



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 30, No. 1 **Three-Time** Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016 January 2022

In This Issue

CCAS Winter Events	2
November Meeting Minutes	2
January 2022 Meeting Agenda	2
Guest Speaker Biography & Presentation Synopsis	3
Historic Launch of JWST	3
The Sky Over Chester County: January 2022	4
January 2022 Observing Highlights	5
Nocturne App for iOS Software Review	6
Classic La Para	7
CCAS Directions: Brandywine Red Clay Alliance	7
Through the Eyepiece: The Blue Snowball Nebula, NGC 7662.....	10
NASA Night Sky Notes	12
Membership Renewals.....	14
New Member Welcome	14
CCAS Directions: WCU Map.....	14
Treasurer's Report	14
CCAS Information Directory	15-16

James Webb Telescope Successfully Launched!



Membership Renewals Due

01/2022	Belczyk Carlton Johnson Kellerman Kovacs McElwee Reese Reynolds
02/2022	McCaffrey Ruggeri Sutton Tronel
03/2022	Angelini DellaPenna Fulton Sterrett Zander Zibinski

January 2022 Dates

- 2nd** • New Moon, 1:33 p.m. EST
- 3rd** • The Quadrantid meteors peak
- 5th** • The Moon, Jupiter and Saturn form a large triangle
- 6th** • Mercury is at greatest elongation and the Moon, Jupiter, Saturn and Mercury form a line
- 9th** • First Quarter Moon, 1:11 p.m. EST
- 17th** • Full Moon, the Full Wolf Moon or the Full Child Moon, 6:48 p.m. EST
- 25th** • Last Quarter Moon, 8:41 p.m. EST



CCAS Upcoming Nights Out

Because of the recent increase in Covid-19 infections, CCAS has curtailed its outreach to local communities with group and organizational observing sessions.

In addition, our monthly observing sessions at Myrick Conservancy Center, BVA, are limited to vaccinated CCAS members only. Annually curtailed during the winter months, we will revisit the monthly schedule normally starting in March in time for the February newsletter.

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

Winter Society Events

January 2022

11th • Monthly CCAS Meeting in Room 113, online via Zoom. The meeting starts at 7:30 p.m. Guest Speaker: Brian Matisak, Deputy Director, Systems Engineering & Integration Office, NASA Space Launch System Program at the Marshall Space Flight Center. His presentation is entitled "Space Launch System: Countdown to Launch."

20th • The von Kármán Lecture Series: [SWOT: Looking at the Earth's Water](#) starting at 10:00 pm EDT. Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

20th • Open call for articles and photographs for the February 2022 edition of [Observations](#).

26th • Deadline for newsletter submissions for the February 2022 edition of [Observations](#).

February 2022

8th • Monthly CCAS Meeting in Room 113, online via Zoom. The meeting starts at 7:30 p.m. Dr. Morgan Cable, Astrobiology and Ocean Worlds Group, NASA's Jet Propulsion Laboratory (JPL): "Ocean Worlds of the Outer Solar System - Explorations of Titan and NASA's Dragonfly Mission."

20th • Open call for articles and photographs for the March 2022 edition of [Observations](#).

21st • The von Kármán Lecture Series: [Roving with Perseverance: Findings from One Year on Mars](#), starting at 10:00 pm EDT. Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

26th • Deadline for newsletter submissions for the March 2022 edition of [Observations](#).

November 2021 Monthly Meeting Minutes

by Bea Mazziotta, CCAS Secretary

- Dave Hockenberry welcomed members and guests to the meeting which was held via Zoom and YouTube only. The guest speaker's presentation was virtual. Dave announced that annual CCAS holiday party would be held at the Be Here Pub in Avondale on Tuesday December 14th. With membership now at 140 it was determined that renting a venue would be necessary to accommodate all who want to attend. The pub will be open to CCAS club members only. It will not be open to the public. Members will be able to purchase their own food and drinks from the pub menu.
- Don Knabb invited members to seek out *Asimov* magazine to read a short story by Jack McDevitt entitled, "Tau Ceti Said What?" The author joined us via zoom. Jack had planned to attend the October 2016 CCAS meeting and give a brief presentation. Sadly hurricane Matthew forced him to cancel.
- With the current heightened interest in finding habitable planets nearby Tau Ceti is intriguing. It is a main sequence star with at least 4 planets in its orbit and is 'only' 12 light years distant from us.
- Don also informed us that the viewing had been good though sporadic at the final 2021 BRC observing session.
- The evening's speaker was Steven Levin and his topic, the "Juno Mission - It's a Whole New Jupiter." He gave an overview of Juno's findings since it entered Jupiter's orbit in 2016, 5 years after its launch. The big takeaway - mostly everything we'd assumed about Jupiter isn't so. We learned that the first planet that formed in our solar system is mostly hydrogen and helium gas and both are liquid at the center. There are clusters of cyclones at both poles and they consistently form a hexagonal pattern. Its core is not dense, but diluted and fuzzy forming only half of the planet's diameter. The deep atmosphere is 'mushy'. The swirling gases we see are 3,000 km deep and the magnetic field is very large, complex and more intense than that of earth. It is indeed a whole new Jupiter.
- Steven Levin has been with JPL since 1990. His areas of interest include CMB, SETI, magnetic fields and radio astronomy. He is currently Project Manager for the Juno mission, lead Co - 1 for the Juno Microwave Radiometer and lead scientist for the Goldstone Apple Valley Radio Telescope project.

January 2022 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on January 11, 2022, online via Zoom. The meeting starts at 7:30 p.m. Guest Speaker: Brian Matisak, Deputy Director, Systems Engineering & Integration Office, NASA Space Launch System Program at the Marshall Space Flight Center. His presentation is entitled "Space Launch System: Countdown to Launch."

