Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 30, No. 6 ***Three-Time*** *Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016* *June 2022*

In This Issue

Membership Renewals Due

06/2022	Crabb
	Dhargalkar
	Hanspal
	Harris
	Hebding
	Hodson
'	Lindtner
	Maynard
	Mazziotta & Calobrisi
	Thomas
07/2022	Barasatian
	Hockenberry & Miller
	Hunsinger
	McGuigan
	Morgan
	Piehl
08/2022	Borowski
	Force
	Johnston & Stein
	Knabb Family
	Lurcott, L.
	Manigly
	Tiedemann
	Tredinnick
	Trunk
	Zullitti

Moon Occults HIP 70633 A During Eclipse

During the May 15th lunar eclipse, CCAS Member John Abbott captured images of the Moon occulting 6th magnitude star HIP 70633A. For more details about the images, see pg. 13.

June 2022 Dates

7th • First Quarter Moon and the Lunar Straight Wall is visible this evening

11th • Two moon shadows are visible on Jupiter around 11:30 p.m.

14th • Full Moon, the Full Strawberry Moon, or the Full Trees Fully Leaved Moon

20th • Last Quarter Moon, 11:10 p.m. EDT

24th • All 5 naked eye planets and the Moon are visible in the pre-dawn sky

28th • New Moon, 10:52 p.m. EDT

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.

☼ Friday, June 3rd • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

☼ Friday, July 8th • CCAS Special Observing Session, Friday Night Lights, ChesLen Preserve, Coatesville, PA.

☼ Friday, July 22nd • 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.

Spring/Summer Society Events

June 2022

2nd-5th • Cherry Springs Star Party at Cherry Springs State Park, Coudersport, PA. For more information, contact our Observing Chair, Don Knabb.

3rd • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

20th • Open call for articles and photographs for the July 2022 edition of Observations.

21st • Summer solstice, 5:13 a.m. EDT

26th • Deadline for newsletter submissions for the June 2022 edition of Observations.

July 2022

8th • CCAS Special Observing Session, Friday Night Lights, ChesLen Preserve, Coatesville, PA. For non-members registration is required with The Natural Lands Trust. For more information, contact our Observing Chair, Don Knabb.

20th • Open call for articles and photographs for the August 2022 edition of Observations.

22nd • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

26th • Deadline for newsletter submissions for the August 2022 edition of Observations.

26th-29th • CCAS Special Camping Trip & Observing Session at Cherry Springs State Park, Coudersport, PA. For more information, contact our Observing Chair, Don Knabb.

August 2022

19th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

20th • Open call for articles and photographs for the August 2022 edition of Observations.

23rd-26th • CCAS Special Camping Trip & Observing Session at Cherry Springs State Park, Coudersport, PA. For more information, contact our Observing Chair, Don Knabb.

26th • Deadline for newsletter submissions for the August 2022 edition of Observations.

May 2022 Monthly Meeting Minutes

by Bea Mazziotta, CCAS Secretary

- Don led a tour of the current night sky which is filled with open clusters, galaxies, stars and globular clusters. The Beehive open cluster, the Leo triplet of galaxies, the Hercules globular cluster and the double star Kuma are but a few of the wondrous objects in May's night sky.
- Bruce Ruggeri introduced the evening's speaker, Dr. Michael Brown. Dr. Brown is a planetary astronomy professor at Cal Tech. He has been called the man who 'killed Pluto' due to his role in downgrading Pluto to a dwarf planet. Dr. Brown is well known in the scientific community for his surveys of distant objects that orbit the sun. He and his team have discovered many objects transiting Neptune including Sedna, a dwarf planet in the outer reaches of our solar system.
- The title of his presentation, *The Search for the Elusive Planet Nine - Myth or Reality*, has its roots in the 1957 movie *Planet Nine from Outer Space*. The movie, the recipient of several Golden Turkey Awards and once deemed the worst movie ever, now has a cult following.
- Astronomers and scientists have long speculated about the existence of a giant planet beyond Neptune. The existence of a planet in that location could explain the strange clustering of orbits for a defined group of objects that are located well beyond Neptune. These objects all orbit the sun in the same peculiar pattern. They all have their closest approach in one sector and their orbits all pull off in the same direction and are all similarly tilted. This suggests the possibility that a very large but as yet undiscovered body is influencing their trajectories. Solar system surveys haven't yet found Planet Nine, but surveys of unexplored regions are ongoing. One of the unexplored regions seems to be the most likely area for Planet Nine's location. Fingers crossed that a new survey will soon reveal the existence the real Planet Nine from Outer Space.

September 2022 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on September 13, 2022, in person (as well as via Zoom) at West Chester University's Merion Science Center, Room 112 (please note the new room right next to our previous room). The Science Center is located at 720 S. Church St., West Chester, PA. CCAS Member Speaker: John Conrad, who will present "Do Look Up- DART: the worlds first asteroid deflection test."

