



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 30, No. 5 **Three-Time** Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016

May 2022

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Ganymede's Shadow on Jupiter



When Jupiter's moons cross between the Jovian giant and the Sun, they created shadows just like when the Earth's moon crosses between the Earth and the Sun. Unlike on Earth, moon shadows occur most days on Jupiter -- what's more unusual is that a spacecraft was close enough to record one with a high-resolution image. That spacecraft, Juno, was passing so close to Jupiter in late February that nearby clouds and the dark eclipse shadow appear relatively large. Image Credit: [NASA/JPL-Caltech/SwRI/MSSS](#); Processing & License: Thomas Thomopoulos

Membership Renewals Due

05/2022	Aylam & Martin-Aylam Bentley Bogusch Cunningham Fletcher Malkan O'Hara Ostank Rosenstein Toth
06/2022	Crabb Dhargalkar Hanspal Harris Hebding Hodson Lindtner Maynard Mazziotta & Calobrisi Thomas
07/2022	Barasatian Hockenberry & Miller Hunsinger McGuigan Morgan Piehl

May 2022 Dates

- 5th** • Uranus is at opposition, 3 a.m. EDT.
- 6th** • The Eta Aquariid meteor shower peaks in the pre-dawn hours.
- 8th** • First Quarter Moon and the Lunar X is visible at 5 a.m. EDT.
- 15th/16th** • Total lunar eclipse.
- 16th** • Full Moon, the Full Flower Moon, or the Full Croaking Moon, 12:14 a.m. EDT
- 22nd** • Last Quarter Moon, 2:43 p.m. EDT
- 30th** • New Moon, 7:30 A.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.

- ☼ Saturday, May 7th • CCAS Special Observing Session with the Atglen Public Library at Wolf's Hollow County Park, Atglen, PA. Non-CCAS members must register with the library to attend the event.
- ☼ Friday, May 20th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.
- ☼ Saturday, May 28th • CCAS Special Observing Session at Hoopes Park, West Chester, PA. The observing session starts at sunset.

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

Spring Society Events

May 2022

2nd • Introduction to Astronomy Class: Star Charts and Planetarium Software, Henderson High School, 7 p.m. EST.

7th • CCAS Special Observing Session with the Atglen Public Library at Wolf's Hollow County Park, Atglen, PA. Non-CCAS members must register with the library to attend the event.

9th • Introduction to Astronomy Class: Using a Telescope, Henderson High School, 7 p.m. EST.

10th • Monthly CCAS Meeting at WCU Merion Science Center, Room 112 & online via Zoom. & online via Zoom. The meeting starts at 7:30 p.m. Guest Speaker: Dr. Michael Brown, Professor of Planetary Astronomy, CalTech, "The Search for Planet Nine – New Developments and Insights."

16th • Introduction to Astronomy Class: Beyond Naked-Eye Observing, Henderson High School, 7 p.m. EST.

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

20th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

22nd-26th • [York County Star Party](#), Susquehannock State Park.

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

28th • CCAS Special Observing Session at Hoopes Park, West Chester, PA. The observing session starts at sunset.

June 2022

8th • [Friday Night Lights Star Party](#), ChesLen Preserve, 7:00-10:00.

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

26th-29th • CCAS Cherry Springs State Park camping trip.

April 2022 Monthly Meeting Minutes

by Bea Mazziotta, CCAS Secretary

- Dave Hockenberry welcomed members and guests to the meeting which was held in person on April 12, 2022, at West Chester University and also via Zoom and YouTube. Twenty-five people attended in person and another 10 on Zoom and YouTube.
- Don Knabb advised the group of some upcoming viewing events and star parties. Look for more information in the newsletter or the CCAS website. <http://www.ccas.us/>
- Bruce Ruggeri introduced the evening's speaker, Dr. Don Miller CCAS member and recently appointed NASA Ambassador. Dr. Miller is a chemical engineer who has been interested in astronomy since childhood and has traveled extensively in pursuit of dark skies and astronomical events. He retired from a pharmaceutical research career and is currently sharing his talents with the Society of the Pacifica's Project Astro for school age children. He is also doing community outreach and presenting to groups such as ours.
- The title of his presentation - Mankind's Exploration of Venus: What We've Learned, Current Questions and Future Plans.
 - Possibly the first habitable planet in our solar system, current conditions are harsh and prohibitive to life as we understand it.
 - It once had shallow oceans, has oxygen still present in its atmosphere and has soil similar to that of Earth.
 - It doesn't have any magnetic fields or visible plate tectonics and there has never been a break in its clouds.
 - Understanding its evolution to its current state might provide insights into the ongoing evolution of earth.

May 2022 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on March 8, 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. Guest Speaker: Dr. Michael Brown, Professor of Planetary Astronomy, CalTech, "The Search for Planet Nine – New Developments and Insights."

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 email 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.

May 2022 Guest Speaker Bio & Presentation Synopsis

by Bruce Ruggeri

Our May CCAS Monthly meeting is scheduled for May 10, 2022, commencing at 7:00 pm ET. We are extremely fortunate to host this month's guest speaker, world-renowned Cal Tech astronomer, Dr. Michael Brown who has prepared an intriguing presentation on the search for a potential Planet Nine in the outermost regions of our solar system.

Dr Brown is an expert on trans-Neptunian bodies in the Kuiper belt and has done some of the leading work worldwide in the search for an elusive Planet Nine. Dr Brown's presentation will commence at approximately 7:50- 8:00PM ET.