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 2021-2022 season and beyond. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

January 2022 Guest Speaker Bio & Presentation Synopsis

by Bruce Ruggeri

At our next monthly meeting on January 11, 2022, Mr. Brian Matisak will join us via Zoom to discuss NASA's upcoming Space Launch System as well as the Artemis Lunar Program. Join us online starting at 7:30 p.m.

Presentation Title

NASA's Space Launch System and the Artemis Lunar Program: Countdown to Launch

Presentation Synopsis

NASA's Space Launch System, the world's most powerful rocket, is the backbone of Artemis lunar exploration and is essential to returning humans to deep space. Mr. Matisak will discuss launch preparations for Artemis I, which is fully stacked in the Vehicle Assembly Building (VAB) at Kennedy Space Center in Florida. Mr. Matisak will also provide information on the progress NASA has made, and is continuing to make, for future Artemis missions and the goals/objectives for these missions.

About the Speaker:

Brian Matisak currently serves as the deputy manager of the Systems Engineering and Integration Office (SEIO) for the Space Launch System (SLS) Program at the Marshall Space Flight Center (MSFC) in Huntsville, Alabama. In this role, he provides expert technical and programmatic leadership for the systems engineering and integration functions at the vehicle level for the SLS Program. These responsibilities require close coordination with internal and external stakeholders of the SLS Program. Prior to serving on the SLS Program leadership team,



Deputy Manager Brian Matisak

Mr. Matisak was the Integration, Analysis, and Test (IA&T) Manager in the Reusable Solid Rocket Booster (RSRB) Project Office during the Space Shuttle Program. As IA&T Manager for the space shuttle, he led the team responsible for the ballistic performance, non-destructive testing, structural modeling, booster ascent debris analysis, launch day console operations support, post-flight hardware evaluations, and full- and sub-scale testing of NASA's reusable solid rocket booster. Mr. Matisak earned a bachelor's degree in Aerospace Engineering in 1989 from Auburn University and a master's degree in Industrial and Systems Engineering from the University of Alabama-Huntsville in 1998.

For his exceptional contributions to the nation's space program, Mr. Matisak has received NASA's Space Flight Awareness Leadership Award, among other NASA achievement awards, throughout his career.

Successful launch of the Historic James Webb Space Telescope

by Haygen Warren & Chris Gebhardt, NASA SpaceFlight.com

It is a mission more than 25 years in the making. The revolutionary JWST (James Webb Space Telescope)—a partnership between NASA, the ESA (European Space Agency), and the CSA (Canadian Space Agency)—has launched atop its Ariane 5 rocket from launchpad ELA-3 at the Guiana Space Centre in South America.

Liftoff of James Webb occurred at the opening of a 32-minute-long window on Saturday, December 25 at 12:20 UTC (7:20 am EST). Ariane 5 placed the telescope into a 30-day transfer trajectory to the L2 Lagrange point in the Sun-Earth system.

James Webb arrived in French Guiana on October 12, 2021, after years of extensive testing and final integration by prime contractor Northrop Grumman. After arriving in French Guiana, James Webb was moved to the Guiana Space Centre where final checks, integration, and fueling of the telescope were performed.

James Webb was lifted and integrated atop the Ariane 5 rocket on December 11 and was encapsulated inside the 5.4-meter payload fairing on December 18. Ariane 5 and James Webb rolled out from the final assembly building five days later, on December 23, to pad ELA-3 (Ensemble de Lancement Ariane 3).

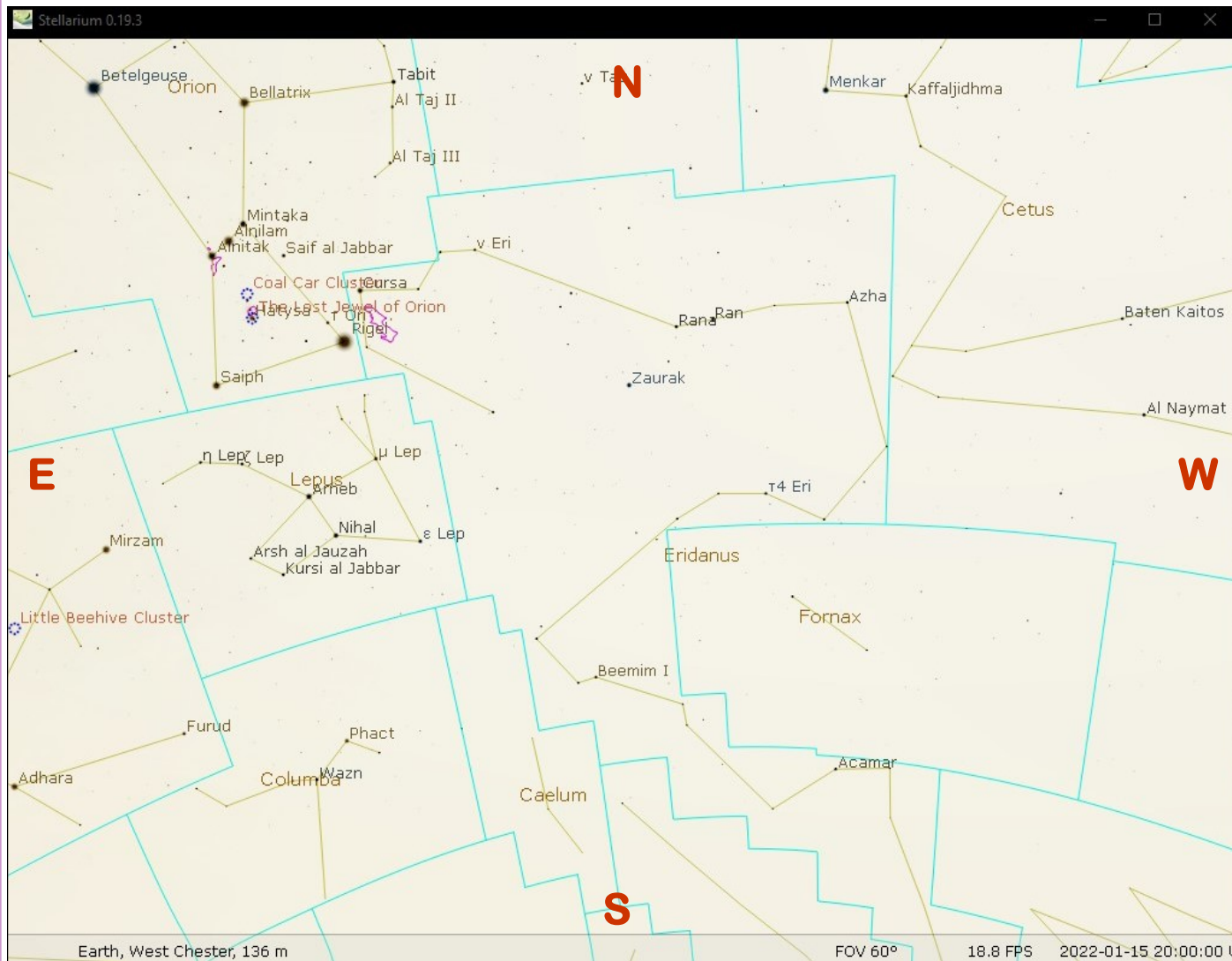
Some modifications for Ariane 5 were necessary for Webb, including increased decontamination efforts on the payload. "There were some precautions