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 2022 -2023 season and beyond. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

Voyager Is Sending "Impossible Data" Back to NASA from the Edge of the Solar System

by Adam Smith, The Independent

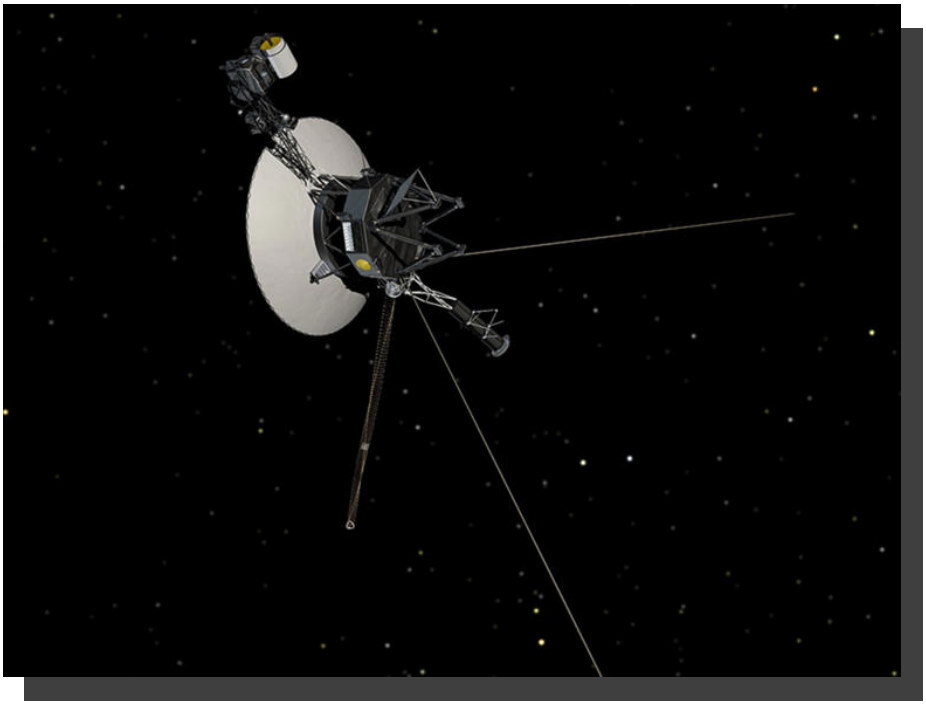


Image Credit: © NASA/JPL-Caltech

NASA's engineering team is investigating a mystery taking place on the Voyager 1 spacecraft.

Voyager 1 is the most distant human-made object in existence, having launched 44 years ago. It is currently operating at the edge of the solar system, flying through the "interstellar medium" beyond the Sun's influence.

However, scientists found that the craft is receiving and executing commands from Earth successfully – but the readouts from the probe's attitude articulation and control system (AACS) do not reflect what is actually happening on board Voyager 1.

The system maintains the craft's orientation, keeping its antenna pointed precisely to the Earth so that data can be sent from it to NASA. While all indications suggest that the AACS is working as normal, the telemetry data it is returning appears to be randomly generated – failing to reflect any possible state that the system could be in.

Further, the issue has not trig-

(Continued on page 13)

New Hubble Space Telescope Data Suggests "Something Weird" Is Going on with Our Universe

by Andrew Griffin, The Independent

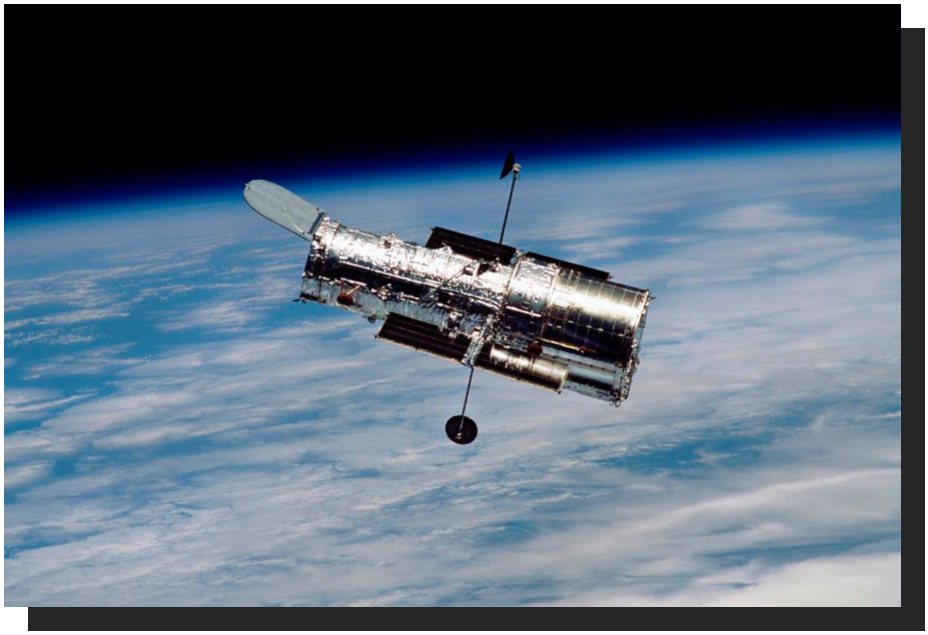


Image Credit: NASA

The Hubble Space Telescope has reached a new milestone in its work to find out how quickly the universe is expanding – and it supports the idea that something strange is happening in our universe, NASA says.

In recent years, astronomers have used telescopes like Hubble to understand exactly how quickly our universe is expanding.

