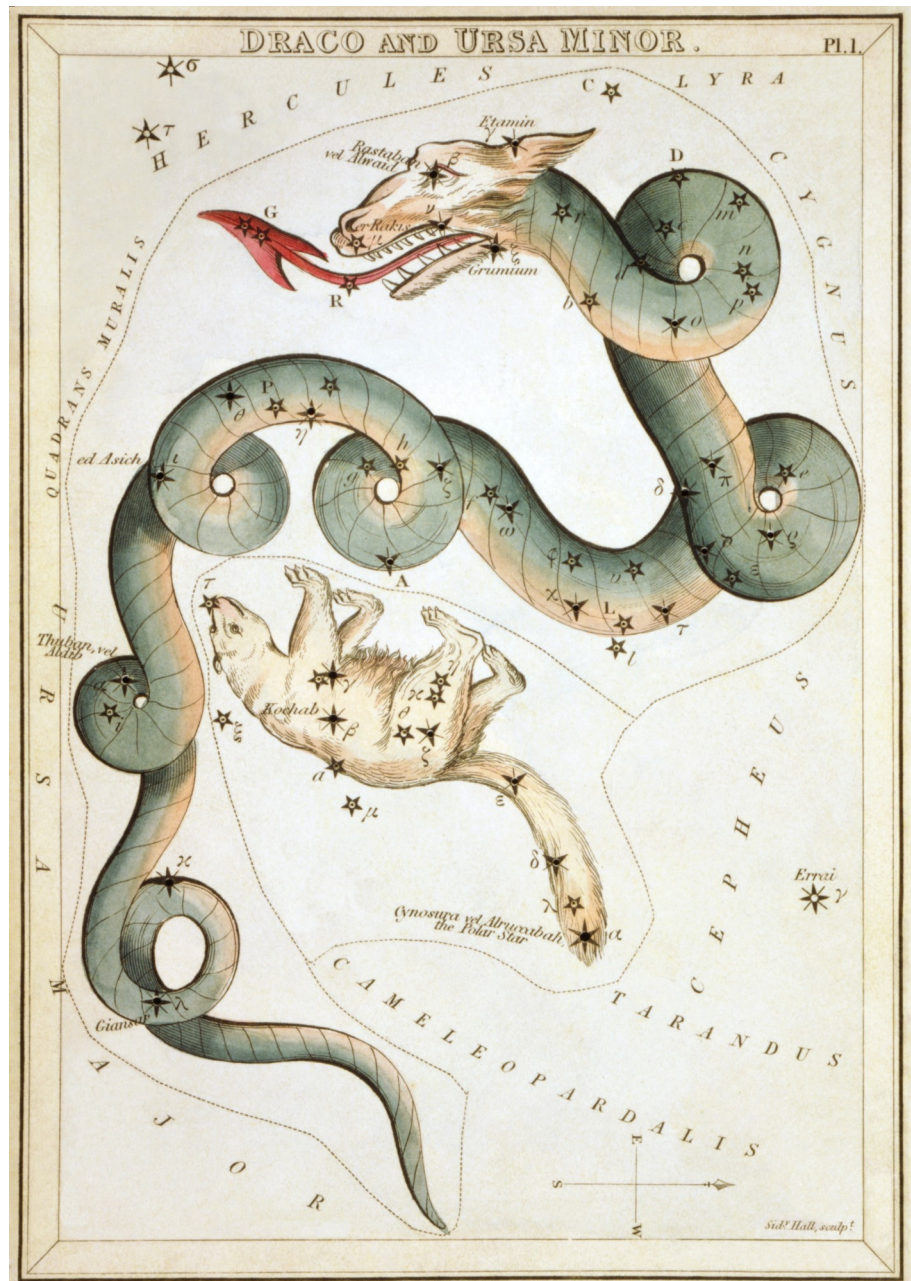


Image credit: Draco, with Ursa Minor, as depicted in *Urania's Mirror*, a set of constellation cards published in London c. 1825. Image restored by Adam Cuerden. Public Domain image from: https://en.wikipedia.org/wiki/Draco_%28constellation%29

Looking Up (Cont'd)