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

Title: The Search for the Elusive Planet Nine – Myth or Reality



Benjamin Hockman, Ph.D.

Synopsis: In the past 175 years, more than 30 separate astronomers have suggested the existence of a giant planet beyond Neptune. They have always been wrong. In 2016, Konstantin Batygin and Dr Brown joined

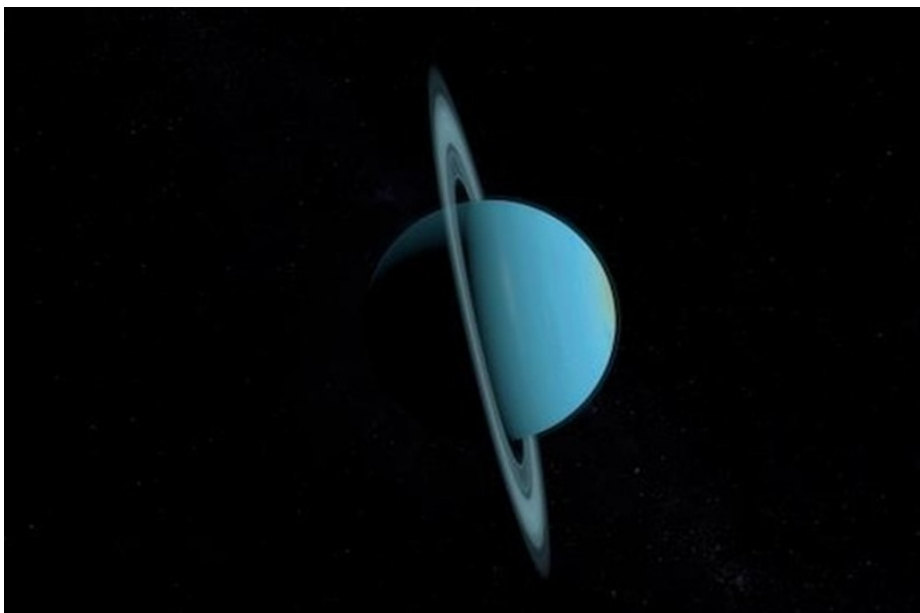
the list, suggesting that Planet Nine, at a distance perhaps 20 times greater than that of Neptune, is the only plausible explanation for a wide range of gravitational phenomena in the distant solar system. Dr Brown will discuss why we think Planet Nine is real, how we're continuing to develop our hypothesis, and what we are doing to track down this elusive planet and when we might find it. Or why we, too, might be wrong.

Biosketch: Mike Brown scans the skies searching for and intensely studying distant bodies in our solar system in the hope of gaining insight into how our planet and the planets around it came to be. In this quest, he has discovered dozens of dwarf planets (and demoted one object from planet to dwarf planet) and

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Decadal Survey Recommends Return Visit to Uranus

by Nadia Drake, courtesy of National Geographic Society



Rendering of Uranus. Image Credit: [Uranus 101 Video](#), National Geographic Partners, LLC © 2019

Uranus is perhaps the strangest planet in the solar system. At some point during its history, the ice giant was knocked over, leaving it spinning on its side. More than a dozen rings circle the world, and some 27 moons cling to it. The planet's atmosphere is a collection of hydrogen, helium, and heavier compounds that exist as ices deep in the frigid Uranian clouds.

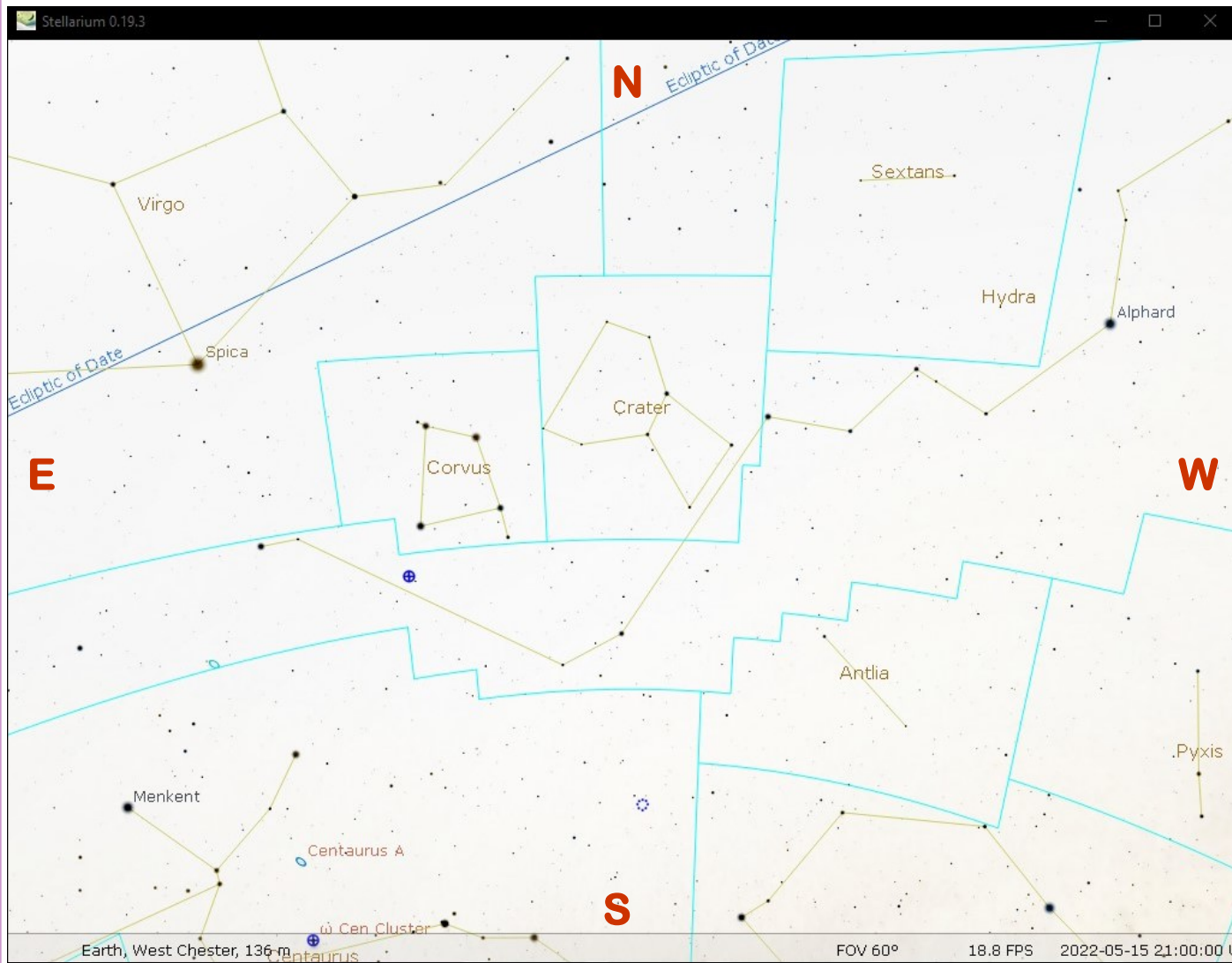
But beyond a handful of intriguing facts, scientists know woefully little about this milky blue world, which was visited for the first and only time by