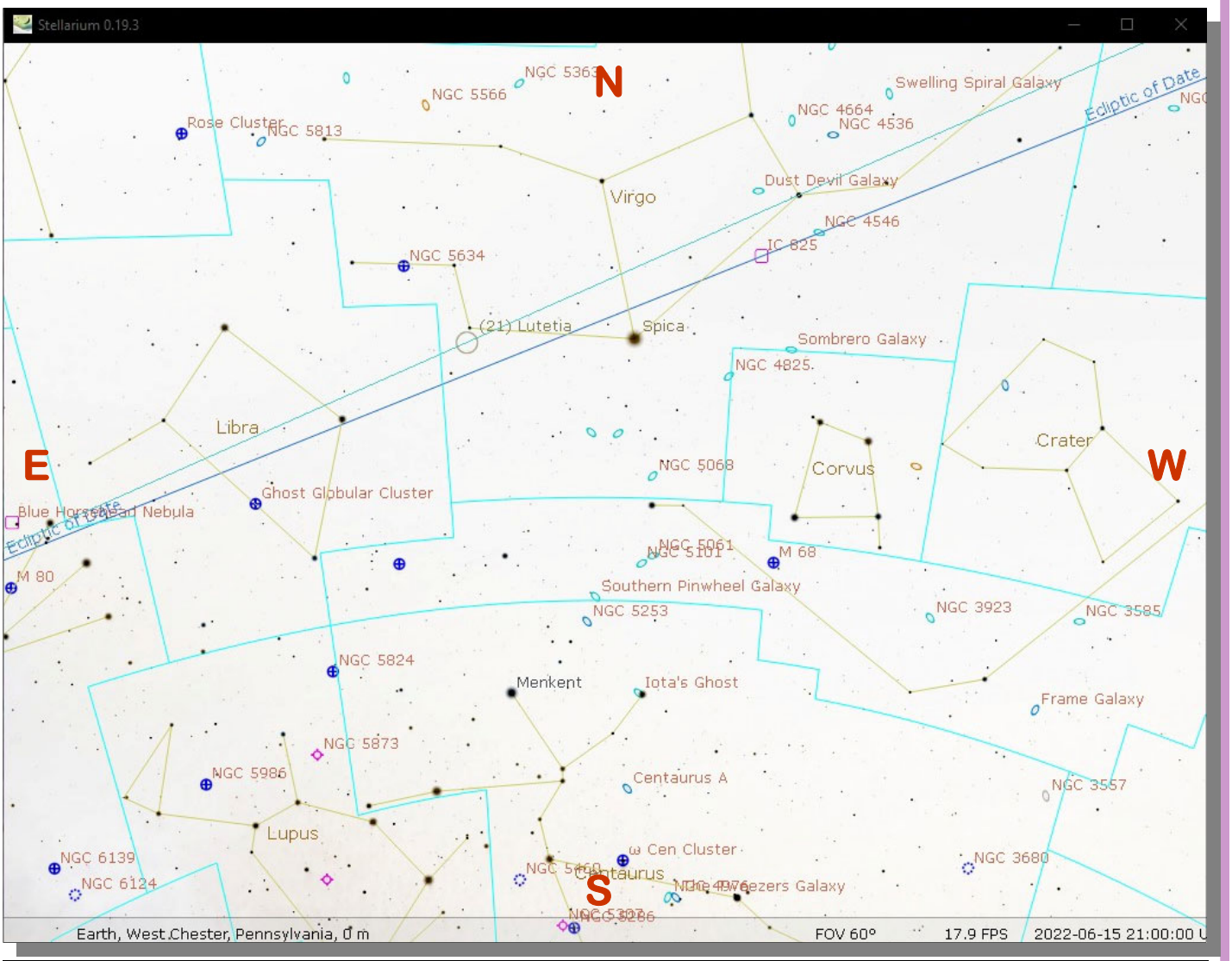
But as those measures have become more precise, they have also shown something strange. There is a key difference between the rate of the expansion of the universe as it is around

(Continued on page 6)

The Sky Over Chester County

June 15, 2022 at 9:00 p.m. ET

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



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
06/01/2022	5:03 a.m. EDT	5:35 a.m. EDT	8:25 p.m. EDT	8:57 p.m. EDT	14h 49m 19s
06/15/2022	5:00 a.m. EDT	5:33 a.m. EDT	8:32 p.m. EDT	9:05 p.m. EDT	14h 59m 42s
06/30/2022	5:04 a.m. EDT	5:37 a.m. EDT	8:35 p.m. EDT	9:07 p.m. EDT	14h 58m 03s

Moon Phases					
First Quarter	06/07/2022	10:48 a.m. EDT	Full Moon	06/14/2022	7:51 a.m. EDT
Last Quarter	06/20/2022	11:10 p.m. EDT	New Moon	06/28/2022	10:52 p.m. EDT

June 2022 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

2	**A thin crescent Moon forms a triangle with Castor and Pollux after sunset**
4	**All 5 naked eye planets can be seen in the pre-dawn sky**
6	**The Lunar X is visible around 5 p.m.**
7	**First Quarter Moon and the Lunar Straight Wall is visible this evening**
11	**Two moon shadows are visible on Jupiter around 11:30 p.m.**
14	**Full Moon, the Full Strawberry Moon, or the Full Trees Fully Leaved Moon**
20	**Last Quarter Moon, 11:10 p.m. EDT**
21	**Summer solstice, 5:13 a.m. EDT**
24	**All 5 naked eye planets and the Moon are visible in the pre-dawn sky**
28	**New Moon, 10:52 p.m. EDT**
29	**Look for a 23-hour old thin crescent Moon soon after sunset**

The best sights this month: The morning sky is full of planets this month. On June 4th all five naked-eye planets line up from the east to the south. And they are even lined up in the order in which they orbit the Sun! The same arrangement is visible on June 24th with Mercury a bit higher in the sky and the planets are joined by the Moon. If you add a telescope to your set up you can also find Uranus, Neptune and minor planet Vesta along the same line in the sky!