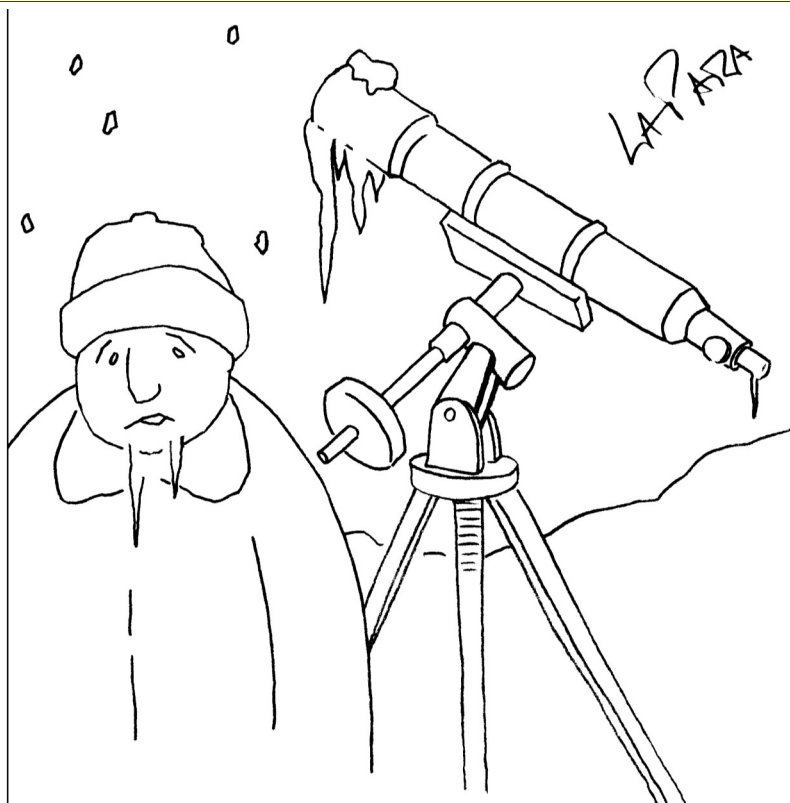
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tude 1 star is exactly 100 times brighter than a magnitude 6 star. The dimmest star you can see in the night sky is a good measure of the quality of the seeing that night.

I like to use the stars of the Little Dipper as a gauge to measure the quality of the seeing. Most evenings in the West Chester area we can only see the North Star and the Guardian stars. But at a site with darker skies it is easy to pick out the fainter stars of the constellation. I created the picture below using Stellarium planetarium software and IrfanView, a photo editing program. I added the magnitudes of 5 stars in the constellation. As you see this constellation is very

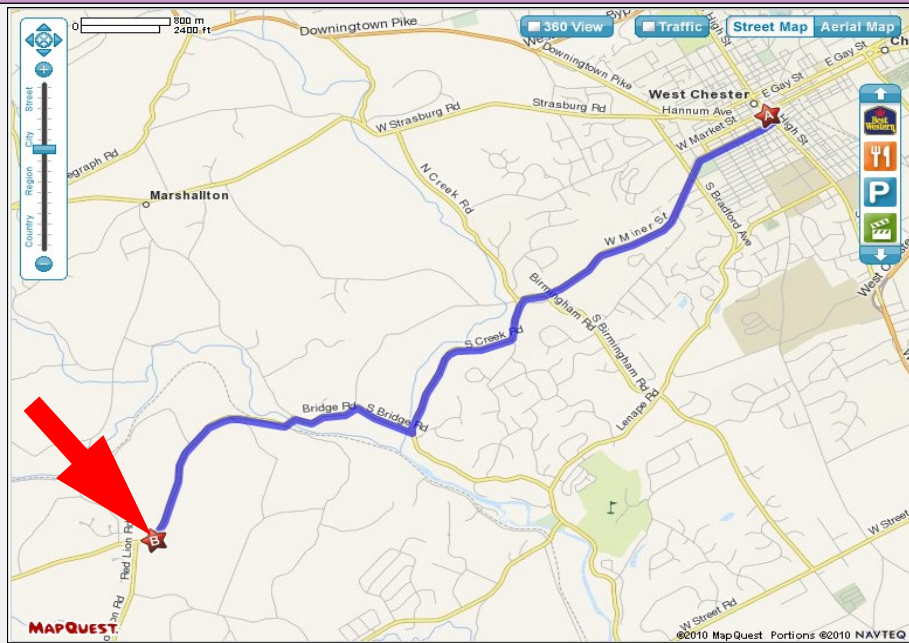
(Continued on page 12)

Classic La Para by Nicholas La Para



"I WISH WINTER WAS OVER!"

CCAS Directions



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).

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.

In Memoriam: CCAS Member Pete LaFrance

by Dave Hockenberry

It is with no small amount of sadness that I wish to inform our CCAS membership that Pete LaFrance passed away on the morning of January 30, 2023. Pete was a member of our Society since at least May of 1994, only a few months after CCAS was founded. By September of the same year, he was elected Treasurer.

