



# Observations

A Monthly Publication Of The  
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 29, No. 9 **Three-Time** Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016 September 2021

## In This Issue

CCAS Summer/Autumn Events.....	2
Profile: Ed "Ned" Lurcott, CCAS Founder.....	2
September 2021 Meeting Agenda.....	2
Space Stations — From Earliest to Latest.....	3
The Sky Over Chester County: September 2021.....	4
September 2021 Observing Highlights.....	5
Classic La Para.....	7
CCAS Directions: Brandywine Red Clay Alliance.....	7
Saturn's Rippling Rings Point to Massive, Soupy Core Hidden Inside.....	9
Through the Eyepiece: Messier 11.....	10
NASA Night Sky Notes.....	12
Membership Renewals.....	12
New Member Welcome.....	14
CCAS Directions: WCU Map.....	14
Treasurer's Report.....	14
CCAS Information Directory.....	15-16

## Hubble Images NGC 2164



An image captured by the Hubble Space Telescope showing the open cluster known as NGC 2164, located in the Large Magellanic Cloud. ESA/HUBBLE & NASA, J. KALIRAI, A. MILONE

## Membership Renewals Due

09/2021	Atmore Holloway Lee Reilly Squire
10/2021	Kraynik Lane Lester Rosenblatt Wirth
11/2021	Buczynski DiGiovanni Holenstein Kerkel Romer Scovill Smith Taylor

## September 2021 Dates

- 5th** • New Moon, 8:51 p.m. EDT
- 9th** • Venus is to the lower left of the Moon and Spica is to their lower right
- 13th** • First Quarter Moon, 4:39 p.m. EDT
- 17th** • The Moon, Jupiter and Saturn form a large triangle
- 20th** • Full Moon, the Full Harvest Moon or the Full Moose Calling Moon, 7:54 p.m. EDT
- 22nd** • Fall equinox, 3:21 p.m. EDT
- 28th** • Last Quarter Moon, 9:57 p.m. EDT



## CCAS Upcoming Nights Out

Until further notice, monthly observing sessions at Myrick Conservancy Center, BVA, are limited to vaccinated CCAS members only in response to the current increase in Covid-19 infections.

Upcoming dates (weather dependent):

- ☼ **Friday, Sept. 3rd**
- ☼ **Friday, Oct. 1st**
- ☼ **Friday, Nov. 5th**

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

## Summer / Autumn Society Events

### September 2021

**3rd** • CCAS Monthly Observing Session, BRC. Due to increase in Covid-19 infections, session is limited to vaccinated CCAS members only.

**14th** • Monthly CCAS Meeting in Room 113, Merion Science Center, WCU. The meeting starts at 7:30 p.m. Dennis O’Leary, CCAS Member and NASA Ambassador – “ NASA Robotic Missions: An Update on New Horizons, Insight, Perseverance, and Juno.”

**16th** • The von Kármán Lecture Series: [Instrumental: Engineers Who Make Science Possible](#), 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 October 2021 edition of [Observations](#).

**26th** • Deadline for newsletter submissions for the October 2021 edition of [Observations](#).

### October 2021

**1st** • CCAS Monthly Observing Session, BRC. Due to increase in Covid-19 infections, session is limited to vaccinated CCAS members only.

**6th-12th** • [York County Star Party](#), Susquehannock State Park, 1880 Park Dr, Drumore, PA 17518.

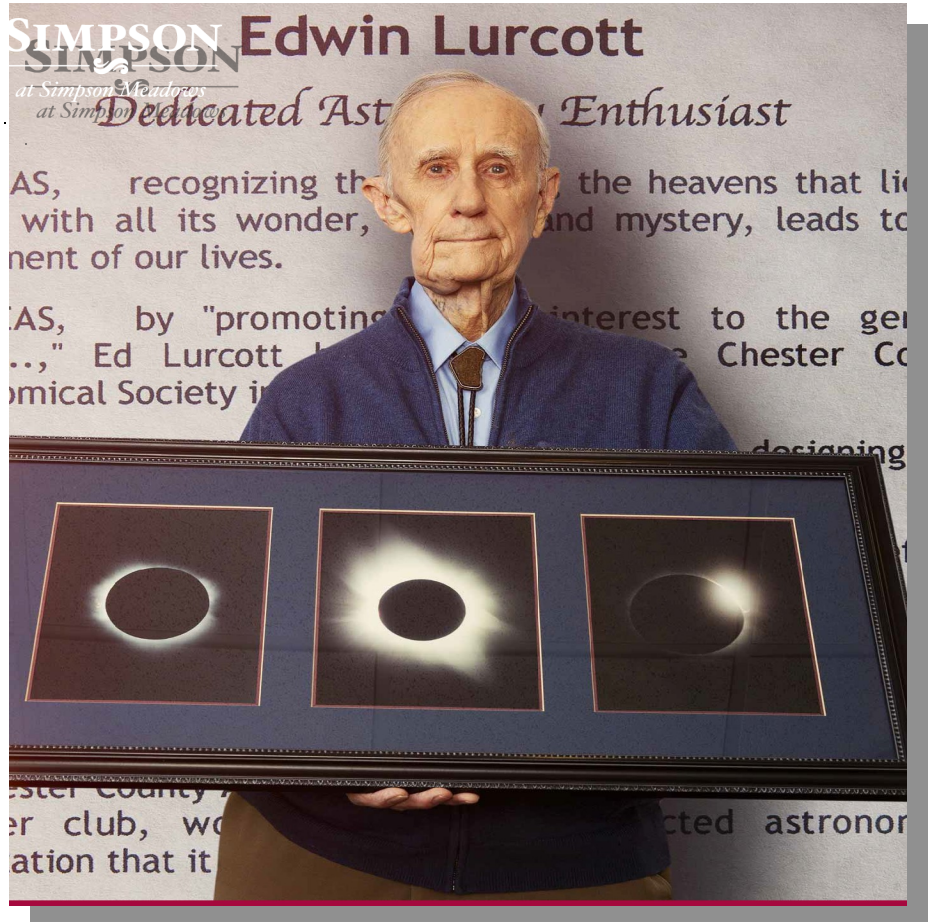
**12th** • CCAS Monthly Meeting, in Room 113, Merion Science Center, WCU. The meeting starts at 7:30 p.m. Member Speaker: John Conrad, who will present “Lucy, the upcoming NASA mission to the Jupiter ‘Trojans’.”