The elusive Lunar X is visible around 5 p.m. on June 6th.

Mercury: Mercury is in the morning sky during most of June.

Venus: Venus shines brightly in the morning planet parade.

Mars: Mars is much dimmer than Venus but will shine with its usual red glow in the morning sky.

Jupiter: Bright Jupiter is also part of the long line of planets in the morning sky.

Saturn: Saturn is at the end of the long line in the morning planet parade.

Uranus and Neptune: Both gas giants can be found in the pre-dawn sky along the line of the naked-eye planets.

The Moon: The Moon is full on June 14th. Native Americans called this the Full Strawberry Moon. This name was universal to every Algonquin tribe. However, in Europe they called it the Rose Moon. Native Canadians called this the Trees Fully Leaved Moon.

The Lunar X is visible at 5 p.m. on June 6th and the Lunar Straight Wall is visible on June 7th.

Constellations: Sunset is so late during June that we need to stay up late to see the stars, but the warm nights and the fireflies make it worth the effort. Leo the Lion is running into the west as if he is fleeing from Hercules in the east. And if you stay up a bit later look to the south for bright red Antares in the constellation Scorpius the Scorpion. In the east the big birds of summer, Aquila the Eagle and Cygnus the Swan are rising. But I'll spend most of my time staring at Sagittarius and Scorpius in the southern sky for the next few months, enjoying their brief time above the horizon.

Messier/deep sky: For a telescopic treat seek out M3 in Canes Venatici in the southwest, one of the three brightest globular clusters in the northern sky. Then switch to a low power/wide field eyepiece and swing over to the east where M39, a loosely structured open cluster is rising with Cygnus. The rest of the evening you can spend in the southern sky enjoying open clusters M6, the Butterfly Cluster, and M7, Ptolemy's Cluster. To see nebulas, nearby are M8 the Lagoon Nebula and M20 the Trifid Nebula.

Comets: There are no bright comets visible during June but if you want to chase 7th magnitude Comet C/2017 K2 (PanSTARRS) you can find a sky map in the June issue of Astronomy magazine. The comet will be in the constellation Ophiuchus during June.

Meteor showers: There are no major meteor showers during June.

Hubble (Cont'd)

NASA's Hubble Space Telescope snapped this panoramic view of a colorful assortment of 100,000 stars residing in the crowded core of the globular star cluster Omega Centauri. The stars in Omega Centauri are between 10 billion and 12 billion years old. The cluster lies about 16,000 light-years from Earth. This was one of the first images taken by the new Wide Field Camera 3 (WFC3), installed aboard Hubble in May 2009, during Servicing Mission 4. Image Credits: NASA, ESA, and the Hubble SM4 ERO Team

(Continued from page 3)

us, when compared with observations from right after the Big Bang.

Scientists are unable to explain that discrepancy. But it suggests there is "something weird" going in our universe, that could be the result of unknown, new physics, NASA says.

For the last 30 years, Hubble has been gathering information on a set of "milepost markets" in space and time that can be used to track the expansion rate of the universe as they move away from us.

It has now calibrated more than 40 of the markers, NASA announced, allowing for even more precision than before.

"You are getting the most precise measure of the expansion rate for the universe from the gold standard of telescopes and cosmic mile markers," said Nobel Laureate Adam Riess of the Space Telescope Science Institute (STScI) and the Johns Hopkins University in Baltimore, Maryland, in a statement.

He is the leader of a team of scientists who have published a new paper detailing the biggest and what is probably the last major update from the Hubble Space Telescope, doubling the previous set of mile markers as well as reanalyzing existing data.

The search for a precise measure of how fast space was expanding came when American astronomer Edwin Hubble that galaxies outside of ours appeared to be moving away from us – and doing so faster the further away from us they are. Scientists have been hunting for a better understanding of that expansion ever since. (Both the rate of expansion and the space telescope that has been researching it are named Hubble, in honor of the astronomer's work.)

When the space telescope started gathering information about the universe's expansion, however, it turned out to be more quick than models had predicted. Astronomers predict that it should be about 67.5 kilometers per second per mega-

(Continued on page 7)

Hubble (Cont'd)

(Continued from page 6)

parsec, give or take 0.5 – but observations show it is around 73.