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The Sky Over Chester County

May 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
05/01/2022	5:33 a.m. EDT	6:02 a.m. EDT	7:57 p.m. EDT	8:26 p.m. EDT	13h 54m 35s
05/15/2022	5:16 a.m. EDT	5:47 a.m. EDT	8:10 p.m. EDT	8:41 p.m. EDT	14h 23m 33s
05/31/2022	5:04 a.m. EDT	5:36 a.m. EDT	8:24 p.m. EDT	8:56 p.m. EDT	14h 48m 10s

Moon Phases					
First Quarter	05/08/2022	8:21 p.m. EDT	Full Moon	05/16/2022	12:14 a.m. EDT
Last Quarter	05/22/2022	2:43 p.m. EDT	New Moon	05/30/2022	7:30 a.m. EDT

May 2022 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

5	Uranus is at opposition, 3 a.m. EDT.
6	The Eta Aquariid meteor shower peaks in the pre-dawn hours
6	The crescent Moon is near the twins Castor and Pollux in Gemini
7	International Astronomy Day and the Moon is near the Beehive Cluster
8	First Quarter Moon and the Lunar X is visible at 5 a.m. EDT
9	The Lunar Straight Wall is visible this evening
15/16	Total lunar eclipse
16	Full Moon, the Full Flower Moon, or the Full Croaking Moon, 12:14 a.m. EDT
22	Last Quarter Moon, 2:43 p.m. EDT
25	In the pre-dawn sky see Jupiter, Mars, and the Moon in a compact group, followed by Venus rising
30/31	New Moon, 7:30 A.M. EDT, and possibly a new meteor shower after midnight

The best sights this month: We have a lunar eclipse to see during May! Mid-totality occurs just after midnight on the night of May 15/16. And at the end of the month there is a possibility of a new meteor shower during the early hours of May 31.

Mercury: Look for Mercury during the first week of May. On May 1st Mercury, the Pleiades and the Moon are together low in the west as sunset fades. After May 7th Mercury becomes very difficult to see and passes behind the Sun on May 21st.

Venus: Venus is visible in the morning planet parade and shines at a dazzling magnitude -4.1! At the start of May, Venus and Jupiter are close together.

Mars: Mars rises shortly before 4 a.m. during May.

Jupiter: Jupiter is also in the morning sky with its pal Venus.

Saturn: Saturn rises around 3 a.m. during May.

Uranus and Neptune: Uranus is in conjunction with the Sun on May 5th, so it is not visible during May. Neptune is in the pre-dawn sky and on May 17th and 18th is near Mars.

The Moon: The Moon is full on May 16th. Native Americans called this the Full Flower Moon. In most areas, flowers are abundant everywhere during this time, thus the name of this Moon. Other names include the Full Corn Planting Moon, or the Milk Moon. Native Canadians called this The Full Frog Croaking Moon.

A total lunar eclipse occurs on May 15/16. The Moon reaches the edge of the umbral shadow at 10:27 p.m. and totality lasts from 11:29 p.m. to 12:53 a.m.

The Lunar X is visible at 5 a.m. on May 8th and the Lunar Straight Wall is visible on May 9th.