**14th** • The von Kármán Lecture Series: [The Warm Glow of our Cool Universe](#), 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 November 2021 edition of [Observations](#).

**26th** • Deadline for newsletter submissions for the November 2021 edition of [Observations](#).

## Profile: Edwin “Ned” Lurcott, CCAS Founder *Courtesy Simpson Meadows Retirement Community*



CCAS Founder Ed “Ned” Lurcott Image Courtesy Simpson Meadows

When Edwin “Ned” Lurcott was growing up, his father introduced him to astronomy, often using tools he made himself to

view the skies. Years later, Ned would share his knowledge of and passion for the heavens with

*(Continued on page 8)*

## September 2021 CCAS Meeting Agenda *by Bruce Ruggeri, CCAS Program Chair*

Our next meeting will be held on September 14, 2021, in Room 113, Merion Science Center, WCU. The meeting starts at 7:30 p.m. Dennis O’Leary, CCAS Member and NASA Ambassador – “ NASA Robotic Missions: An Update on New Horizons, Insight, Perseverance, and Juno.”

Please note that inclement weather or changes in speakers’ schedules may affect the pro-

gram. 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](mailto:programs@ccas.us).

## Space Stations – from Earliest to Latest

by John Conrad, CCAS member and NASA Solar System Ambassador

Pop quiz – especially for old-timers in the Philadelphia suburbs: What brought fame to the King of Prussia area in the 1960s?

Most would answer the Mall – which did have its beginnings in 1963. But quite literally above the Mall – on the hill – is a set of buildings which today are a relatively modest part of Lockheed Martin, but in 1960, they housed the headquarters of GE Aerospace, a huge early entrant in the Space Race. On 131 acres the main building is over 900,000 square feet. *Factory* magazine in 1961 named it one of the Top

Ten new manufacturing plants in the US. For more, you can read a King of Prussia Historical Society article: <http://www.kophistory.org/ge-comes-to-town/>.

Among the major programs which GE Aerospace won in the 60's were Apollo and the Air Force's Manned Orbiting Laboratory (MOL). How many of you are even aware of the MOL program, let alone that it was a *space station* – and not a NASA program!? I have written in the past about the real driver behind the Apollo success. The Moon Race was simply a necessary

battle to win in the Cold War. Similarly, the MOL program was publicly known for science missions and planned experiments, but the real priority was as a manned reconnaissance (spy) platform – another part of the Cold War. Another key MOL objective was “to prove that astronauts could perform militarily useful tasks in a shirt-sleeve environment in space for up to thirty days.” Details like this can be found in a great Wikipedia article.

That decade was one of huge

*(Continued on page 6)*

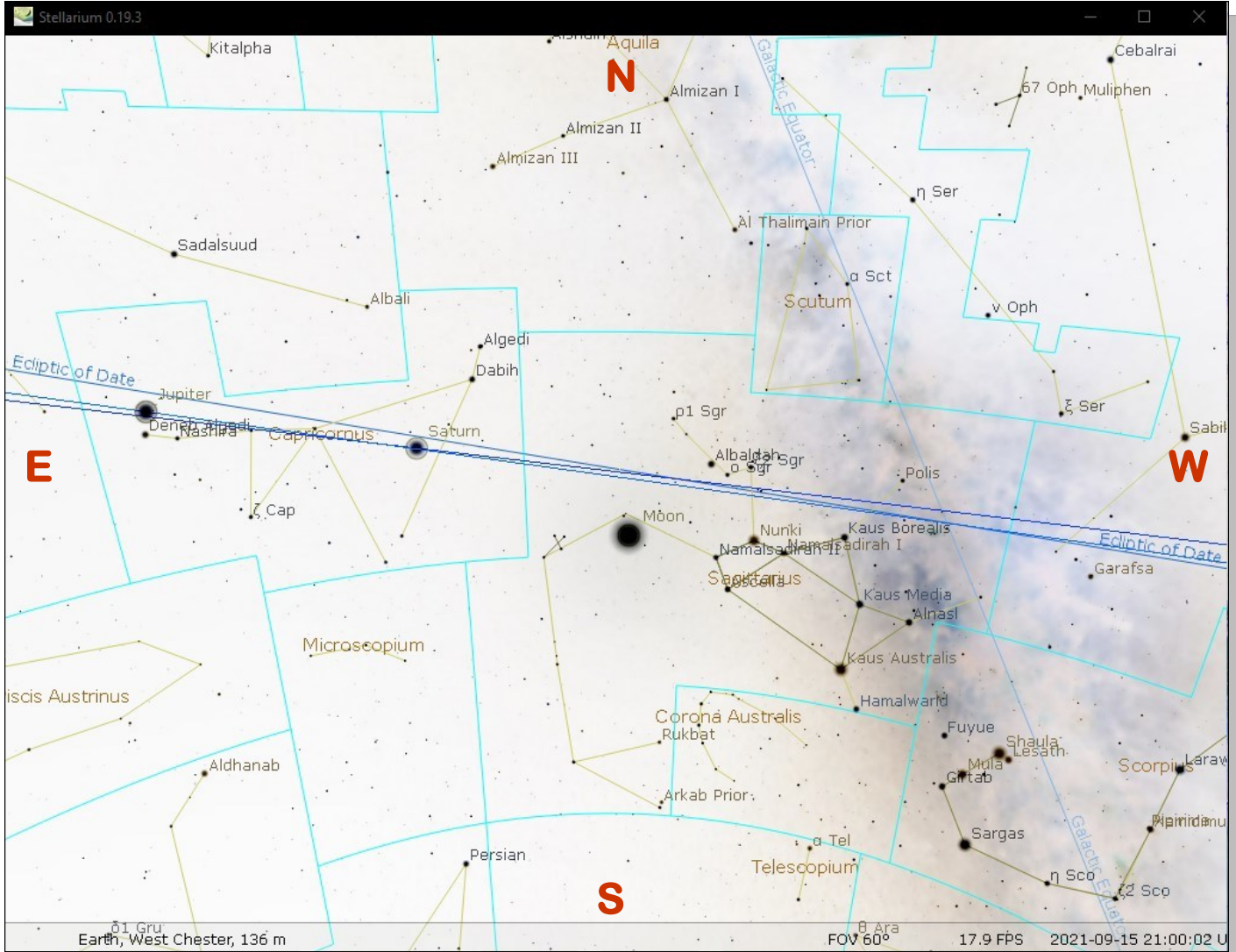


Artist's Concept – Gemini capsule on left would carry astronauts to rendezvous with the MOL. Image Credit: NRO. Retrieved from <https://www.space.com/34661-manned-orbiting-laboratory-declassified-photos.html>