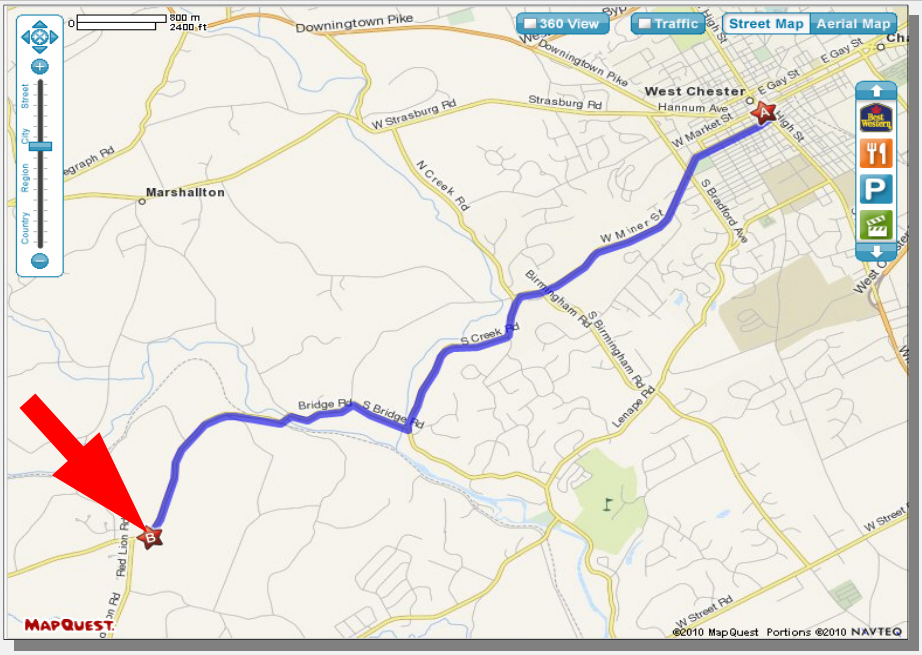
There is only a one in a million chance that astronomers have got it wrong. Instead, it suggests the universe's evolution and expansion is more complicated than we had realized, and that there is more to learn about how the universe is changing.

Scientists hope to delve deeper into that difficulty with the new James Webb Space Telescope, which recently launched to space and is set to send back its first observations soon. That should allow them to see new mileposts that are even further away and in better resolution.

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).

Through the Eyepiece: Messier 24, the Sagittarius Star Cloud
by Don Knabb, CCAS Observing Chair & Treasurer

Star map created with Stellarium planetarium software

During the summer months when I observe the night sky, I find myself drawn to the southern sky to enjoy the wonders of the central portion of the Milky Way. There is so much to see in this section of the sky, and it only is above the horizon for a few months, so if you are not familiar with this part of the sky try to find time to gaze into the rich star fields of Sagittarius.

A unique object to observe in this area of the sky is Messier 24, the Sagittarius Star Cloud. This Messier object is in a class by itself. It is not a true open star cluster or globular cluster but is a rich star field in one of the spi-

(Continued on page 9)

Eyepiece (Cont'd)

Credit: Roberto Colombari - https://apod.NASA.gov/apod/ap180629.html Creative Commons file

(Continued from page 8)

ral arms of our galaxy.

M 24 is visible to the naked eye under dark skies. In the sky chart produced with Stellarium planetarium software, you can see M 24 directly above Sagittarius.

The Sagittarius star cloud is very large, measuring approximately 2 degrees by 1 degree. It is the most intense naked eye knot of light in the band of light that is the Milky Way galaxy.

M 24 was discovered by Charles Messier in 1764. Messier described M 24 as a "large nebulosity containing many stars" and gave its dimensions as being some 1.5° across, a description that fits the star cloud rather well. This is the densest concentration of individual stars visible using binoculars, with around 1,000 stars visible within a single field of view. If you chose a telescope to see M 24 use your lowest magnification eyepiece. Even so, it is not likely you will get the entire star field in your field of view.

Messier 24 is one of the most curious of the entries in Messier's catalog because it really isn't a star cluster. What we are looking at is thousands of stars that belong to the Sagittarius arm of the Milky Way galaxy seen through a chance hole in

(Continued on page 11)

NASA Night Sky Notes: Solstice Shadows

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.