He was already a dedicated amateur astronomer and astrophotographer before joining CCAS. In the early years of the

club he gave a considerable amount of his time, effort, and expertise to our members and to the public through outreach programs. He gave presentations and demonstrations of his astrophotography technique back in the days of film astrophotography. It took a lot of dedication in those days to guide the exposures manually by staring into a guider eyepiece and correct tracking errors by hand, hour after hour. He had already built his own backyard “polygon-

dome” observatory in his backyard and even had the membership gather there for demonstrations.

Yet he wasn’t just an Astro shutterbug. He would regularly attend distant national star parties and was a seasoned visual observer as well. Our founder Ed Lurcott related to me a time when he offered to take him to an event in North Carolina. Ed says Pete showed up at the front

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CCAS Original Astrophotography

by Jeff Cunningham



Comet C/2022 E3 (ZTF) taken at 4:30am January 27, 2023. Image captured using a Canon Rebel T6, f/4.5 30sec ISO-1600 125mm. Edited with Canon Digital Photo Professional for contrast, shadow and saturation. Final cleanup with Topaz Photo AI for noise, sharpness and enhancement. 8 photos stacked with Sequator.

Memoriam (Cont'd)



Self-portrait: Pete LaFrance in his first observatory in Avondale, PA.

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door with his pickup truck, helped load up all his gear, and they spent the next 4 days camping under dark skies searching out deep space objects. Ed warmly remembers Pete's infectious enthusiasm at the eyepiece.

By the time I joined CCAS in 2006, Pete had long made the transition from film to CCD imaging. His images were amazing, and he had established himself as the premier astrophotog-

rapher for CCAS. I was in awe of his observatory and deep space imaging skills. His narrow-band filter efforts are still impressive, and can be viewed in the archived editions of Observations on the CCAS website. There is also an excellent article written by Jim Anderson about Pete's upgraded observatory including construction details in the August 2005 issue.

(Continued on page 14)



M 17 by Pete LaFrance

Scholarship (Cont'd)

(Continued from page 3)

verse aspects that make them unique and distinct. Some clubs are mostly about local and national observing activities, some clubs are very equipment and gear oriented, and some are as much social organizations as anything else. But the "hallmark" of CCAS has been, from the beginning, public outreach and education.

I can think of no better and forward-looking way to continue our tradition than by our membership providing a much-needed assist to college students endeavoring to focus on space science and astronomy. College expenses in recent years have become onerous. What better way to help ease the burden and stay true to our mission than this annual commitment of support to students based on their merits and needs?

Third, this Scholarship Fund directly addresses the issue of getting younger people involved in, and excited about, astronomy, planetary, and space sciences. For many years the Astronomical League has been sounding alarms about how few younger people, and especially younger women, are participating in amateur astronomy. CCAS will now be addressing this issue head-on by giving young students an assist. We feel that the good will and encouragement embodied in these annual awards will sow the seeds among the younger generation of aspiring astronomers and space scientists for many years to come.

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NASA Night Sky Notes: Spot the King of Planets—Observe Jupiter

by David Prosper

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.

Jupiter is our solar system's undisputed king of the planets! Jupiter is bright and easy to spot from our vantage point on Earth, helped by its massive size and banded, reflective cloud tops. Jupiter even possesses moons the size of planets: Ganymede, its largest, is bigger than the planet Mercury. What's more, you can easily observe Jupiter and its moons with a modest instrument, just like Galileo did over 400 years ago.

Jupiter's position as our solar system's largest planet is truly earned; you could fit 11 Earths along Jupiter's diameter, and in case you were looking to fill up Jupiter with some Earth-size marbles, you would need over 1300 Earths to fill it up – and