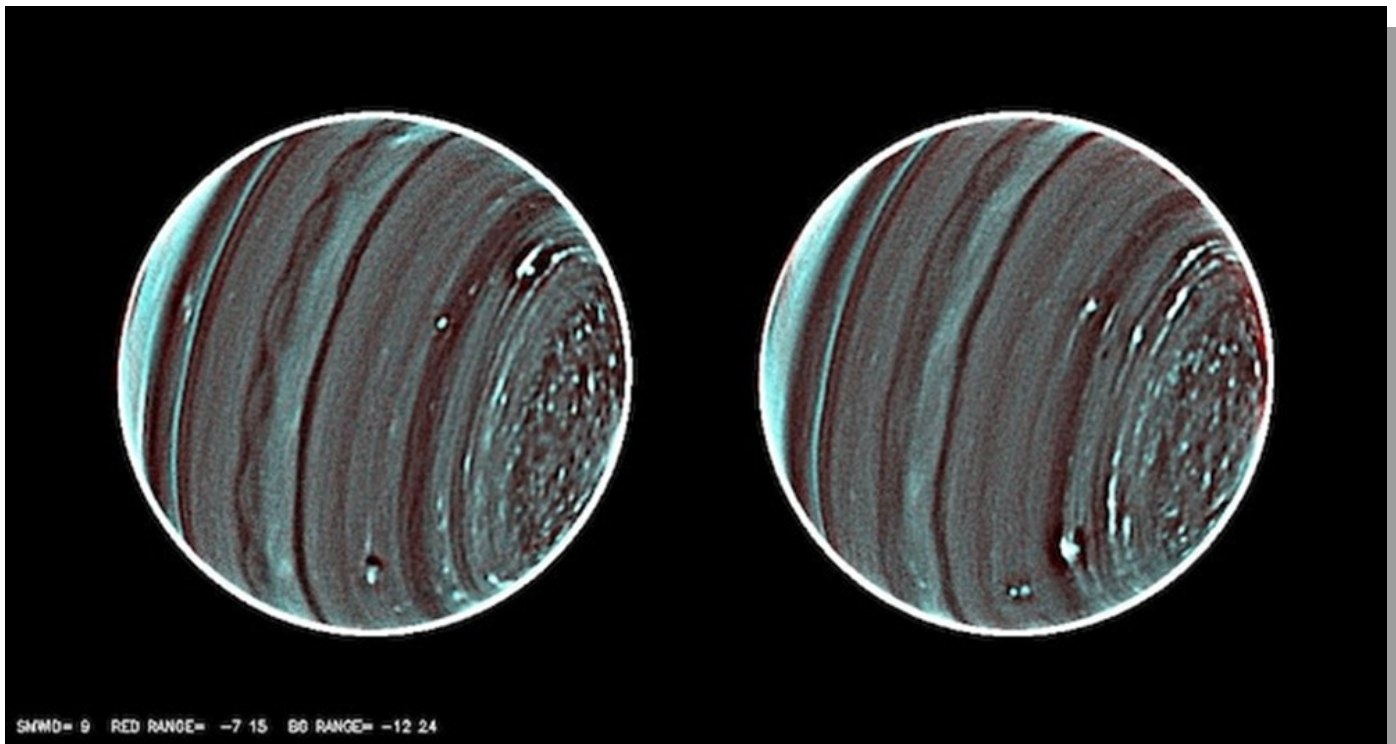
Constellations: This is a great time of year to look high overhead at the Big Dipper and find the entire constellation Ursa Major, the Big Bear. Leo the Lion is still high in the sky as darkness falls, but he seems to be running away from Hercules as he is rising in the east. And bright Arcturus in Bootes shines like a beacon in the southeast. Bootes and Hercules are well placed for viewing by the time it is completely dark and an hour or two later the summer triangle is rising in the east. And if we have a good dark sky the Milky Way can be seen in Cygnus. Aim your telescope there and gaze into an eyepiece full of stars!

Messier/deep sky: As summer approaches it is once again globular cluster time! M3 is high overhead during May. Look at the glow of 500,000 stars in your eyepiece! And stay up a bit later as M13, the Great Globular Cluster in Hercules rises in the east. M13 contains several hundred thousand stars, perhaps a million!

Comets: There is a chance that comet C/2021 O3 (PanSTARRS) will be visible during May. Information on this comet is in the May issue of Astronomy magazine.

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Uranus (Cont'd)



This paired picture of Uranus taken by the Keck II telescope in Hawaii reveals details about the planet's enigmatic atmosphere. The north pole of Uranus (to the right in the picture) is characterized by a swarm of storm-like features, and an unusual scalloped pattern of clouds encircles the planet's equator. Image credit: Lawrence Sromosvsky, Pat Fry, Heidi Hammel, Imke de Pater / University of Wisconsin-Madison

(Continued from page 3)

the [Voyager 2](#) spacecraft in 1986. That could be about to change.

[A report prepared by planetary scientists](#) and released this week has recommended that NASA make a mission to Uranus a top priority for the coming decade, perhaps launching a spacecraft to the seventh planet from the sun—as well as a thousand inevitable jokes—as soon as 2031.

“I think we’re going to see some real extraordinary surprises there and learn a tremendous amount about planet formation in general, and we may discover some new ocean worlds,” says Cornell University’s [Jonathan Lunine](#), who chaired the report’s [panel on giant planets](#).

One big draw is that Uranus—

and Neptune, the solar system’s other ice giant—might be representative of the most common type of planet in the galaxy. Scientists think that solving the mysteries of Uranus, such as its odd magnetic field, shrouded interior structure, and surprisingly frosty temperatures, could be crucial not only for understanding ice giants across the Milky Way, but also for unlocking clues about the history of our solar system.