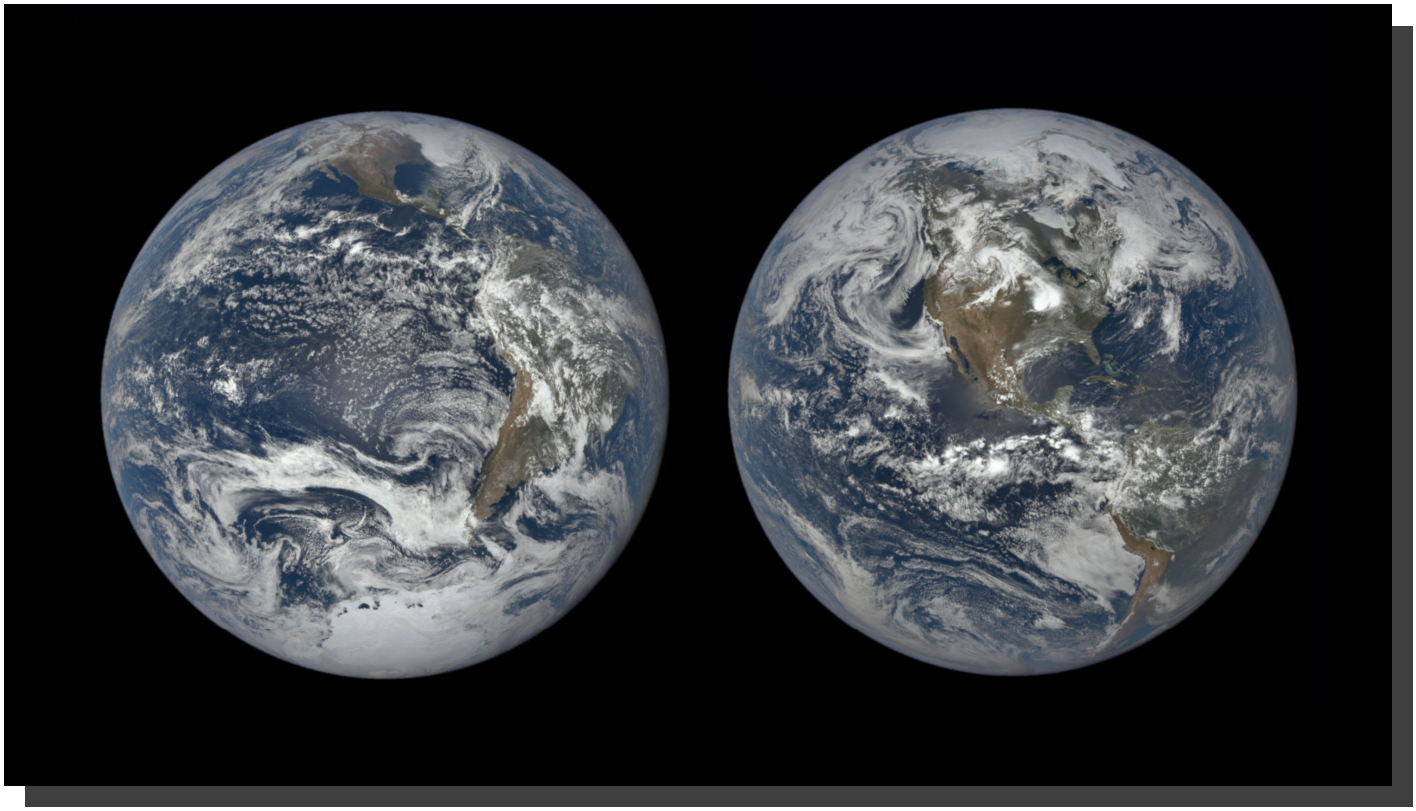
Visit nightsky.jpl.NASA.gov to find local clubs, events, stargazing info and more.

Solstices mark the changing of seasons, occur twice a year, and feature the year's shortest and longest daylight hours - depending on your hemisphere. These extremes in the length of day and night make solstice days more noticeable to many observers than the subtle equality of day and night experienced during equinoxes. Solstices were some of our earliest astronomical observations, celebrated throughout history via many summer and

winter celebrations.

Solstices occur twice yearly, and in 2022 they arrive on June 21 at 5:13 am EDT (9:13 UTC), and December 21 at 4:48pm EST (21:48 UTC). The June solstice marks the moment when the Sun is at its northernmost position in relation to Earth's equator, and the December solstice marks its southernmost position. The summer solstice occurs on the day when the Sun reaches its highest point at solar noon for regions outside of the tropics, and those observers experience the longest amount of daylight for the year. Conversely, during the winter solstice, the Sun is at its lowest point at solar noon for the year and observers outside of the tropics experience the least amount of daylight- and the longest night – of the year. The

(Continued on page 11)



These images from NASA's DSCOVR mission shows the Sun-facing side of Earth during the December 2018 solstice (left) and June 2019 solstice (right). Notice how much of each hemisphere is visible in each photo; December's solstice heavily favors the Southern Hemisphere and shows all of South America and much of Antarctica and the South Pole, but only some of North America. June's solstice, in contrast, heavily favors the Northern Hemisphere and shows the North Pole and the entirety of North America, but only some of South America. Credit: NASA/DSCOVR EPIC Source: https://www.NASA.gov/image-feature/goddard/2021/summer-solstice-in-the-northern-hemisphere

Night Sky Notes (Cont'd)

(Continued from page 10)

June solstice marks the beginning of summer for folks in the Northern Hemisphere and winter for Southern Hemisphere folks, and in December the opposite is true, as a result of the tilt of Earth's axis of rotation. For example, this means that the Northern Hemisphere receives more direct light from the Sun than the Southern Hemisphere during the June solstice. Earth's tilt is enough that northern polar regions experience 24-hour sunlight during the June solstice, while southern polar regions experience 24-hour night, deep in Earth's shadow. That same tilt means that the Earth's polar regions also experience a reversal of light and shadow half a year later in December, with 24 hours of night in the north and 24 hours of daylight in the south. Depending on how close you are to the poles, these extreme lighting conditions can last for many months, their duration deepening the closer you are to the poles.

While solstice days are very noticeable to observers in mid to high latitudes, that's not the case for observers in the tropics - areas of Earth found between the Tropic of Cancer and the Tropic of Capricorn. Instead, individuals experience two "zero shadow" days per year. On these days, with the sun directly overhead at solar noon, objects cast a minimal shadow compared to the rest of the year. If you want to see your own shadow at that moment, you have to jump! The exact date for zero shadow days depends on latitude; observers on the Tropic of Cancer (23.5° north of the equator) experience a zero shadow day on the June solstice, and observers on the Tropic of Capricorn (23.5° south of the equator) get their zero shadow day on December's solstice. Observers on the equator experience two zero shadow days, being exactly in between these two lines of latitude; equatorial zero shadow days fall on the March and September equinoxes.