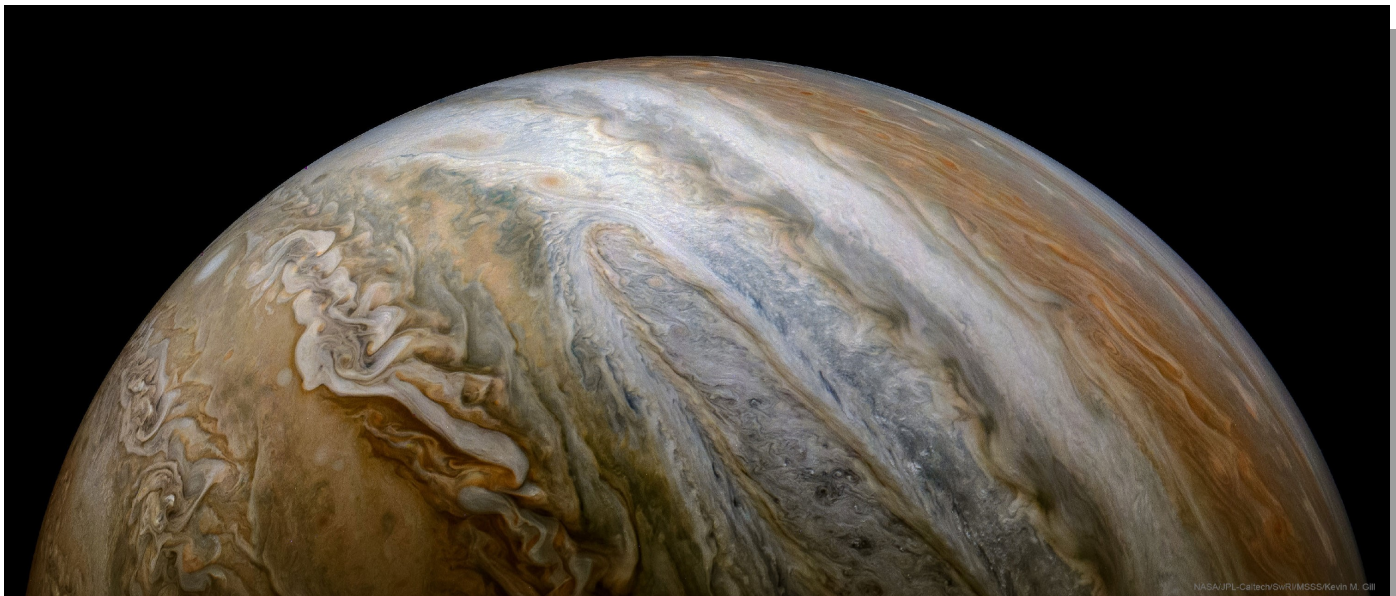


that would still not be quite enough! However, despite its awesome size, Jupiter's true rule over the outer solar system comes from its enormous mass. If you took all of the planets in our solar system and put them together they would still only be half as massive as Jupiter all by itself. Jupiter's mighty mass has shaped the orbits of countless comets and asteroids. Its gravity can fling these tiny objects towards our inner solar system and also draw them into itself, as fa-

mously observed in 1994 when Comet Shoemaker-Levy 9, drawn towards Jupiter in previous orbits, smashed into the gas giant's atmosphere. Its multiple fragments slammed into Jupiter's cloud tops with such violence that the fireballs and dark impact spots were not only seen by NASA's orbiting Galileo probe, but also observers back on Earth!

Jupiter is easy to observe at night with our unaided eyes, as well-documented by the ancient astronomers who carefully recorded its slow movements from night to night. It can be one of the brightest objects in our nighttime skies, bested only by the Moon, Venus, and occasionally Mars, when the red planet is at opposition. That's impressive for a planet that, at its closest to Earth, is still over 365 million miles (587 million km) away.

(Continued on page 11)



This stunning image of Jupiter's cloud tops was taken by NASA's Juno mission and processed by Kevin M. Gill. You too can create amazing images like this, all with publicly available data from Juno. Go to missionjuno.swri.edu/junocam to begin your image procession journey – and get creative! Full Image Credit: NASA/JPL-Caltech/SwRI/MSSS; Processing: Kevin M. Gill, license: CC BY 2.0) <https://creativecommons.org/licenses/by/2.0/> Source: <https://apod.nasa.gov/apod/ap201123.html>

Night Sky Notes (Cont'd)

(Continued from page 10)