The proposed mission, called the Uranus Orbiter and Probe, would release a small probe to sniff the planet’s atmosphere while an orbiter zips around the Uranian system for years. It’s a plan similar to NASA’s highly successful Cassini mission, which explored the Saturn system from 2004 to 2017.

“The returns for this mission

will be so rich, they will touch on almost every field of planetary science,” says planetary astronomer [Heidi Hammel](#) of the Association of Universities for Research in Astronomy. A plush toy of Uranus hangs out behind her during our video call, and before we hang up, the fuzzy blue planet offers me a high five. “I’m pretty happy,” Hammel says.

Named for the Greek god of the night sky, Uranus may be key to understanding the thousands of [planets orbiting faraway stars](#) that scientists have spotted so far, many of which are roughly the same size as the ice giant.

“Uranus might be representative of the most common type of exoplanet out there, and we know so little about it that any

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Uranus (Cont'd)

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science we'd get from the Uranus system would be invaluable," planetary scientist [Paul Byrne](#) of Washington University in St. Louis writes in an email. "I can't wait to see this mission fly!"

We don't know how or when Uranus tipped over, or how such an off-kilter planet held on to such an orderly system of moons. Scientists don't know much about the planet's interior structure, or why it's so much colder than Neptune. And Voyager observations of the planet's magnetic field show that it's "really screwy, really offset, and tilted," Hammel says.

Over the decades, the Hubble Space Telescope and Earth-

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Classic La Para by Nicholas La Para

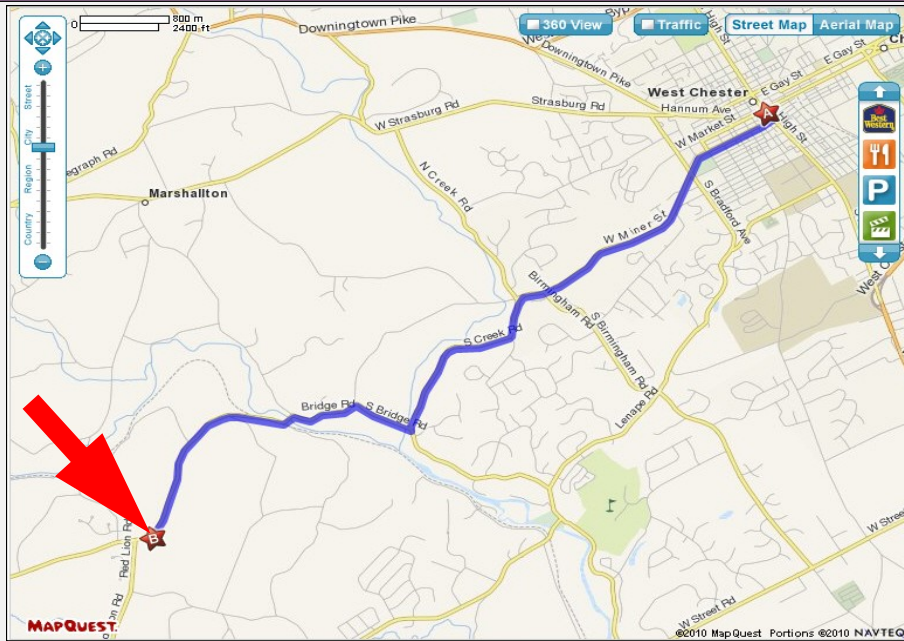
ASTRONOMY NEWS

DWARF PLANET CONCERNS

- * In a bid to improve its image, the International Astronomical Union (IAU) has launched an "Adopt a Dwarf Planet" campaign.
- * The IAU is also lobbying congress for a "Planets With Disabilities" act.