# The Sky Over Chester County

September 15, 2021 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](http://www.stellarium.org).



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
09/01/2021	6:02 a.m. EDT	6:30 a.m. EDT	7:33 p.m. EDT	8:01 p.m. EDT	13h 02m 51s
09/15/2021	6:16 a.m. EDT	6:43 a.m. EDT	7:10 p.m. EDT	7:37 p.m. EDT	12h 26m 56s
09/30/2021	6:30 a.m. EDT	6:57 a.m. EDT	6:45 p.m. EDT	7:12 p.m. EDT	11h 47m 54s

## Moon Phases

			New Moon	09/06/2021	8:51 p.m. EDT
First Quarter	09/13/2021	4:39 p.m. EDT	Full Moon	09/20/2021	7:54 p.m. EDT
Last Quarter	09/28/2021	9:57 p.m. EDT			

## September 2021 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

6	New Moon, 8:51 p.m. EDT
9	Venus is to the lower left of the Moon and Spica is to their lower right
10	The crescent Moon is near Venus
12	The crescent Moon and Antares are close as they sink into the west
13	First Quarter Moon and the Lunar X is visible around 4 p.m.
14	The Lunar Straight Wall is visible
14	Neptune is at opposition and therefore visible all night
17	The Moon, Jupiter and Saturn form a large triangle
20	Full Moon, the Full Harvest Moon or the Full Moose Calling Moon, 7:54 p.m. EDT
22	Fall equinox, 3:21 p.m. EDT
28	Last Quarter Moon, 9:57 p.m. EDT

**The best sights this month:** September is a great month to view planets, and you can see 6 of them before midnight! Mercury and Venus are low in the west just after sunset, Jupiter and Saturn rule the evening sky, and Uranus and Neptune are rising in the east.

**Mercury:** Mercury is not an easy target during September, but with a low western horizon and a pair of binoculars you will find it low in the west in early September.

**Venus:** The “evening star” is still fairly low in the sky but with it shining at magnitude -4 it is easy to find all month. On September 9<sup>th</sup> you can see a nice grouping of Venus, the Moon and Spica.

**Mars:** Mars is too close to the path of the Sun in the sky to be observed during September. The red planet will be seen in the pre-dawn sky in December.

**Jupiter:** The king of the planets is impossible to miss in the east during September! With its Great Red Spot, two large equatorial bands and the 4 Galilean moons Jupiter is a joy to observe in a telescope.

Wait until late evening when Jupiter is high in the sky for the best viewing.

**Saturn:** The ringed planet is a stunning sight in the eyepiece of a telescope! Those rings never fail to amaze me and I can stare at them for long minutes. On a night of good seeing you can make out the Cassini Division, the gap between the main inner and outer rings.

**Uranus and Neptune:** Neptune reaches opposition on September 14<sup>th</sup> and is therefore visible all night. Neptune is not a thrilling sight in a telescope, at a distance of 2.7 billion miles it is just too far away to be much more than a dim bluish speck in the eyepiece. But it is still amazing that we can see this distant cold world at all. Uranus is more easily found and observed and is a definite greenish disk in the eyepiece. Uranus rises around 10 pm and is best viewed a few hours later.

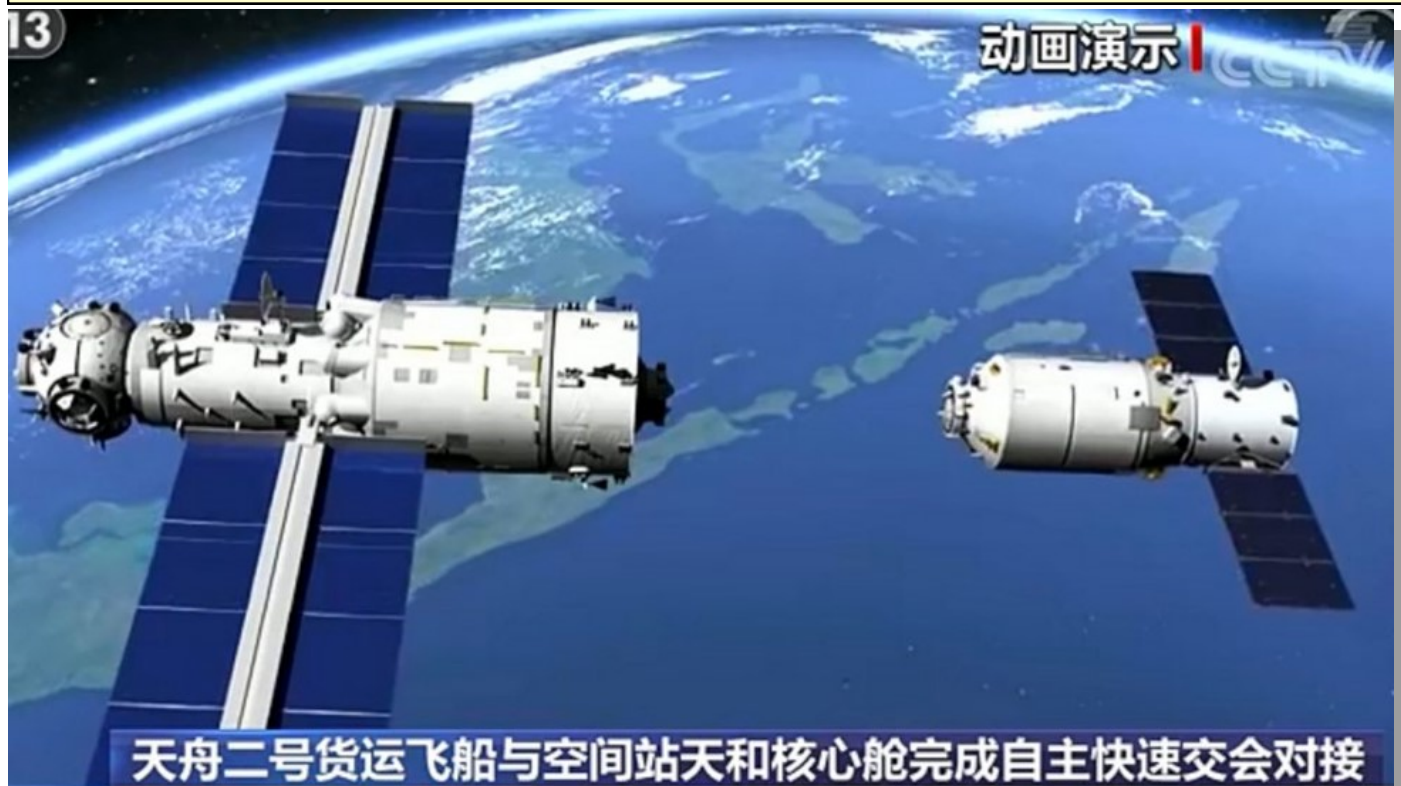
**The Moon:** Full Moon is on September 20<sup>th</sup>. This full Moon is the Harvest Moon because it is the full Moon that occurs closest to the autumn equinox. In two years out of three, the Harvest Moon comes in September, but in some years it occurs in October. At the peak of harvest, farmers can work late into the night by the light of this Moon. Native Canadians called this the Moose Calling Moon.