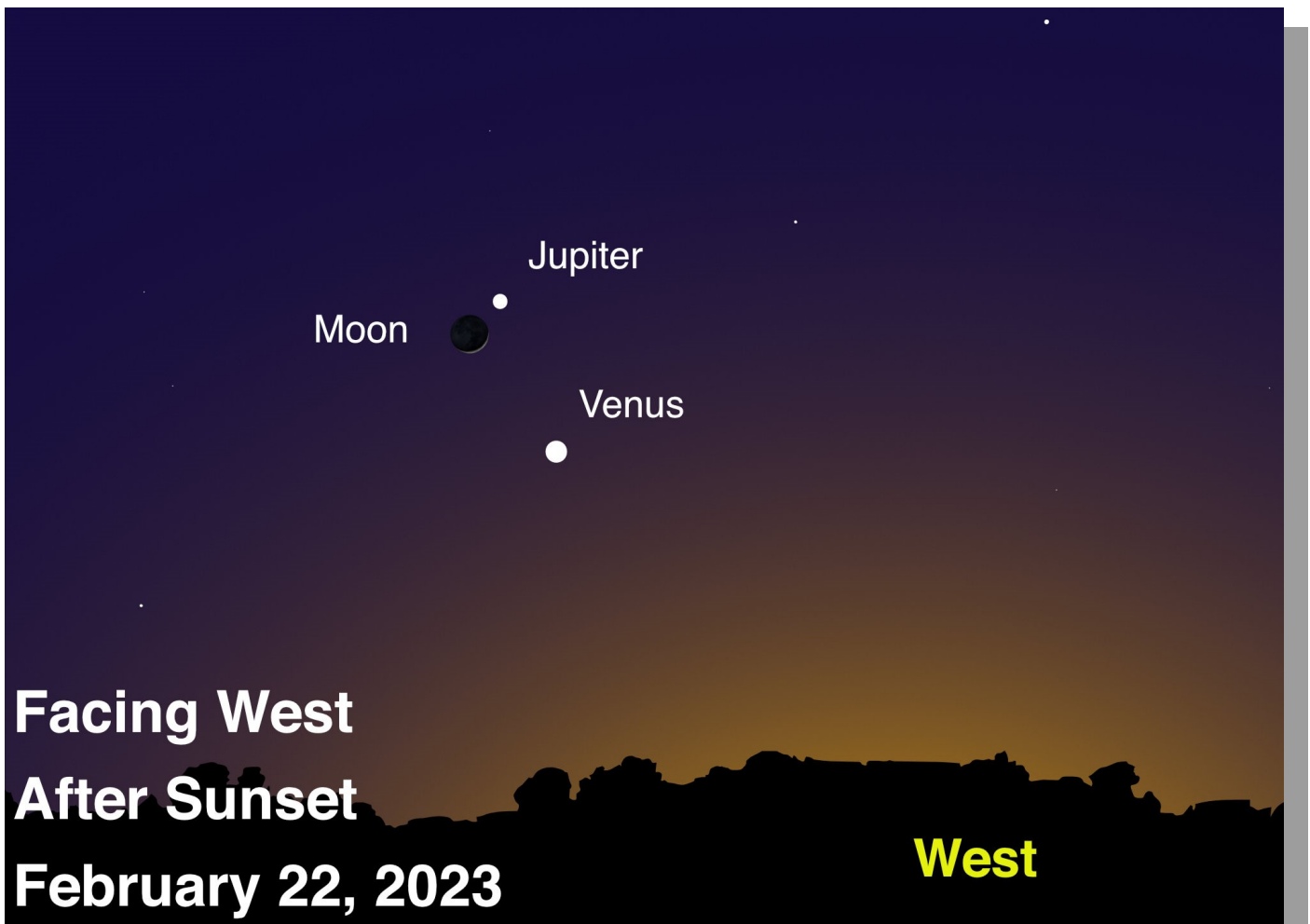
It's even more impressive that the giant world remains very bright to Earthbound observers at its furthest distance: 600 million miles (*968 million km*)! While the King of Planets has a coterie of around 75 known moons, only the four large moons that Galileo originally observed in 1610 – Io, Europa, Ganymede, and Calisto – can be easily observed by Earth-based observers with very modest equipment. These are called, appropriately enough, the *Galilean*

moons. Most telescopes will show the moons as faint star-like objects neatly lined up close to bright Jupiter. Most binoculars will show at least one or two moons orbiting the planet. Small telescopes will show all four of the Galilean moons if they are all visible, but sometimes they can pass behind or in front of Jupiter, or even each other. Telescopes will also show details like Jupiter's cloud bands and, if powerful enough, large storms like its famous Great Red Spot, and the shadows of the Galilean

moons passing between the Sun and Jupiter. Sketching the positions of Jupiter's moons during the course of an evening - and night to night – can be a rewarding project! You can download an activity guide from the Astronomical Society of the Pacific at bit.ly/drawjupitermoons

NASA's Juno mission currently orbits Jupiter, one of just nine spacecraft to have visited this awesome world. Juno entered

(Continued on page 13)



Look for Jupiter as it forms one of the points of a celestial triangle, along with Venus and a very thin crescent Moon, the evening of February 22, 2023. This trio consists of the brightest objects in the sky – until the Sun rises! Binoculars may help you spot Jupiter's moons as small bright star-like objects on either side of the planet. A small telescope will show them easily, along with Jupiter's famed cloud bands. How many can you count? Keep watching Jupiter and Venus as the two planets will continue to get closer together each night until they form a close conjunction the night of March 1. Image created with assistance from Stellarium.

Looking Up (Cont'd)

(Continued from page 7)

convenient because it gives us stars of approximately magnitude 2, 3, 4, 5 and 6 all in a close grouping and an easily recognized pattern. If you can see stars down to magnitude 5 you are under excellent skies. If you can see the magnitude 6 star you are in a special dark

sky location, such as Cherry Springs State Park.