(Continued on page 8)

The Sky Over Chester County

January 15, 2022 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
01/01/2022	6:53 a.m. EST	7:24 a.m. EST	4:48 p.m. EST	5:18 p.m. EST	9h 23m 55s
01/15/2022	6:52 a.m. EST	7:22 a.m. EST	5:01 p.m. EST	5:31 p.m. EST	9h 39m 35s
01/31/2022	6:53 a.m. EST	7:11 a.m. EST	5:20 p.m. EST	5:17 p.m. EST	10h 08m 51s

Moon Phases					
			New Moon	01/02/2022	1:33 p.m. EST
First Quarter	01/09/2022	1:11 p.m. EST	Full Moon	01/17/2022	6:48 p.m. EST
Last Quarter	01/25/2022	8:41 p.m. EST			

January 2022 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

1	Venus, Mercury, Saturn and Jupiter line up as the sky darkens
2	New Moon, 1:33 p.m. EST
3	The Quadrantid meteors peak
5	The Moon, Jupiter and Saturn form a large triangle
6	Mercury is at greatest elongation and the Moon, Jupiter, Saturn and Mercury form a line
9	First Quarter Moon and the Lunar X is visible around 10 p.m.
11	The Lunar Straight Wall is visible
17	Full Moon, the Full Wolf Moon or the Full Child Moon, 6:48 p.m. EST
25	Last Quarter Moon, 8:41 p.m. EST

The best sights this month: The evening sky has a nice line up of planets early in the month with the best view being on January 1st when Venus, Mercury, Saturn and Jupiter line up as the sky darkens. Early January is a good opportunity to see Mercury with January 9th the best day for viewing. Also on January 9th we can view the elusive Lunar X around 10 p.m.

Mercury: January is a great month to see the planet closest to the Sun. For several days before and after January 6th, just as the sky darkens, Mercury will be visible low in the southwest. On January 12th and 13th Mercury will be only 3.4° from Saturn.

Venus: Catch Venus early in the month because on January 8th it slips behind the Sun and emerges in the pre-dawn sky on January 10th. I'll miss that brilliant "evening star" as the sky darkens.

Mars: If you are an early riser you can see Mars low in the east before dawn.

Jupiter: The king of the planets becomes the brightest planet in the evening sky after Venus transitions to the morning sky in early January. Jupiter will be visible all month in the southwest.

Saturn: Enjoy the ringed planet early in January, because past mid-month it falls into the glow of the setting Sun and will be hard to see after January 20th.

Uranus and Neptune: Uranus is in the southeast after the sky darkens and is visible nearly all night. It is in the constellation Aries the Ram and can be found using binoculars and a good app on your mobile device if you star-hop to it. Neptune is much fainter at magnitude 7.8 in the constellation Aquarius. It can be seen with binoculars but you should mount them on a tripod to make star-hopping easier.

The Moon: Full Moon is on January 17th. According to Native Americans, the first full Moon of January is the Full Wolf Moon. Amid the cold and deep snows of midwinter, the wolf packs howled hungrily outside Indian villages, so it was named the Full Wolf Moon. Sometimes it was also referred to as the Old Moon, or the Moon after Yule. Some called it the Full Snow Moon, but most tribes applied that name to the next full Moon. Native Canadians called this the Child Moon.

Constellations: As the last blush of twilight drains from the sky, look toward the west for Cygnus the Swan, also known as the Northern Cross. The Swan is diving headfirst toward the horizon, so it looks like a cross in the sky, with bright Deneb at the top of the cross. In the eastern sky the most recognized constellation of the winter climbs into view, Orion the Hunter. Look for his three-star belt extending straight up from the horizon. Orange Betelgeuse is to the left of the belt with blue-white Rigel to the right. About an hour behind Orion follow the line made by the belt down toward the horizon for the brightest star in the night sky, Sirius the Dog Star, twinkling through the atmosphere.