**Constellations:** Hercules and the Summer Triangle shine near the zenith throughout September with “the backbone of the night”, the Milky Way, arching across the sky. Stay up a bit later and the autumn constellations will rise in the east, so look for the Great Square of Pegasus, Cassiopeia and Perseus.

**Messier/deep sky:** We lose the southern Messier objects as September moves on but the Andromeda galaxy makes up for that loss. What a sight that is! The Double Cluster in Perseus is a worthwhile target and late at night the open clusters in Auriga rise out of the eastern horizon.

**Comets:** There are no bright comets visible during September

**Meteor showers:** There are no significant meteor showers during September.



Tianzhou 2 (second module) approaches the Tianhe core module (left) of the Tiangong Space Station. Image retrieved from <https://www.newsnetnebraska.org/the-tianzhou-2-unit-docked-at-the-china-tianhe-space-station/>

(Continued from page 3)

growth for GE at the Valley Forge Space Center, with thousands of new aerospace workers and dozens of buildings all around the King of Prussia area. As one of the Air Force-selected MOL prime contractors, GE's roles engaged the 14 newly-selected MOL astronauts, completely separate from NASA's growing corps of astronauts – from the Mercury 7 to Gemini and Apollo. These were heady days for GE as billions of dollars were driving the MOL program forward, toward its first planned 30-day manned mission in December 1969 – what would be the world's first manned space station.

Unfortunately, the momentum of human training and preparations, and engineering design

and development – including unmanned prototype flights – was not matched by budget and political priorities. And so, in 1969, with preparation well underway for an upcoming manned launch, the program was cancelled. Seven of the 14 MOL astronauts who had seen extensive training in the King of Prussia area were transferred to NASA, where they all flew the Space Shuttle years later.

As for the earliest orbiting space station, that honor went to the Soviet *Salyut* in 1971. The most recent space station – well – that isn't a NASA station either. It's the recently launched first module of China's *Tiāngōng*. Orbiting a bit lower than the ISS, in a lower inclination orbit, it will be constructed via 11 total launches across

2021 and 2022. Quite a bit smaller than the ISS, it will host up to six taikonauts at a time. On June 17, the first crew of three docked and currently inhabit the *Tianhe* core module.

Lots of us remember “The Russians are coming..... the Russians are coming,” an oft-repeated Cold War warning. We have truly arrived at the day of “The Chinese are coming..... the Chinese are coming!”

Now...back to the MOL legacy. Within a couple years after the 1969 cancellation, the Space Shuttle effort was off and running with even bigger budgets and a number of major contractors. In the early 80s, the first two Space Shuttle missions were flown by two of the lead-

(Continued on page 7)

## Lucy (Cont'd)

(Continued from page 6)

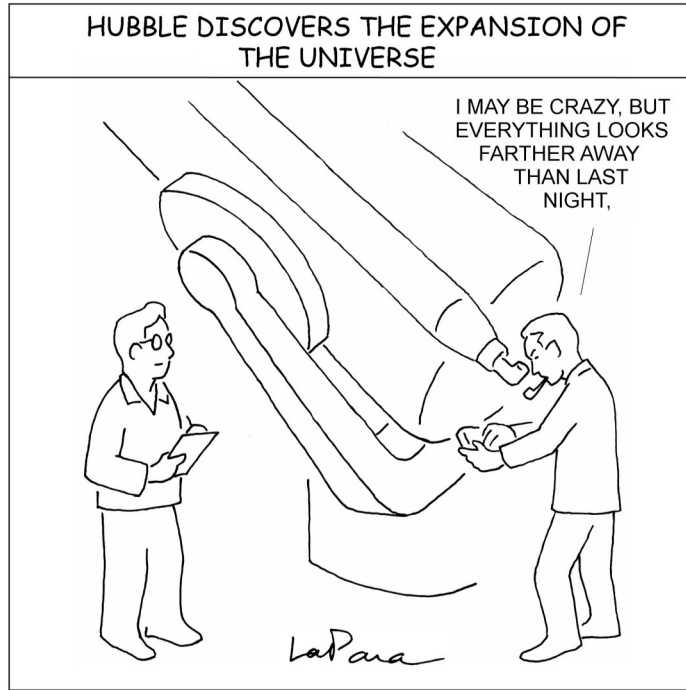
ing MOL astronauts – Bob Crippen and Dick Truly – who were well known by many in the King of Prussia area.