So now you have an easy to use “ruler” by which you can measure the quality of the sky any night of the year!

Information credits:

- Star magnitudes from the iPad application Sky Safari Pro.

- <http://www.space.com/6505-find-dipper.html>
- <http://earthsky.org/brightest-stars/kochab-and-pherkad-guard-the-north-celestial-pole>
- https://en.wikipedia.org/wiki/Magnitude_%28astronomy%29
- <https://skyandtelescope.org/astronomy-resources/the-stellar-magnitude-system/>

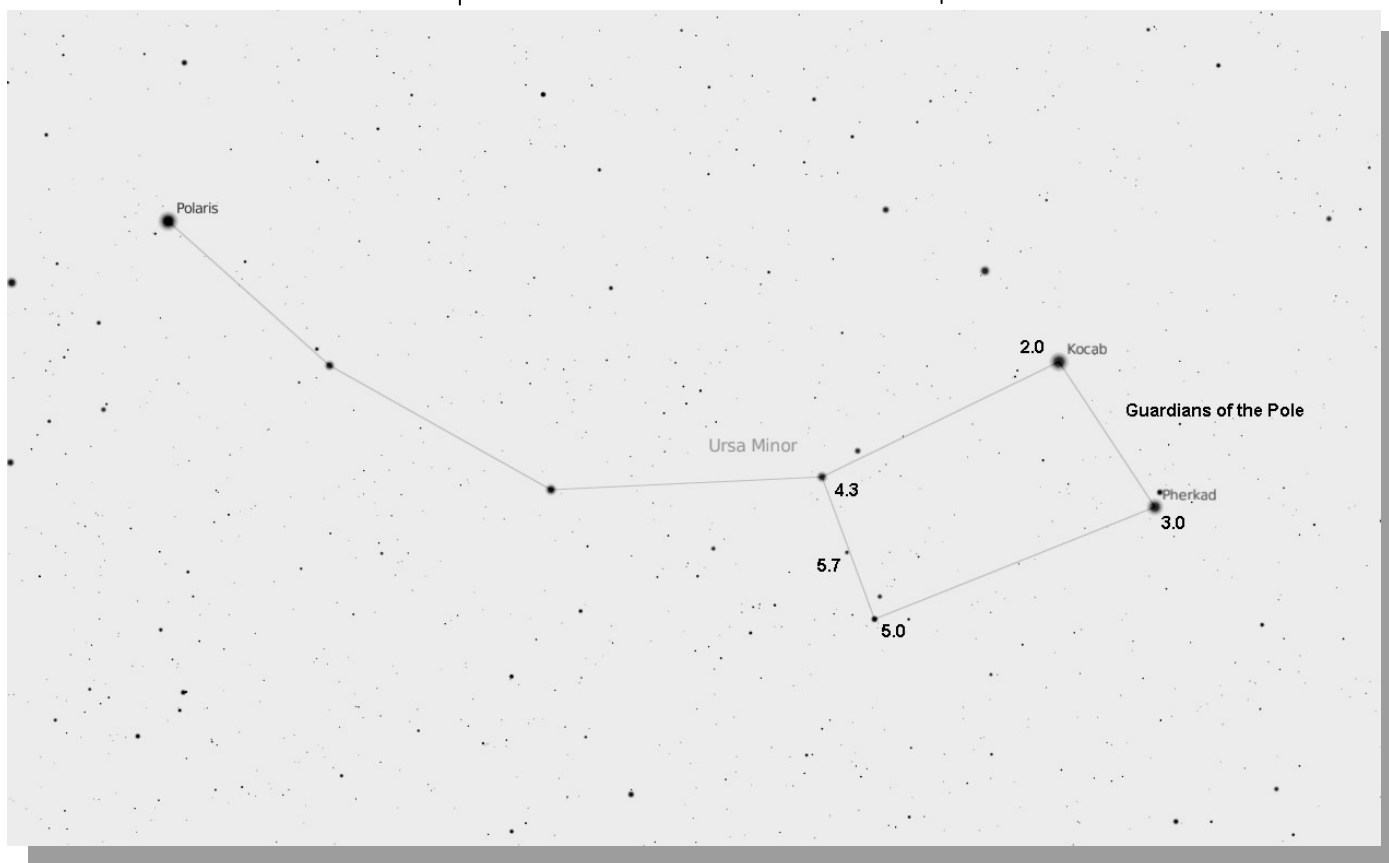


Image credit: Stellarium planetarium software screen capture and IfranView editing by the author

Spring Astronomy Classes!

by Don Knabb, CCAS Education Co-Chair

CCAS has partnered with [Chester County Night School](#) to offer a six-week program meeting Monday nights from 7:00 to 8:00 PM. The classes run from March 20, 2023 through May 1, 2023, with no class April 10th.