There is some serious science that can be done by carefully observing solstice shadows. In approximately 200 BC, Eratosthenes is said to have observed sunlight shining straight down the shaft of a well during high noon on the solstice, near the modern-day Egyptian city of Aswan. Inspired, he compared measurements of solstice shadows between that location and measurements taken north, in the city of Alexandria. By calculating the difference in the lengths of these shadows, along with the distance between the two cities, Eratosthenes calculated a rough early estimate for the circumference of Earth – and also provided further evidence that the Earth is a sphere!

Are you having difficulty visualizing solstice lighting and geometry? You can build a "Suntrack" model that helps demonstrate the path the Sun takes through the sky during the seasons; find instructions at stanford.io/3FY4mBm. You can find more fun activities and resources like this model on NASA Wavelength: science.NASA.gov/learners/wavelength.

And of course, discover the latest NASA science at NASA.gov.

Eyepiece (Cont'd)

(Continued from page 9)

the gas and dust. It is like looking through a clear "window" in space.

M 24 is often referred to as the "Sagittarius Star Cloud", or "Little" or "Small Sagittarius Star Cloud", in contrast to the "Big" or "Large Sagittarius Star Cloud" which lies more to the south and consists of that portion of our Galaxy's central bulge which happens to be not obscured by foreground dust.

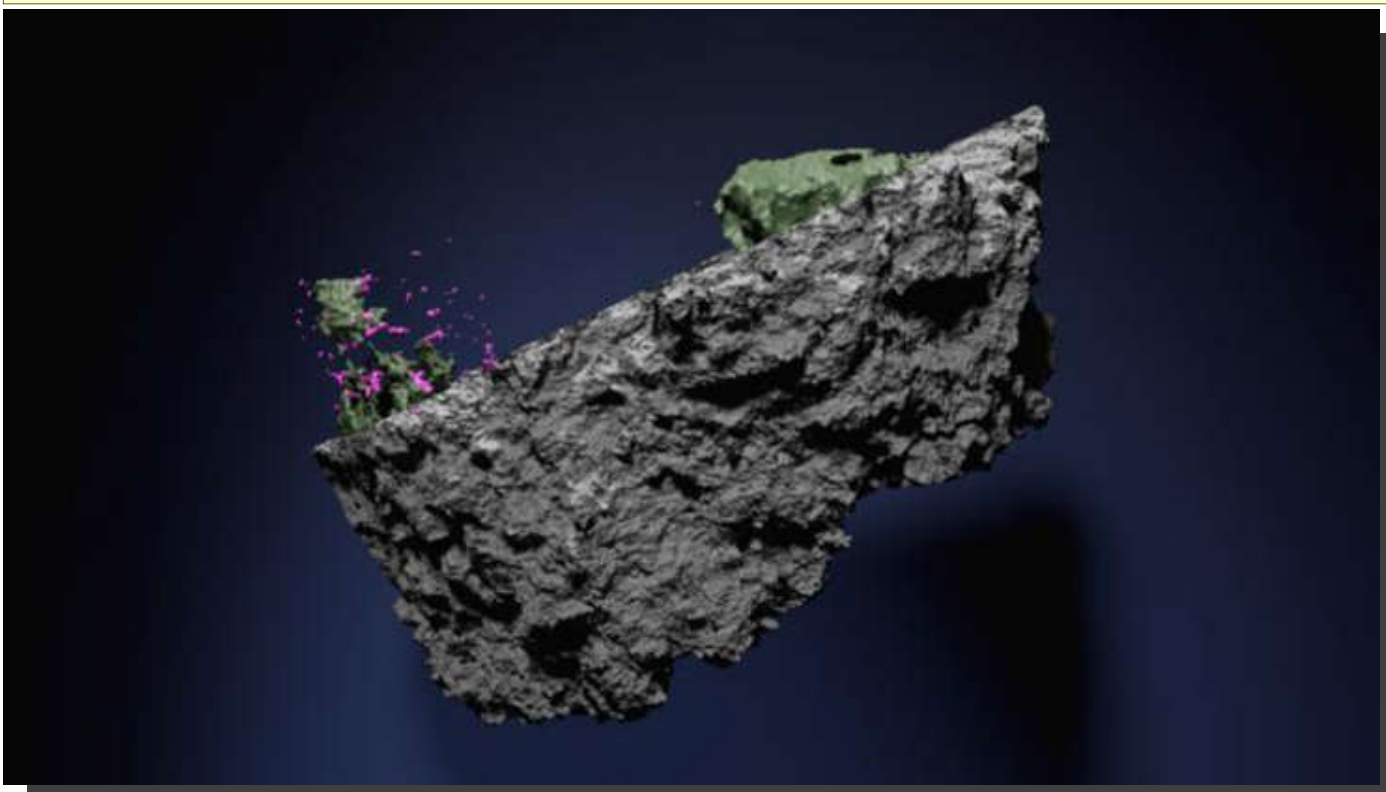
As you can see from the star chart of Sagittarius, this region is rich with many deep sky objects in addition to M 24. So, "go deep" and gaze at thousands of stars through your eyepiece!