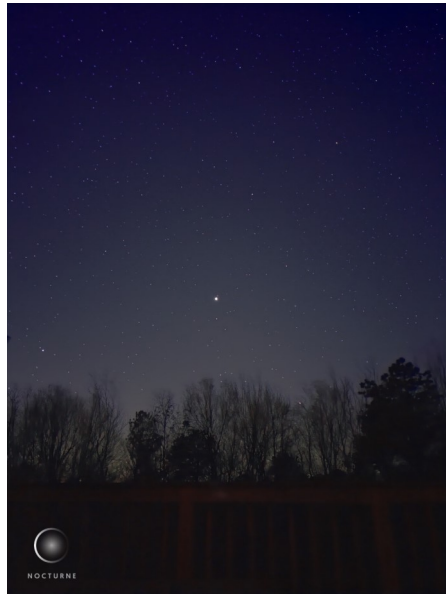
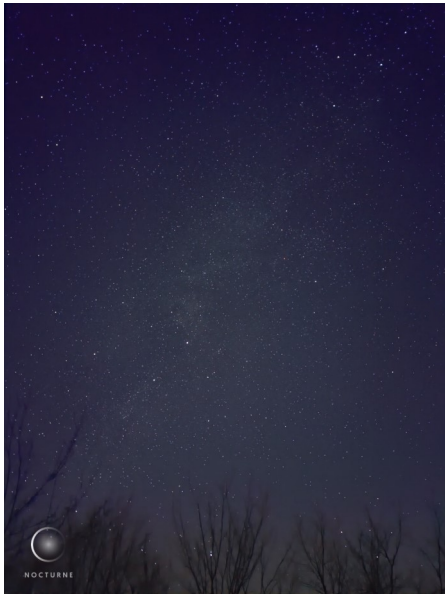
Messier/deep sky: Although there are many wonderful sights in the winter sky, if I could see only one, I would pick M42, the Great Orion Nebula. Set up your telescope and just stare at this, the brightest nebula in the sky. If you don't have a telescope M42 is still a nice sight in binoculars, but instead find the Beehive Cluster, M44, in the constellation Cancer. The stars of the Beehive will fill your eyepieces!

Comets: Comet Leonard is gone from the sky, and

(Continued on page 7)

Wide Field Astrophotography with an iPhone Made Easy: Nocturne App for iOS

by Don Knabb



Author Photos Using the Nocturne App on His iPhone 11. L.-to-R. (Cygnus, Jupiter & Orion.

Unistellar is a company that produces telescopes that are fully automated requiring no alignment whatsoever. They currently sell two telescopes, one that is completely digital so that viewing night sky objects happens only on your mobile device and one that is digital and also includes an eyepiece. These telescopes use proprietary enhanced vision, pointing and tracking and light pollution reduction technologies to show galaxies, nebulae, comets and other deep sky objects.

Unistellar has made a free app available for iOS that allows an iPhone to perform wide field astrophotography with no additional equipment, although a smart phone holder and tripod will be a big help. The app is called Nocturne and is available through the Apple app store. As of this writing the app only works with iOS, although an Android version is being developed. Here is a link to the website of the app: <https://unistelleroptics.com/nocturneapp>

I took several pictures with an iPhone 11 leaning against my eyepiece box setting on a table. It was tricky to aim and to push the button to initiate the picture, so next time I use Nocturne I will use a phone holder and a tripod.

The image acquisition takes about 3 minutes. The app takes 150-200 images and aligns, stacks and processes them al-

most immediately.

I took pictures of the area of the sky with the Pleiades, Jupiter, Cygnus and Orion. In the Cygnus picture the Milky Way is easily visible, and in the Orion picture you can see our Dobsonian telescope in the foreground. It is a lot of fun and a really easy way to get started in wide field astrophotography!



Author Photo of the Pleiades Using the Nocturne App on His iPhone

Observing (Cont'd)

(Continued from page 5)

when I saw it in mid-December it was underwhelming. But, it was clearly a fuzzy spot in the sky, so I'm glad we had a chance to see this visitor from the outer solar system. There are no bright comets in the January sky.

Meteor showers: The Quadrantid meteor shower is best viewed during the pre-dawn sky on January 3rd. The Moon will not be in the sky so we have a good chance of seeing a nice collection of "shooting stars". I have seen some amazing outbursts from this shower, so look if you can.

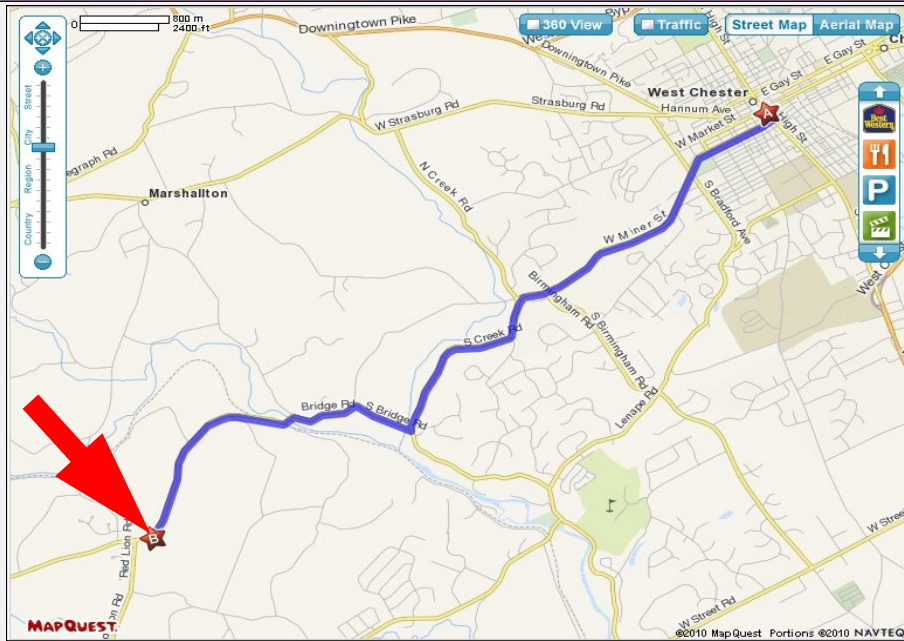
Classic La Para by Nicholas La Para

ASTRONOMY NEWS

EARTH COMPLETES ANOTHER ORBIT WITHOUT MISHAP!

***NASA: "A perfect mission." Requests increased funding to keep gravity at its current level.**

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.

James Web Launches (Cont'd)

(Continued from page 3)

done,” said Daniel de Chambure, Ariane 5 Operational launch System manager.