- March 20th: Spaceship Earth
- March 27th: Our Moon—Phases and Faces
- April 3rd: Other Kids on the Block
- April 17th: Star Charts and Planetarium Software
- April 24th: Using a Telescope
- May 1st: Beyond Naked-Eye Observing

The cost for the courses is \$59.00 per person. All classes held in person at Stetson Middle School, which is located at 1060 Wilmington Pike (Rte. 202), West Chester 19382.

Jupiter (Cont'd)

(Continued from page 11)

Jupiter's orbit in 2016 to begin its initial mission to study this giant world's mysterious interior. The years have proven Juno's mission a success, with data from the probe revolutionizing our understanding of this gassy world's guts. Juno's mission has since been extended to include the study of its large moons, and since 2021 the plucky probe, increasingly battered by Jupiter's powerful radiation belts, has made close flybys of the icy moons Ganymede and Europa, along with volcanic Io. In 2024 NASA will launch the Europa Clipper mission to study this world and its potential to host life inside its deep subsurface oceans in much more detail. Find the latest discoveries from Juno and NASA's missions at [nasa.gov](https://www.nasa.gov).

Meeting Minutes (Cont'd)

(Continued from page 2)

- A magnetosphere is a region of space surrounding an astronomical object in which charged particles are affected by that object's magnetic field.
- While scientists have been studying the earth's magnetosphere since the 1600s, much remains unknown of these reactions in the ice giants.
- Greater understanding of these forces can enhance our understanding of Earth's magnetosphere as well as magnetic reversals.
- Her lecture seems particularly timely as the earth's magnetic field may be undergoing its cyclical rotation now.
- Following a question and answer period Dave Hockenberry adjourned the meeting.

Observing (Cont'd)

(Continued from page 5)

the area of Cancer the Crab is M44, the "big" Beehive. For more of a challenge, look toward the North, above and to the left of the Big Dipper to find M81 and M82, a pair of relatively bright galaxies.

Comets: Look for Comet (C/2022 E3) ZTF during February as it passes through Taurus the Bull. On February 14th the comet is near Aldebaran, the eye of the bull. Comet ZTF could be near magnitude 5 and easily visible in binoculars. A sky map is in the February issue of Sky and Telescope. Unless a new comet appears out of nowhere, Comet ZTF will be the best comet of 2023.

Meteor showers: There are no meteor showers during February.

Scholarship (Cont'd)

(Continued from page 9)

The actual workings of the Scholarship Fund are quite simple. CCAS members can donate directly to the Fund on a purely optional basis that is distinct from their annual CCAS membership dues. Every year in early spring, a select committee of faculty members within the Department of Earth and Space Sciences at West Chester University nominates two recipients for a \$1,500.00 grant largely on the basis of academic merit as well as need. The nominees selected by the University committee are forwarded to the CCAS Scholarship Fund coordinator, and then we provide the funds to the West Chester University Foundation who admin-

isters these awards to the students. Although the recipients are not required to, they can if they wish receive acknowledgment of their awards in person at our May CCAS meeting and/or in the *Observations* newsletter. Once again, none of the support for the Scholarship Fund come from CCAS membership dues - this is a separate account, funded only by generous donations from our CCAS membership.

Donations can be made by sending your check made out to "CCAS Scholarship Fund" and mailed to our Scholarship Fund coordinator, Bruce Ruggeri. Please mail your donation to:

Bruce Ruggeri
ATTN: CCAS Scholarship Fund
1202 Killington Circle
West Chester, PA 19380