Information credits:

- Dickinson, Terence 2006. *Nightwatch: a practical guide to viewing the universe.* Buffalo, NY. Firefly Books
- Ottewell, Guy 2010. *Astronomical Calendar 2010.* Raynham, MA. Universal Workshop
- French, Sue. *Celestial Sampler 2006.* Cambridge, MA. Sky Publishing
- http://en.wikipedia.org/wiki/Messier_24
- http://www.universetoday.com/tag/delle-caustiche/
- http://www.redorbit.com/images/gallery/messier_objects/m_24__sagittarius_star_cloud_delle_caustiche/104/87/index.html

Scientists Find Evidence of Water in Mars Rock, But No Signs of Life

by Don Jacobson, UPI News



Swedish scientists analyzed this Martian meteorite that was found on Earth and concluded that it had only very limited interaction with liquid water. Photo courtesy Josefin Martell/Lund University/UPI

Swedish scientists analyzed this Martian meteorite that was found on Earth and concluded that it had only very limited interaction with liquid water.

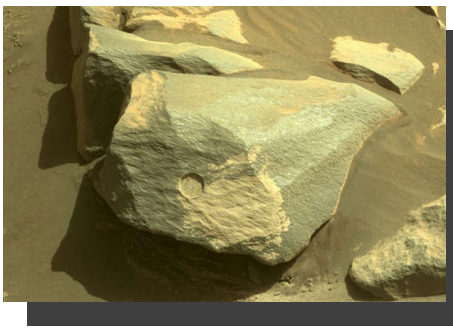
The results of their study were published last week in the academic journal Science Advances.

While samples of Martian rocks are being collected by NASA's Perseverance rover and are expected to be available by 2030, scientists got a jump on the process with a Martian "Nakhlite" meteorite -- rock ejected from the Red Planet by a meteorite impact hundreds of millions of years ago.

The chunk is known as the Miller Range 03346 nakhlite, a 1.6-pound rock that scientists discovered in Antarctica's Miller Range in 2003.

Josefin Martell, geology doctoral student at Lund University, said the goal of studying the meteorite was answering whether there was ever a "major hydrothermal system" on Mars.

"Since water is central to the question of whether life ever existed on Mars, we wanted to investigate how much of the meteorite reacted with water when it was still part of the Mars bedrock," Martell said in a statement.



NASA's Perseverance Mars rover has sent many images from the Martian surface, including this photo of a rock on February 24. File Photo by NASA/UPI

Researchers used neutron and X-ray tomography to study meteorite -- neutron tomography was used because neutrons are very sensitive to hydrogen -- and found that only a fairly small part of it seems to have reacted with liquid water.

Thus, they reasoned, it probably wasn't a large hydrothermal system that produced the reaction, but rather "small accumulations of underground ice" that melted when the meteorite impacted the planet about 630 million years ago.

(Continued on page 14)

CCAS Original Astrophotography

by John Abbott, CCAS Member

Two images of the moon occulting star HIP 76033 A during the eclipse just before midnight on Sunday, May 15, 2022, by CCAS Member John Abbott. Images were taken of HIP 76033 A with a Celestron 102mm refractor, 17mm TeleVue eyepiece (that I bought from our own Don Miller!), 39 magnification, and Camera set at ISO 1600.

Voyager (Cont'd)

(Continued from page 3)

gered any fault protection system that could put Voyager into safe mode, and the signal has not weakened – suggesting that the antenna is still in its normal position, pointing towards Earth.

NASA says that it will continue to monitor the situation, as it is possible that the invalid data could be being produced by another system, but says that it does not understand why it is happening or how long this issue could continue. It takes approximately two days for a message from Earth to reach Voyager and get a response from the craft.

"A mystery like this is sort of par for the course at this stage of the Voyager mission," said Suzanne Dodd, project manager for Voyager 1 and 2 at NASA's Jet Propulsion Laboratory in Southern California.

"The spacecraft are both almost 45 years old, which is far beyond what the mission planners anticipated. We're also in interstellar space – a high-radiation environment that no spacecraft have flown in before. So there are some big challenges for the engineering team. But I think if there's a way to solve this issue with the AACS, our team will find it."

There is a possibility that NASA will not find the source of the issue and instead have to issue software changes or use one of the craft's backup systems – something that has been done before in 2017 when Voyager had to switch from its primary thrusters to secondary ones because of signs of degradation.

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).

Mars Rock (Cont'd)

(Continued from page 12)

Scientists said the findings "have direct implications for the habitability of the Martian subsurface in the Nakhlite source region, where any habitable environments were localized and very short-lived, reducing the chance of life's emergence or survival on Mars" during its most recent historical period.

"Of course, that doesn't mean that life couldn't have existed in other places on Mars, or that there couldn't have been life at other times," Martell noted.

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

May 2022 Financial Summary

Beginning Balance	$1,688
Deposits	$330
Disbursements	-$176
Ending Balance	$1,842

New Member Welcome!

Welcome to our new CCAS members Rich Blessing & Family, Kennett Square PA, Cindy Dautrich, Paoli, PA, Chris Dautrich, Wayne, PA, Michael Curry, Berwyn, PA, and Jeff Cunningham, Phoenixville, 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.

CCAS Information Directory

Join the Fight for Dark Skies!

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

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 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

★ ★ ★ ★ ★

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 (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 & Tel*escope 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.