“For the satellite, we have installed a specific high-efficiency HEPA filter to create a laminar flow around Webb as needed. The key objective there was to prevent contamination—the normal contamination—by [a factor of] 10. Taking this precaution, an active charcoal filter in the air conditioning system... these were necessary for Webb’s sensitivity.”

Additionally, the payload fairing that protected Webb from Earth’s dense lower atmosphere

during the initial moments of launch underwent more stringent cleaning and decontamination procedures, cleaned first in Europe before shipment to French Guiana and then again prior to encapsulation.

These new procedures were specifically designed for Webb, but de Chambure noted they will likely be used to some degree for ESA’s upcoming JUICE mission to Jupiter’s moons—a mission currently slated to launch on the second-to-last Ariane 5 rocket in history.

For Webb, Ariane 5 entered countdown operations at T-11 hours 23 minutes. A full check

of Ariane 5’s electrical systems took place at T-10 hours 33 minutes before the beginning of Ariane 5 propellant load.

The loading of liquid hydrogen and liquid oxygen into the Ariane 5 first stage begins at T-4 hours 38 minutes. A little over an hour later, liquid hydrogen and liquid oxygen begin flowing into the second stage, at T-3 hours 23 minutes. Chilling of the first stage’s Vulcain main engine begins at T-3 hours 18 minutes.

At T-1 hour 15 minutes, Arianespace teams checked the connections between the rocket

(Continued on page 9)



Ariane 5 with the James Webb Space Telescope launches from ELA-3 in French Guiana. Image Credit: ESA

James Webb Launches (Cont'd)



The fueling arms for the Ariane 5 rocket (Credit: Chris Gebhardt (photo) Nathan Barker (edit))

(Continued from page 8)

and the telemetry, tracking, and command systems. A little over an hour later, launch teams held an “all systems go” report to confirm that James Webb and Ariane 5 were ready for launch.

At T-4 minutes, the first and second stage propellant tanks pressurized for flight. Next, at T-1 minute, Ariane 5 switched to onboard power.

At T-5 seconds, the cryogenic arms that supply the Ariane 5 tanks with cryogenic fuels opened and retracted from the vehicle. At T-4 seconds, the rocket’s onboard systems took over the launch sequence.

After T0, the first stage Vulcain main engine ignited, with the twin solid rocket boosters firing at T+7.01 seconds.

At T+7.3 seconds, the Ariane 5 rocket lifted off from pad ELA-3 at the Guiana Space Centre carrying the James Webb Space

Telescope.

Solid rocket booster separation occurred at T+2 minutes 22 seconds, with payload fairing jettison at T+3 minutes 26 seconds. The Vulcain engine exhausted its supply of liquid hydrogen and liquid oxygen at T+8 minutes 47 seconds, followed immediately by stage separation and the ignition of the HM-7B engine on the ESC-A (Étage Supérieur Cryogénique-A) upper stage.

The upper stage performed a single, continuous 16-minute 6-second burn to place Webb directly into its L2 transfer trajectory.

Separation of Webb from the Ariane 5’s upper stage occurred 27 minutes 7 seconds after lift-off.

While its mission has now begun, the history of JWST traces its direct roots to the mid-1990s and the Next Generation Space Telescope, which sought to

greatly expand upon the capabilities of the Hubble Space Telescope.

As such, JWST is not technically a replacement of the iconic Hubble observatory but rather an enhanced, complimentary telescope that can see in great detail in wavelengths that Hubble cannot.

Of particular interest for JWST astronomers is the infrared wavelengths 0.6 to 28.3 μm —for which Webb is optimized. Hubble observes the near-visible, near-infrared, and ultraviolet wavelengths between 0.1 to 1 μm .

[NASASpaceflight has written extensively](#) on the various instruments onboard JWST, as well as its cryocooler that is key to cooling the observatory to just 6K for infrared observations. With its 6.8 m gold-coated beryllium mirror, JWST will be able to see back to “first light,” around 400 million years after the big bang when the first stars and galaxies were forming.

However, this is not the farthest back a telescope has seen; that honor goes to the COBE (Cosmic Background Explorer). COBE provided critical evidence to support the Big Bang Theory of the universe’s creation, including that the cosmic microwave background radiation has a near-perfect black-body spectrum, and that it has very faint anisotropies.

Two of COBE’s PIs (Principal Investigators), George F. Smoot and John C. Mather, were awarded the Nobel Prize in Physics in 2006 for their work

(Continued on page 11)

Through the Eyepiece: The Blue Snowball Nebula, NGC 7662

by Don Knabb, CCAS Observing Chair & Treasurer

With winter approaching it seems appropriate to write about The Blue Snowball Nebula. Also known as NGC 7662, the Blue Snowball Nebula or Caldwell 22 is a planetary nebula located in the constellation Andromeda.

NGC 7662 is a popular planetary nebula for casual observers. A small telescope will reveal a star-like object with slight nebulosity. A 6" telescope with a magnification around 100x will reveal a slightly bluish disk, while telescopes with a primary mirror at least 16" in diameter may reveal slight color and brightness variations in the interior.

I observed the Blue Snowball Nebula with a 12 inch Dobsonian telescope. This is a small nebula, no more than half the size of the famous Ring Nebula in Lyra. I could barely perceive a hint of blue color in the nebula, and although it is a relatively bright object for a nebula, I still found it best observed with averted vision. I could clearly see why this nebula was nicknamed a snowball.

A planetary nebula is an emission nebula consisting of an expanding glowing shell of ionized gas ejected by stars late in their life. This name originated with their first discovery in the 18th century because of their similarity in appearance to giant planets when viewed through small optical telescopes, and is otherwise unrelated to the planets of the solar system.

Whereas diffuse nebula give birth to stars in the gravitational condensation of gas clouds in



Image by Judy Schmidt - Flickr: NGC 7662 "Blue Snowball"

interstellar space, planetary nebula, such as the Blue Snowball Nebula, signal instead the death of stars. Rather than disperse widely across many light-years, the gases of planetary nebula are concentrated around the dying star that throws them off, with a more tightly-packed, ball-like appearance.