LAPARA

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

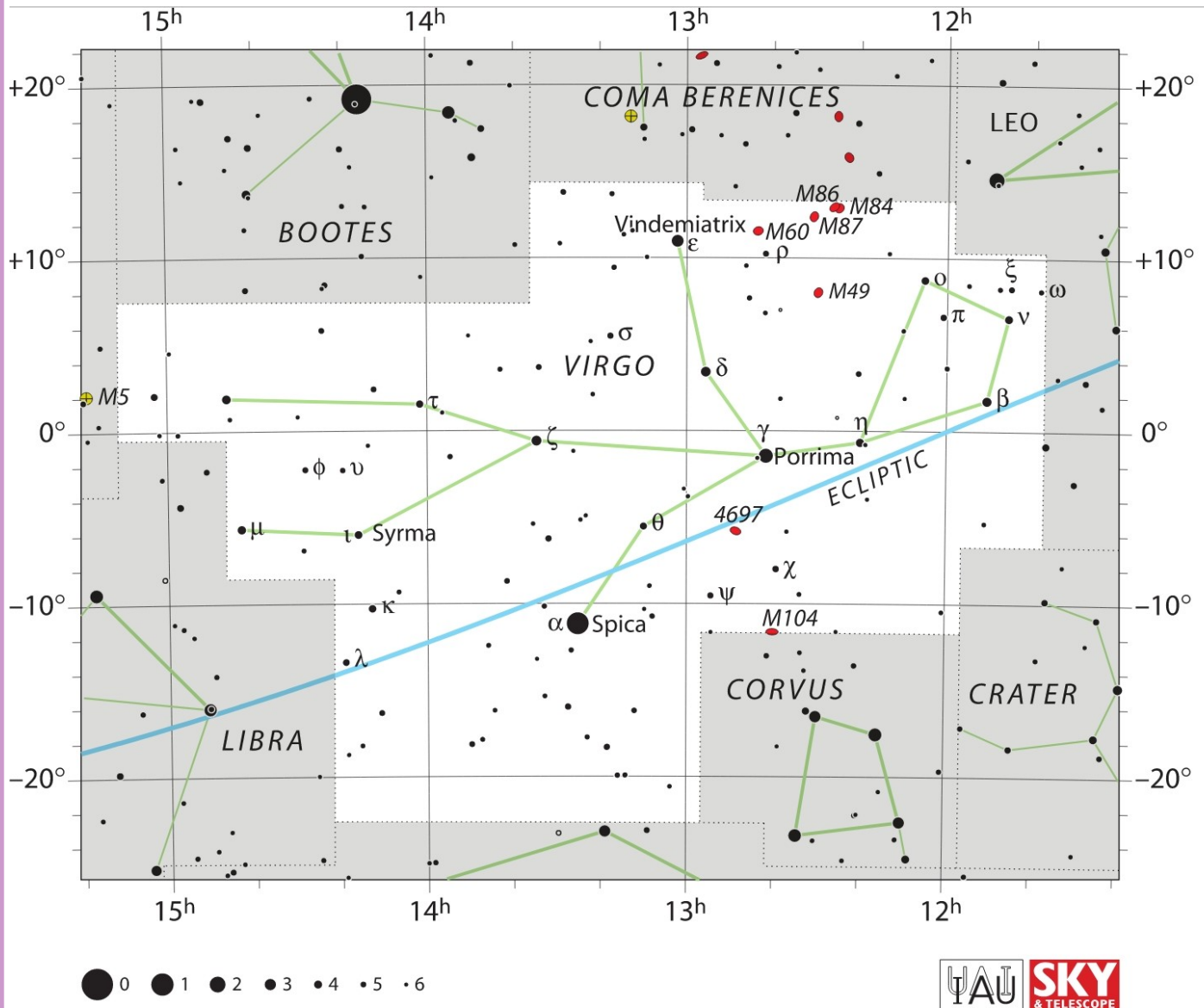
1760 Unionville Wawaset Rd
West Chester, PA 19382
(610) 793-1090

<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.

Through the Eyepiece: Markarian's Chain in the constellation Virgo

by Don Knabb, CCAS Observing Chair & Treasurer



Virgo Constellation Map, by IAU and Sky & Telescope magazine, Creative Commons image
https://en.wikipedia.org/wiki/File:Virgo_IAU.svg

The spring night sky brings a parade of galaxies into center stage not long after the sky becomes completely dark. The skies are not full of the humidity of summer, so they are quite dark when the Moon is absent. And you'll need a dark sky to enjoy these faint fuzzies, but they are worth seeking out. So, grab the largest telescope you can carry and aim your light

bucket toward the constellation Virgo.

As you find these denizens of the deep sky, remember that they are much more distant than the stars of our home galaxy the Milky Way and the photons that hit your retina and travel to your brain have had a long journey indeed. Keep that in mind if they are faint and fuzzy and are best seen with averted vision.

We start our search for galaxies by looking between Arcturus in Boötes and the tail of Leo the Lion, the star Denebola. Use the sky map below to aim your telescope at the area marked M84, M86 and M87.

For an observer with a moderate to large telescope, targets abound. You'll need to have

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Eyepiece (Cont'd)



Image credit: Dave Hockenberry, astrophotographer

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some good quality star charts or a star chart app for your electronic device to make a definitive conclusion about what objects you are looking at because there are just so many galaxies in this area of the sky.

One of the most interesting things to see in this part of the sky is a group called Markarian's Chain. Markarian's Chain is a stretch of galaxies that forms part of the Virgo Cluster.

It's called a "chain" because, when viewed from Earth, the galaxies lie along a smoothly curved line. It was named after the Armenian astrophysicist, B. E. Markarian, who discovered it in the mid-1970s. At least seven galaxies in the chain appear to move coherently, although others appear to be superposed by chance.

Above is an image of Markarian's Chain taken by CCAS president Dave Hocken-

berry. You can see how this group of galaxies got its name.

In the lower left corner of Dave's photo is M87, which is not in the "chain". The two bright objects on the right, below center are M86 and M84, with M84 the one to the right. All these Messier objects are galaxies, as are most of the objects in the photograph that are not obviously stars. Very near center of the photo is a pair of

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NASA Night Sky Notes: Night Lights—Aurora, Noctilucent Clouds, and the Zodiacal Light 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.

Have you spotted any “night lights”? These phenomena brighten dark skies with celestial light ranging from mild to dazzling: the subtle light pyramid of the zodiacal light, the eerie twilight glow of noctilucent clouds, and most famous of all, the wildly unpredictable and mesmerizing aurora.