But alas the King of Prussia GE organization did not have a major role in the shuttle program – and so years of layoffs ensued. When I arrived in 1977, I heard about those years, where first the fat was cut, then more fat, until there was nothing left but the bones. GE had many NASA contracts and a growing presence in the military/intelligence space arena, but it was over a decade before GE Aerospace returned to the level of the 60s, filling much of the real estate originally built for MOL. One of the standard lines from old-timers – back in

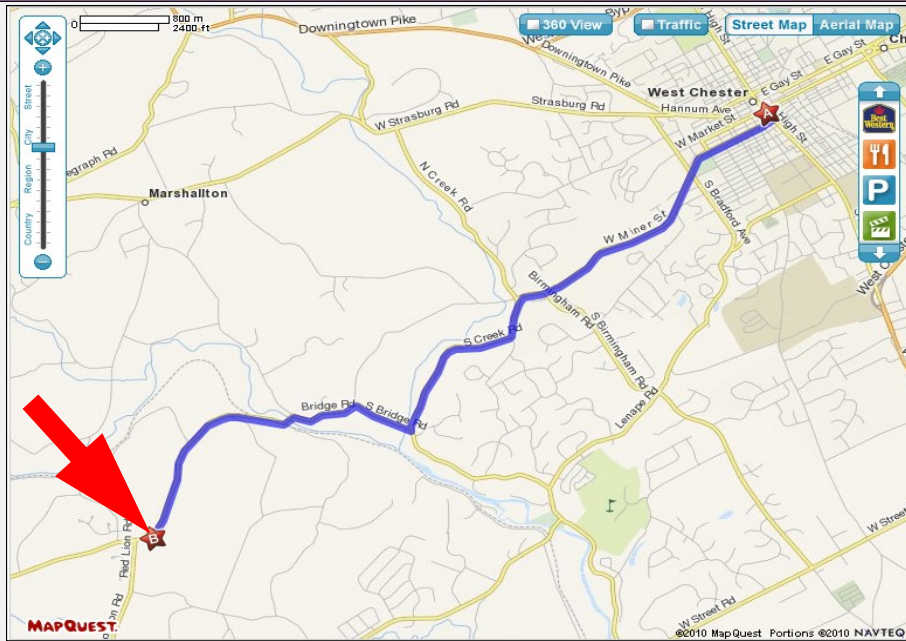
(Continued on page 8)

## Classic La Para

by Nicholas La Para



## 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.

## Lurcott (Cont'd)

(Continued from page 2)

countless others as the founder of the Chester County Astronomical Society.

Ned was born in 1928 in Elizabeth, New Jersey. At age 18, he began two years in the Army, then earned a degree in civil engineering from Syracuse University and went to work for the Pennsylvania Railroad, where he was in charge of bridge inspections. He spent three weeks touring Europe before he was married. After marrying his wife, Evelyn, a nurse, they toured national parks and the Western United States before the birth of their four children. His 38-year career with the railroad took them to Indianapolis; Philadelphia; Columbus, Ohio; and Washington, D.C. In 1970, the family settled in West Chester, where he and Evelyn were active members of Grove United Methodist Church. All the while, he never lost his interest in astronomy.

In 1985, he took some astronomy courses at West Chester University and was asked to restore their 12-inch telescope to operating condition in time to view Haley's Comet. Eventually, he became an adjunct professor of astronomy, operating their observatory for several years.

In September 1993, he and a half-dozen others who shared his fascination with the universe formed the Chester County Astronomical Society (CCAS) in cooperation with West Chester University. Over the years, the society has provided programs for scout troops, schools and civic groups interested in learning more about the skies. As part of CCAS's Intro to Astronomy program, Ned taught a class called Spaceship Earth, which explained how the earth relates to the rest of the solar system, why seasons exist and why the night sky changes.

CCAS also partnered with West Goshen Township Parks

and Recreation Department to offer residents guided viewings of the lunar eclipse and other celestial phenomena.

As a result of his involvement with the Chester County Astronomical Society, Ned was admitted to the Astronomical League, a federation of astronomical societies, and in 2016, he received their Outreach Observing Award. He has built a lasting legacy. Not only is CCAS still active today, welcoming anyone who is interested in learning more about astronomy, and the CCAS website still features photographs of a lunar eclipse that Ned took in La Paz, Mexico.

Ned and Evelyn moved to Simpson Meadows in 2007. Although Evelyn has passed, three of their children still live nearby. Today, Ned enjoys the atmosphere of the small community, exercise, dinners and holidays, and getting a glimpse of the stars.

## Space Station (Cont'd)

(Continued from page 7)

that day: "If you want to buy insurance or a used car in the area, you can probably find an ex-GE engineer selling it." And there were MOL astronaut stories.....

But first, a personal story about my brush with MOL. Tucked into one of the many original GE MOL buildings, about a mile from the Mall, is the one housing the 'neutral buoyancy tank,' used to train the astronauts in 'simulated' weightlessness. Those of us who knew about this over a dec-

ade later referred to it simply as the 'pool.' In fact it was a huge 18-foot deep empty pool which Safety had deemed must be filled in, but of course that never made it into the budget.

As it happened, the first post-MOL use of that area of the building was a program I was managing, to develop and build a shelterized intelligence system for the Army. Our team learned of this adjacent hazard, separated from us by no more than what was essentially a very large shower curtain – plus a flimsy wooden perimeter rail. The end

of this story is that nobody fell in, but I wouldn't be surprised if the pool is still there almost 40 years later.

One final note from the MOL adventures of the 1960s: the astronauts did use the 'pool' and not just for training, but some extracurricular pool parties! And so, the first space station started in King of Prussia but did not reach orbit. But it did provide GE with their first foothold in the Space Age, with many accomplishments through the years.