NGC 7662 is often referred to as the *Blue Snowball Nebula* because astronomers are often whimsical, if not lacking in creativity. The Blue Snowball is a very bright (comparatively) magnitude 9 and is well-placed for

viewing and imaging in the Northern hemisphere in the fall and winter months. It makes an excellent visual target for small scopes, since this small nebula measures just 32" x 28", so its small size and high actual magnitude couple to create a very high apparent magnitude, which is a very good measure of how bright an object will appear to a visual observer.

One source I found made this comment in regards to visual observation vs. imaging of deep sky objects: "Targets of this size

(Continued on page 11)

Eyepiece (Cont'd)

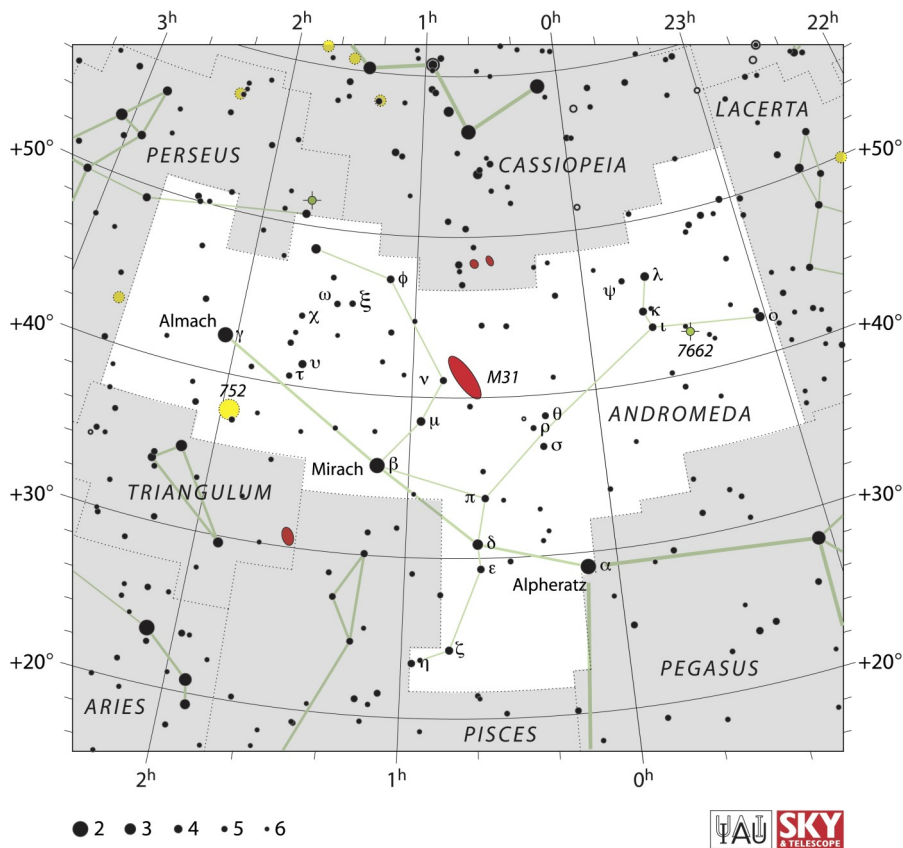


Image credit: International Astronomical Union and Sky and Telescope Magazine
(Roger Sinnott & Rick Fienberg)

(Continued from page 10)

are a mere speck to astrophotographers who sing praise to their tiny apertures with short focal lengths and “starscape” like fields of view. To a large aperture scope, it’s a chance for a little redemption.”

The Blue Snowball Nebula (NGC 7662 in the map) is not hard to find using the star chart of the constellation Andromeda. It is about half way between the Great Square of Pegasus and Cassiopeia.

So when you are looking through the eyepiece of a telescope, seek out the first snowball of the winter, The Blue Snowball Nebula!

Information sources:

- http://en.wikipedia.org/wiki/NGC_7662
- http://en.wikipedia.org/wiki/Planetary_nebulae
- <http://exosky.net/exosky/?p=592>
- <http://www.calvin.edu/academic/phys/observatory/images/Astr111.Fall2009/Morse.html>
- <http://apod.nasa.gov/apod/ap961121.html>

Webb Launches (Cont'd)

(Continued from page 9)

on COBE. John Mather is now a Senior Project Scientist on JWST, which will continue his work on the formation of the universe by picking up—in terms of what it can see—where COBE left off.

But Webb isn’t just about seeing back to the first elements of the formation of the universe. JWST will also be able to see much closer to the present day, investigating—among other things—exoplanet atmospheres to characterize their composition and reveal more about their evolution as well as their potential to harbor life. Webb will also be called upon to observe planets and other targets in our solar system.

In order to fit in Ariane 5, Webb must be able to fold itself up for launch. This is not an uncommon practice in spaceflight. Satellites routinely fold up portions of themselves not just to fit in rocket fairings but for launch load considerations as well.

This is where Webb is different from all others that have come before it. Its size mandates 344 folds to fit in Ariane 5—folds that must be reversed one at a time after reaching space.

Of those 344 unfolds, 307 (87%) are critical, single-point failure areas—meaning that should one of those critical unfolds fail, be it with the sunshield deployment or primary/second mirror deployment, the mission will be over before it really begins. Of these 307 critical single-point failure areas,

(Continued on page 13)

NASA Night Sky Notes: Hunting the Hunter — Observing Orion

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.

If you are outside on a clear January night, it's hard not to notice one distinctive star pattern above all: **Orion!** While we've covered Orion in earlier articles, we've never discussed observing the constellation as a whole. Perhaps you've received a new telescope, camera, or binoculars, and are eager to test it out. Orion, being large, prominent, and full of interesting, bright objects, is a perfect constellation to test out your new equipment and practice your observing skills - for beginners and seasoned stargazers alike.