Aurora, often referred to as the northern lights (aurora borealis) or southern lights (aurora australis), can indeed be a wonderful



sight, but the beautiful photos and videos shared online are often misleading. For most observers not near polar latitudes, auroral displays are relatively rare and faint, and without much structure, more gray than color-

ful, and show up much better in photos. However, geomagnetic storms can create auroras that dance and shift rapidly across the skies with several distinct colors and appear to observers much further away from the poles - on very rare occasions even down to the mid-latitudes of North America! Geomagnetic storms are caused when a magnetic storm on our Sun creates a massive explosion that flings a mass of particles away from its surface, known as a Coronal Mass Ejection (CME). If Earth is in the path of this CME, its particles interact with our planet’s magnetic field and re-

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Comet NEOWISE flies high above a batch of noctilucent clouds in this photo from Wikimedia contributor Brwynog. License and source CC BY-SA 4.0 https://commons.wikimedia.org/wiki/File:Comet_Neowise_and_noctilucent_clouds.jpg

Night Sky Notes (Cont'd)



The zodiacal light extends into the Pleiades, as seen in the evening of March 1, 2021 above Skull Valley, Utah. The Pleiades star cluster (M45) is visible near the top. Credit and source: NASA/Bill Dunford. <https://www.flickr.com/photos/gsf/51030289967>

(Continued from page 10)

sult in auroral displays high up in our ionosphere. As we enter our Sun's active period of its 11-year solar cycle, CMEs become more common and increase the chance for dazzling displays! If you have seen any aurora, you can report your sighting to the Aurorasaurus citizen science

program at aurorasaurus.org

Have you ever seen wispy clouds glowing an eclectic blue after sunset, possibly towards your west or northwest? That wasn't your imagination; those luminescent clouds are noctilucent clouds (also called Polar

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Eye-piece (Cont'd)

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galaxies called "The Eyes". These are the galaxies NGC 4435 and NGC 4438.

Markarian's Chain is part of the Virgo Cluster of galaxies. Our own Local Group of galaxies, the Milky Way, the large and small Magellanic Clouds, M31, M32, M100, M33, is currently receding from the Virgo Cluster at a rate of about 1000 km/second. However, it is anticipated that our Local Group will eventually stop receding from the Virgo Cluster and will ultimately accelerate towards this region because the gravity from the Virgo Cluster influences us even at distances of 70 million light years.

If we are lucky enough to have clear weather for our next BRC observing night, we should convince whoever brings the largest telescope to seek out Markarian's Chain!

Information sources:

- http://en.wikipedia.org/wiki/Markarian%27s_Chain
- <http://seds.org/messier/more/virgo.html>
- <http://www.starrywonders.com/markarian.html>
- http://www.cloudynights.com/item.php?item_id=1779
- <http://www.allaboutastro.com/markarianchain.html>

Speaker (Cont'd)

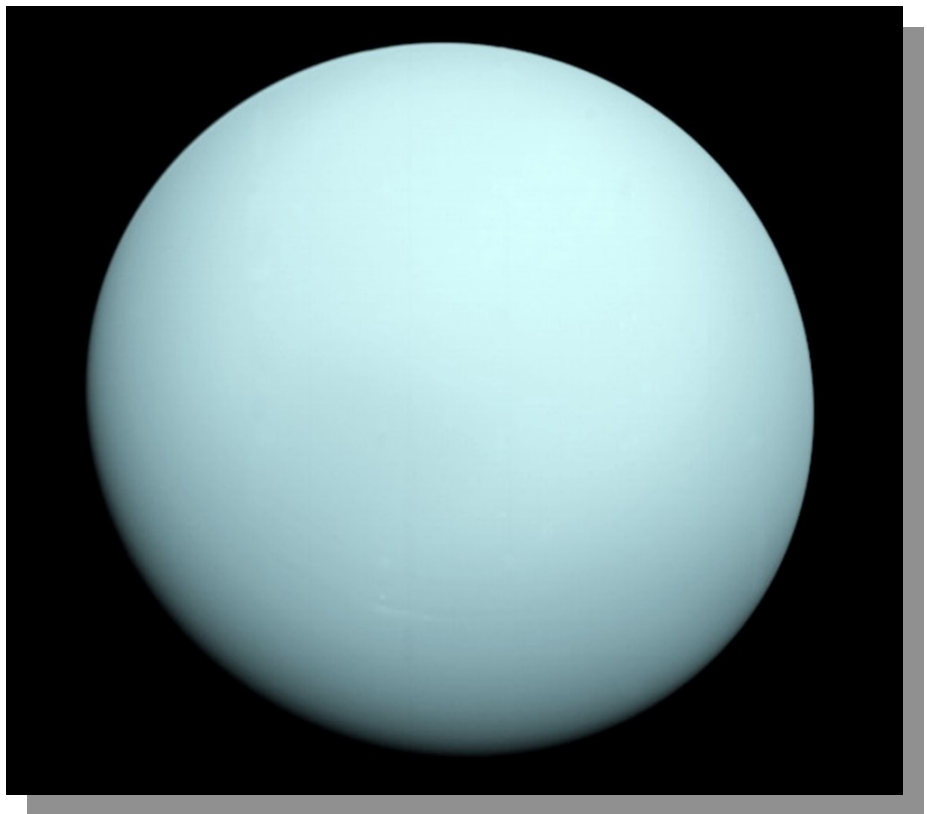
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is currently hot on the trail of Planet Nine -- a hypothesized body that is possibly the fifth largest planet of our solar system. He is the Richard and Barbara Rosenberg Professor of Planetary Astronomy at the California Institute of Technology and has been on the faculty there since 1996. He has won many awards and honors for his scholarship, including the Urey Prize for best young planetary scientist from the American Astronomical Society's Division of Planetary Sciences; a Presidential Early Career Award; a Sloan Fellowship; and the 2012 Kavli Prize in Astrophysics. He was inducted into the National Academy of Science in 2014. He was also named one of Wired Online's Top Ten Sexiest Geeks in 2006, the mention of which never ceases to make his wife laugh.