## Saturn's Rippling Rings Point to Massive, Soupy Core Hidden Inside

by Tereza Pultarova, Space.com



*The rings of Saturn, seen here in an archival photo from NASA's Cassini spacecraft, may hold clues into the planet's soupy, mushy core, scientists say.*

Saturn's rings aren't just a beautiful adornment — scientists can use the feature to understand what's happening deep inside the planet.

By using the famous rings like a seismograph, scientists studied processes in the planet's interior and determined that its core must be "fuzzy." Instead of a solid sphere like Earth's, the core of Saturn appears to consist of a 'soup' of rocks, ice and metallic fluids that slosh around and affect the planet's gravity.

The new study used data from NASA's Cassini mission, which orbited Saturn and its moons for 13 years between 2004 and 2017. In 2013, data from the mission revealed for the first time that Saturn's innermost ring, the D-ring, ripples and swirls in ways that cannot be entirely explained by the gravitational influences of the planet's moons. The new study looked at these motions in Saturn's rings in greater detail to gain insight into the processes in its interior.

"We used Saturn's rings like a giant seismograph to measure oscillations inside the planet,"

Jim Fuller, assistant professor of theoretical astrophysics at Caltech and one of the authors of the paper said in a statement. "This is the first time we've been able to seismically probe the structure of a gas giant planet, and the results were pretty surprising."

Not only does the planet's core seem sludgy, it also appears to extend across 60% of the planet's diameter, making it much larger than previously estimated.

The analysis showed that Saturn's core might be about 55 times as massive as the entire planet Earth. Of the total mass of the core, 17 Earth masses are made of ice and rock, with the rest consisting of a hydrogen and helium-based fluid, the study suggests.

The lead author of the study, Christopher Mankovich, a post-doctoral scholar research associate in planetary science who works in Fuller's group, explained that the motions in the core cause Saturn's surface to constantly ripple. These surface waves create minuscule changes

in the planet's gravity that subsequently affect the rings.

"Saturn is always quaking, but it's subtle," Mankovich said in the statement. "The planet's surface moves about a meter [3 feet] every one to two hours like a slowly rippling lake. Like a seismograph, the rings pick up the gravity disturbances, and the ring particles start to wiggle around."

According to the scientists, the nature of those ring ripples suggests that the core, despite its sloshing, is composed of stable layers of various densities. Heavier materials sit around the center of the planet and don't mix with the lighter materials closer to the surface.

"In order for the planet's gravitational field to be oscillating with these particular frequencies, the interior must be stable, and that's only possible if the fraction of ice and rock gradually increases as you go in toward the planet's center," Fuller said.

Mankovich compared the material in the core to sludge, adding that the layered but liquid nature of the core is akin to the salinity of Earth's oceans, which increases with depth.

"The hydrogen and helium gas in the planet gradually mix with more and more ice and rock as you move toward the planet's center," Mankovich said.

The findings might challenge some of the established models of the formation of gas giants, planets with no hard surface, which are composed mainly of

*(Continued on page 11)*

## Through the Eyepiece: Messier 11, The Wild Ducks in the sky

by Don Knabb, CCAS Observing Chair & Treasurer

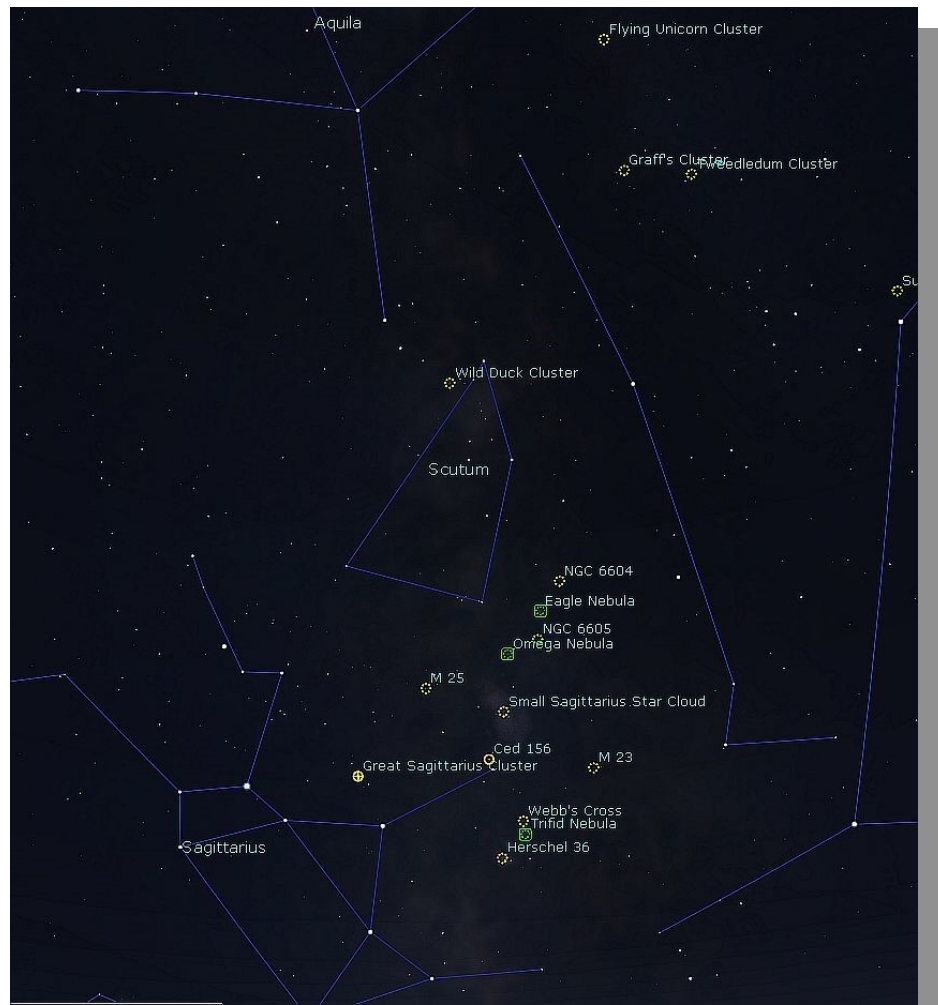
It has been many years since I first saw Messier 11, The Wild Duck Cluster. It remains among my favorite deep sky objects and I still experience a sense of awe and wonder whenever I look at this marvelous open cluster. Many open clusters are exactly that – open. But the Wild Duck Cluster has so many stars that it looks like you are viewing a globular cluster upon first viewing it in your eyepiece.