In Greek mythology, Orion is a strong hunter, with numerous legends about his adventures. Being such a striking group of stars, cultures from all around the world have many myths about this star pattern. There are so many that we can't list them all here, but you can find a wonderful interactive chart detailing many cultures' legends on the Figures in the Sky website at figuresinthesky.visualcinnamon.com.

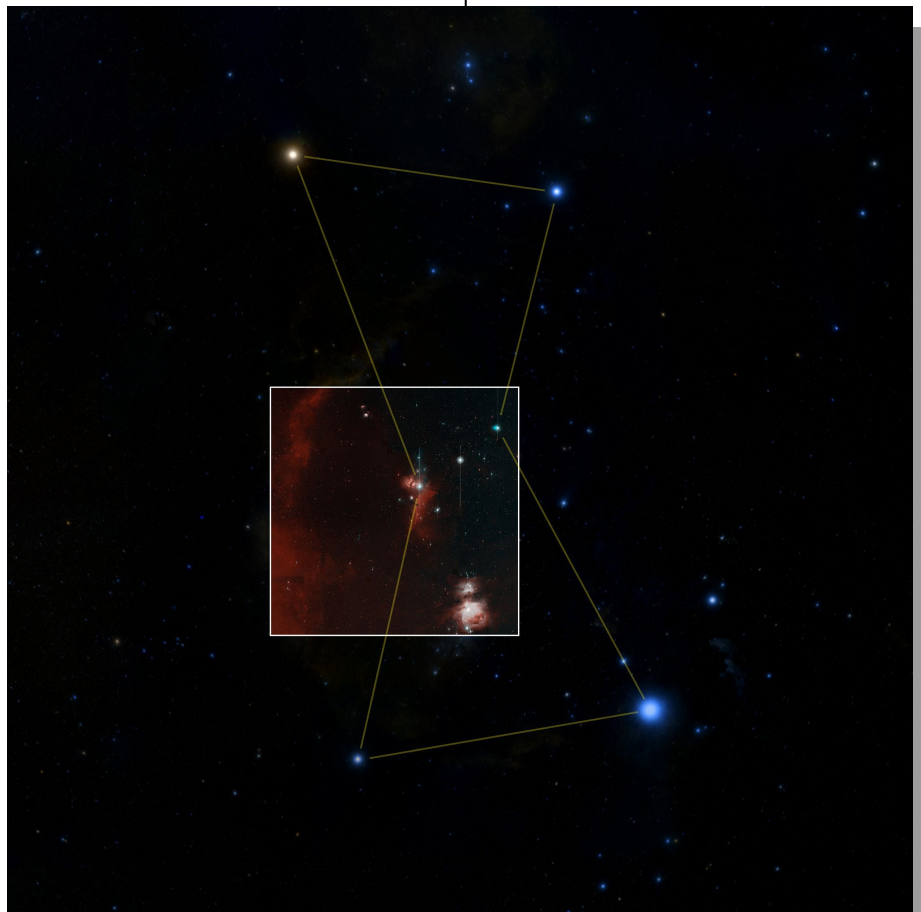
What sights can you see in Orion? Look above the variable orange-red supergiant "shoulder star" Betelgeuse to find the stars making up Orion's "club," then move across from Betelgeuse towards the bright star Bellatrix (Orion's other "shoulder") and the stars of his bow and arrow - both essential tools for the Hunter. Many interesting sights lie near Orion's "belt" and



"sword." Orion's belt is made up of three bright giant stars forming an evenly spaced line: Alnitak, Alnilam, and Mintaka. Move from the belt stars towards the stars Rigel and Saiph

(Orion's "feet" or "knees") to arrive at Orion's distinctive Sword, parts of which may appear fuzzy to your unaided eyes. Binoculars reveal that fuzz to be the famed Orion Nebula (M42), perched right next to the star Hatysa! Diving in deeper with a telescope will show star clusters and more cloud detail around the Nebula, and additional magnification brings out further detail inside the nebula itself, including the "baby stars" of the Trapezium and the next-door neighbor nebula M43. Want to dive deeper? Dark skies and a telescope will help to bring out the

(Continued on page 13)



The inset image is the "first light" photo from the Zwicky Transient Facility, a large survey telescope designed to detect changes in the entire night sky by detecting "transient objects" like comets, supernovae, gamma ray bursts, and asteroids. For many astronomers, amateur and pro alike, Orion is often the "first light" constellation of choice for new equipment! Image Credit: Caltech Optical Observatories

Night Sky Notes (Cont'd)

Webb Launches (Cont'd)

(Continued from page 11)

225 (65%) are in the sunshield.

Of the 344 unfolds, 178 (52%) are NEA (non-explosive actuator) release mechanisms. The sunshield contains 120 of these NEA release mechanisms, 107 of which are MRDs (membrane release devices), 9 are pin pullers, and 4 are for cable brake assays.