Feature articles about Dr. Brown and his work have appeared in the New Yorker, the New York Times, the Los Angeles Times, and Discover, and his discoveries have been covered on front pages of countless newspapers worldwide. In 2006 he was named one of Time magazine's 100 Most Influential People. He has authored over 150 scientific papers and is a frequent invited lecturer at astronomical meetings as well as at science museums, planetariums, and college campuses. At Caltech he teaches undergraduate and graduate students, in classes ranging from introductory geology to the formation and evolution of the solar system. He was especially

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Uranus (Cont'd)



Uranus, the seventh planet from the sun, has only been visited once during a flyby performed by the Voyager 2 spacecraft in 1986. Now scientists want to go back to study the planet and its moons in detail. Image Credit: NASA/JPL

(Continued from page 7)

based observatories have spied strange thermal signatures among the planet's rings, an eruption of bright clouds across its surface, glowing auroras, and powerful winds. Scientists even spotted additional moons as recently as 2003.

Planetary scientists will have to wait a while for their close-up of Uranus, because it takes years, decades even, for spacecraft to arrive in the outer solar system.

As designed, the Uranus Orbiter and Probe could launch aboard a SpaceX Falcon Heavy rocket between 2031 and 2038 or later, to take advantage of a favorable alignment of the planets. Once in space, the fastest possible journey takes about 13

years, meaning the spacecraft wouldn't pull into orbit around Uranus until the mid-2040s at the earliest.

But Hammel and others who've spent years studying the ice giants with relative scraps of data aren't upset that this mission might arrive after they've stopped professionally studying planets—or as Hammel puts it, when she's teetering around in a retirement home.

“This mission isn't for me. It's for the next generation,” Hammel says. “Twenty years ago, I might have said, I really want this, I want to get there before I retire. And that changed. It became: I want to see it launched before I retire, because then I know it will be real.”

Night Sky Notes (Cont'd)



A sampling of some of the various patterns created by aurora, as seen from Iceland in 2014. The top row photos were barely visible to the unaided eye and were exposed for 20-30 seconds; in contrast, the bottom row photos were exposed for just 4 seconds- and were clearly visible to the photographer, Wikimedia contributor Shnuffel2022. License and source: CC BY-SA 4.0 https://commons.wikimedia.org/wiki/File:Aurora_shapes.jpg

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Mesospheric Clouds (PMC)). They are thought to form when water vapor condenses around 'seeds' of dust from vaporized meteorites - along with other sources that include rocket launches and volcanic eruptions - around 50 miles high in the mesosphere. Their glow is caused by the Sun, whose light still shines at that altitude after sunset from the perspective of ground-based observers. Noctilucent clouds are increasing both in frequency and in how far south they are observed, a development that may be related to climate change. Keeping in mind that observers closer in latitude to the poles have a better chance of spotting them, your best opportunity to spot noctilucent clouds occurs from about half an hour to two hours after sunset during the summer months. NASA's AIM mission studies these clouds from its orbit high above the North Pole:

go.nasa.gov/3uV3Yj1

You may have seen the zodiacal light without even realizing it; there is a reason it's nicknamed the "false dawn"! Viewers under dark skies have their best chance of spotting this pyramid of ghostly light a couple of hours after sunset around the spring equinox, or a couple of hours before dawn around the autumnal equinox. Unlike our previous two examples of night lights, observers closer to the equator are best positioned to view the zodiacal light! Long known to be reflected sunlight from interplanetary dust orbiting in the plane of our solar system, these fine particles were thought to originate from comets and asteroids. However, scientists from NASA's Juno mission recently published a fascinating study indicating a possible alternative origin: dust from Mars! Read more about their serendipitous discovery at:

go.nasa.gov/3Onf3kN

Curious about the latest research into these night lights? Find news of NASA's latest discoveries at nasa.gov

Speaker (Cont'd)

(Continued from page 12)

pleased to be awarded the Richard P. Feynman Award for Outstanding Teaching at Caltech. Dr. Brown received his AB from Princeton in 1987, and then his MA and PhD from the University of California, Berkeley, in 1990 and 1994, respectively. Dr. Brown is the author of "How I Killed Pluto and Why It Had It Coming", an award winning bestselling memoir of the discoveries leading to the demotion of Pluto. His writing has appeared in the *New York Times*, the *Wall Street Journal*, the *Washington Post*, *Astronomy* magazine, and elsewhere.

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).



Observing (Cont'd)

(Continued from page 5)

Meteor showers: This is a good year for the Eta Aquariid meteor shower because the Moon will set just after midnight. Look for “shooting stars” during the early hours of the morning of the peak on May 6th.

An article in the May issue of *Sky and Telescope* discusses the possibility of a new meteor the night of May 30/31 with the peak just after midnight.

CCAS Membership Information and Society Financials

Treasurer's Report by Don Knabb

April 2022 Financial Summary

Beginning Balance	\$1,623
Deposits	\$65
Disbursements	-\$0
Ending Balance	\$1,688

New Member Welcome!

Welcome to our new CCAS members Brough Richey, Malvern PA, Luke Miles, Chester Springs, PA, Rich Blessing, Kennett Square, PA, and Mark Hepler, Jonestown, 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



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 & 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.