The Wild Duck Cluster is quite small for an open cluster and you will need more than the usual low power eyepiece to view the details of the cluster. At 60X the impression is of a loose globular cluster. At 140X the individual stars stand out and they are very easily observed. If only a picture could capture the actual experience of viewing such a sight in the eyepiece.

Burnham's Celestial Handbook describes M11 as an "Exceptionally fine galactic star cluster, lying on the north edge of the prominent Scutum Star Cloud, and one of the outstanding objects of its type for telescopes of moderate aperture."

There are not too many weeks left in 2021 to see M11 before it slips below the horizon. During September and October if you look to the southwest just after it gets dark you can find the Wild Ducks in the small constellation Scutum.

There are an estimated 2,900 stars, about 500 of which are brighter than magnitude 14 in the Wild Duck Cluster. A planet at the center of M11 would have a remarkable night sky filled with several hundred first mag-



Sky map created with Stellarium planetarium software

nitude stars. Go out and find Vega, the brightest star of the Summer Triangle. Now imagine a sky filled with several hundred stars of this brightness!

M11 was discovered by the German astronomer Gottfried Kirch of the Berlin observatory in 1681, but it appeared as nothing more than a fuzzy blob in his telescope. Charles Messier included it in his catalog on May 30, 1764 as M11. According to Burnham's it was Rev. Wm. Derham of England who first resolved the cluster into stars in 1732. It was Admiral Smyth who named M11 the Wild Duck Cluster as he wrote in his notes:

"This object, which somewhat resembles a flight of wild ducks in shape, is a gathering of minute stars, with a prominent 8th-magnitude in the middle, and two following;"

You can try to find what Admiral Smyth thought were the wild ducks in this image below. Also, you will see that M11 lies in a section of the Milky Way that is highly populated with background stars.

So where do the "wild ducks" come into play? It is the general consensus that the name arose as a result of the object resembling the V-shape of a flight of ducks,

## Eyepiece (Cont'd)



ESO Wild Duck Cluster. Image credit: This image was taken by the Wide Field Imager on the MPG/ESO 2.2-metre telescope at ESO's La Silla Observatory in northern Chile.

(Continued from page 10)

when viewed through a small telescope.

Many stars like our Sun were

formed in open clusters like M11. The stars in M11 all formed together about 250 million years ago. Open clusters, also called galactic clusters, con-

tain fewer and younger stars than globular clusters. Also unlike globular clusters, open clusters are generally confined to the plane of our Galaxy.

So before all the ducks head south for the winter grab your binoculars or telescope and enjoy the view of one of the most amazing clusters in the night sky!

Information credits:

- [http://www.daviddarling.info/encyclopedia/W/Wild\\_Duck\\_Cluster.html](http://www.daviddarling.info/encyclopedia/W/Wild_Duck_Cluster.html)
- <http://www.seds.org/messier/m/m011.html>
- [https://en.wikipedia.org/wiki/Wild\\_Duck\\_Cluster](https://en.wikipedia.org/wiki/Wild_Duck_Cluster)
- <http://www.universetoday.com/31352/messier-11/>

## Saturn (Cont'd)

(Continued from page 9)

hydrogen and helium, the study suggests. These models assume that the rocky cores of these planets formed first and then attracted large envelopes of gas. If the cores of the planets are, however, fuzzy as the study indicates, the planets might instead incorporate gas earlier in the process.

In fact, recent findings by NASA's Juno mission suggest that another of the solar system's

gas giants, Jupiter, might also have a similarly fuzzy core.

"Christopher [Mankovich] and Jim [Fuller] were able to show that one particular ring feature provided strong evidence that Saturn's core is extremely diffuse," said Matt Hedman, a planetary scientist at the University of Idaho, who was part of the team that first discovered that the motions in Saturn's rings can't be fully explained by the gravity of its moons.

"I am excited to think about what all the other ring features generated by Saturn might be able to tell us about that planet," added Hedman, who did not collaborate on the new paper.

The research was described in a paper published Monday, August 16, 2021, in the journal *Nature*.

Follow Tereza Pultarova on Twitter @TerezaPultarova.

Follow us on Twitter @Spacedotcom and on Facebook.

## NASA Night Sky Notes: Catch Andromeda Rising

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](https://nightsky.jpl.nasa.gov) to find local clubs, events, stargazing info and more.

If you're thinking of a galaxy, the image in your head is probably the Andromeda Galaxy! Studies of this massive neighboring galaxy, also called M31, have played an incredibly important role in shaping modern astronomy. As a bonus for stargazers, the Andromeda Galaxy is also a beautiful sight.