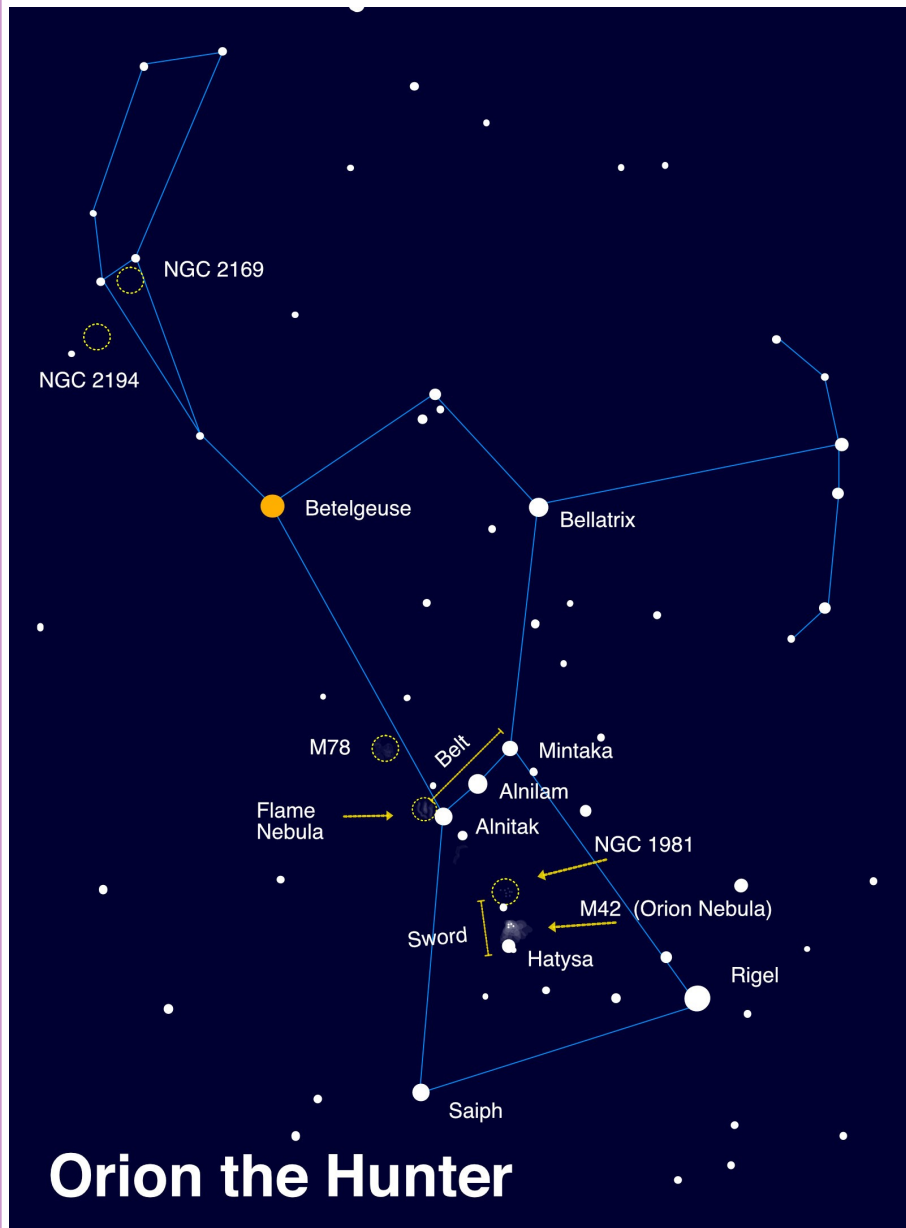
The unfolding process, planned in 15-minute increments by the team, started soon after JWST is deployed from the top of the Ariane 5's ECS-D upper stage and will proceed for roughly 30 days. Project scientists and engineers have been hesitant to release the full timeline in advance, as many of these operations have never been performed in space before, and slips and realignments are almost certain to occur.

If the 30-day unfolding process works as planned, JWST will then need approximately five more months for the sunshield and cryocooler to properly cool the observatory down before final instrument calibrations can take place—though some calibrations will be possible beforehand as well.

At present, JWST should be ready for first observations by the middle of 2022—though no specific date will be known publicly until the complex process of readying the telescope to actually look at the universe is nearing completion. As such, the public should not expect images from Webb until the middle of 2022 at the earliest.

Read the entire article at <https://www.nasaspacelight.com/2021/12/ariane-5-webb-launch/>

(Continued on page 14)



Northern Hemisphere observers can find Orion during January evenings in the east/southeast skies. Can you spot the Orion nebula with your naked eye, in Orion's sword? How does it look via binoculars or a telescope? What other details can you discern? Please note that some deep sky objects aren't listed here for clarity's sake. For example, M43, a nebula located directly above M42 and separated by a dark dust lane, is not shown. Orion's Belt and Sword are crowded, since they star-forming regions! You can read more in our November 2019 article *Orion: Window Into a Stellar Nursery*, at bit.ly/orionlight. Image created with assistance from Stellarium.

(Continued from page 12)

reflection nebula M78, the Flame Nebula (NGC 2024), along with many star clusters and traces of dark nebula throughout the constellation. Very careful observers under dark clear skies may be able to

spot the dark nebula known as the Horsehead, tracing an equine outline below both the Belt and the Flame Nebula. Warning: the Horsehead can be a difficult challenge for many stargazers, but very rewarding.

CCAS Directions

West Chester University Campus

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



Night Sky Notes (Cont'd)

(Continued from page 13)

This is just a taste of the riches found within Orion's star fields and dust clouds; you can study Orion for a lifetime and never feel done with your observations. To be fair, that applies for the sky as a whole, but Orion has a special place for many. New telescopes often focus on one of Orion's treasures for their first test images. You can discover more of NASA's research into Orion's stars - as well as the rest of the cosmos - online at nasa.gov.

CCAS Membership Information and Society Financials

Treasurer's Report by Don Knabb

Dec. 2021 Financial Summary

Beginning Balance	\$682
Deposits	\$279
Disbursements	<u>-\$0</u>
Ending Balance	\$961

New Member Welcome!

Welcome to our new CCAS member Eric Schier from Downingtown, 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
3225 North First Avenue
Tucson, AZ 85719

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

PENNSYLVANIA OUTDOOR



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.LymePA.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 Park City, Utah.

Phone: 877-604-7377
Fax: 877-313-2889

<http://www.starrynightlights.com>



LIGHTHOUSE
OUTDOOR LIGHTING

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

Phone: 484-291-1084

<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

<http://www.skiesunlimited.net>



Spectrum Scientifics
Quality Science Products for All Ages

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

4403 Main Street
Philadelphia, PA 19127

Phone: 215-667-8309
Fax: 215-965-1524

Hours:
Tuesday thru Saturday: 10AM to 6PM
Sunday and Monday: 11AM 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 (410) 639-4329 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.