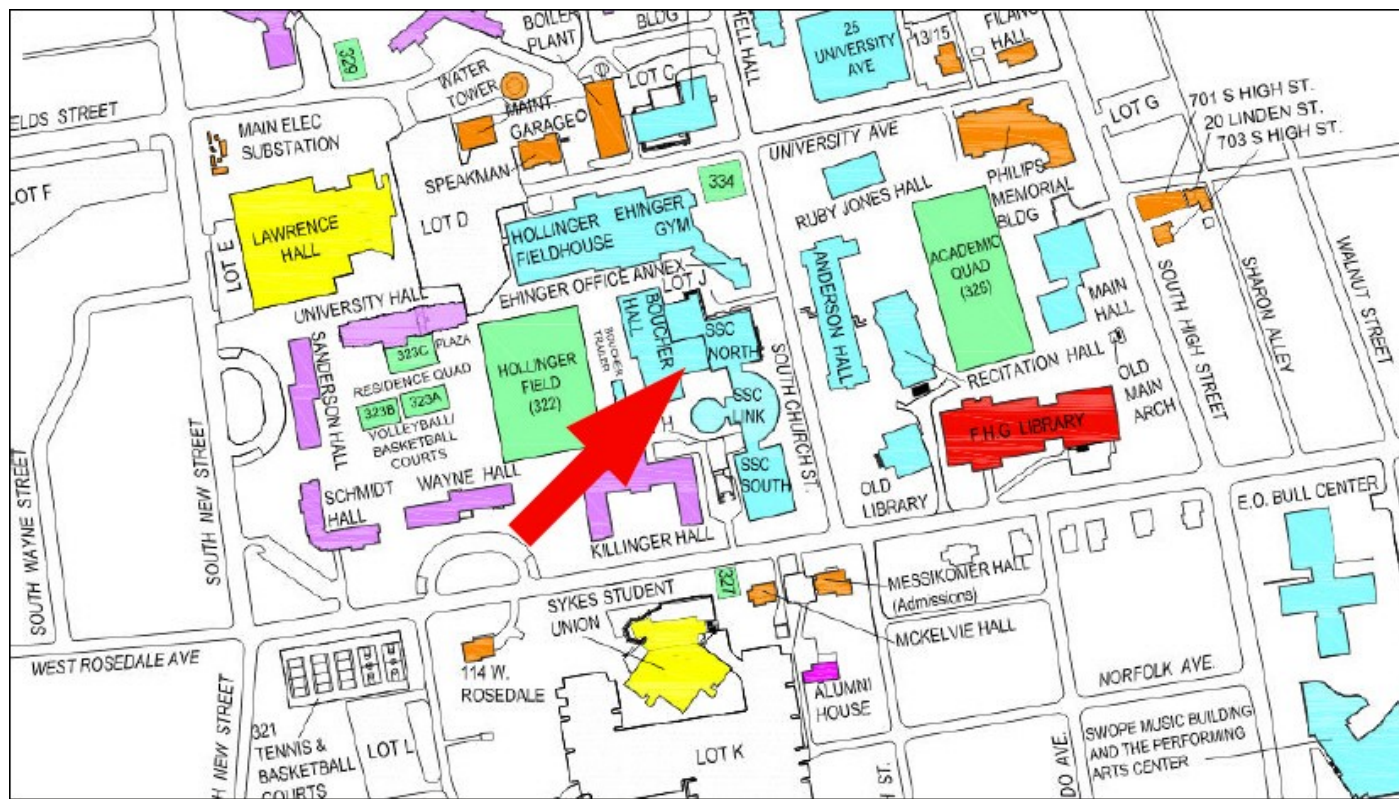
Should you have any questions or need more information about the Fund please contact myself or Bruce directly. We are expecting our first recipients to be chosen in late Spring of this year for the Fall 2023 WCU semester. I know we can count on our membership to help make this Scholarship Fund a success for the long term!

I must give many thanks to Bruce Ruggeri for his inspiration and tireless work in making this this program a reality.

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).



Memoriam (Cont'd)

(Continued from page 9)

Thank you, Pete, for all that you did for CCAS and for astronomy outreach. Our heartfelt condolences to Pete's family and friends who will miss his presence among us. He belongs to the heavens now.

On the Cover

Caroline's Rose. Image acquired with Starizona Hyperion 12.5" astrograph, AP 1200 mount, Starlight Xpress M25C Pro imaging camera, and SX Lodestar/Active Optics guiding. Stack of 30 180-second second RAW sub-exposures, processed in CCDStack and Photoshop CC. Named after William Herschel's astronomer sister Caroline Herschel who discovered this open cluster in 1783. This object actually looks more like its moniker through an eyepiece in a wide field telescope, with curved lines of delicate stars outlining shapes suggestive of rose petals. Some of those shapes are evident here, but this is an excellent winter target for visual observers.

CCAS Membership Information and Society Financials

Treasurer's Report by Don Knabb

Jan. 2023 Financial Summary

Beginning Balance	\$1864
Deposits	\$190
Disbursements	-\$0
Ending Balance	\$2054

New Member Welcome!

Welcome to our new CCAS members Roger & Linda Kennedy from Glen Mills, PA, Bepin Jose & Family from Exton, PA, and Jacob Goldsborough from WCU, 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.ida-dsa.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, and on the CCAS website. 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, Observing, & Treasurer: Don Knabb
610-436-5702

Secretary: Beatrice Mazziotta
610-933-2128

Librarian: Barb Knabb
610-436-5702

Program: Bruce Ruggeri
484-883-5092

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 2021 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.