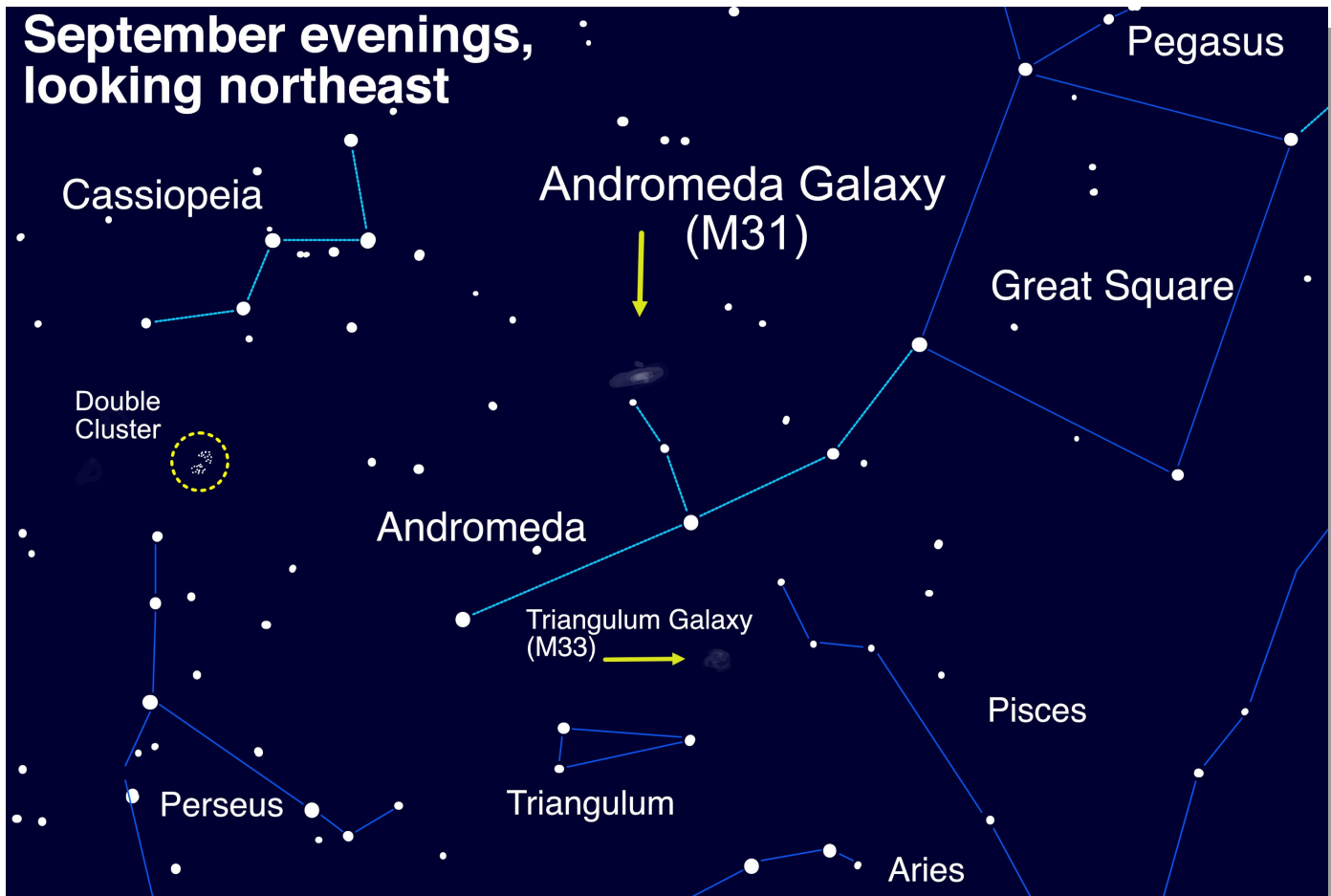
Have you heard that all the stars you see at night are part of our Milky Way galaxy? While that is mostly true, one star-like



object located near the border between the constellations of Andromeda and Cassiopeia appears fuzzy to unaided eyes. That's because it's not a star, but the Andromeda Galaxy, its trillion stars appearing to our eyes

as a 3.4 magnitude patch of haze. Why so dim? Distance! It's outside our galaxy, around 2.5 million light years distant - so far away that the light you see left M31's stars when our earliest ancestors figured out stone tools. Binoculars show more detail: M31's bright core stands out, along with a bit of its wispy, saucer-shaped disc. Telescopes bring out greater detail but often can't view the entire galaxy at once. Depending on the quality of your skies and your magnification, you may be able to make out individual globular clusters, structure, and at least two of its orbiting dwarf galaxies: M110

(Continued on page 13)



Spot the Andromeda Galaxy! M31's more common name comes from its parent constellation, which becomes prominent as autumn arrives in the Northern Hemisphere. Surprising amounts of detail can be observed with unaided eyes from dark sky sites. Hints of it can even be made out from light polluted areas. Image created with assistance from Stellarium

### HUBBLE MAPS THE HALO AROUND THE ANDROMEDA GALAXY



While M31's disc appears larger than you might expect (about 3 Moon widths wide), its "galactic halo" is much, much larger – as you can see here. In fact, it is suspected that its halo is so huge that it may already mingle with our Milky Way's own halo, which makes sense since our galaxies are expected to merge sometime in the next few billion years! The dots are quasars, objects located behind the halo, which are the very energetic cores of distant galaxies powered by black holes at their center. The Hubble team studied the composition of M31's halo by measuring how the quasars' light was absorbed by the halo's material. Credits: NASA, ESA, and E. Wheatley (STScI) Source: <https://bit.ly/m31halo>

(Continued from page 12)

and M32. Light pollution and thin clouds, smoke, or haze will severely hamper observing fainter detail, as they will for any "faint fuzzy." Surprisingly, persistent stargazers can still spot M31's core from areas of moderate light pollution as long as skies are otherwise clear.

Modern astronomy was greatly shaped by studies of the Andromeda Galaxy. A hundred

years ago, the idea that there were other galaxies beside our own was not widely accepted, and so M31 was called the "Andromeda Nebula." Increasingly detailed observations of M31 caused astronomers to question its place in our universe – was M31 its own "island universe," and not part of our Milky Way? Harlow Shapley and Heber Curtis engaged in the "Great Debate" of 1920 over its nature. Curtis argued forcefully

from his observations of dimmer than expected nova, dust lanes, and other oddities that the "nebula" was in fact an entirely different galaxy from our own. A few years later, Edwin Hubble, building on Henrietta Leavitt's work on Cepheid variable stars as a "standard candle" for distance measurement, concluded that M31 was indeed another galaxy after he observed Cepheids in photos of Androme-

(Continued on page 14)

## 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)*

da, and estimated M31's distance as far outside our galaxy's boundaries. And so, the Andromeda Nebula became known as the Andromeda Galaxy.

These discoveries inspire astronomers to this day, who continue to observe M31 and many other galaxies for hints about the nature of our universe. One of the Hubble Space Telescope's longest-running observing campaigns was a study of M31: the Panchromatic Hubble Andromeda Treasury (PHAT): [bit.ly/m31phat](http://bit.ly/m31phat). Dig into NASA's latest discoveries about the Andromeda Galaxy, and the cosmos at large, at [nasa.gov](http://nasa.gov).

### CCAS Membership Information and Society Financials

#### Treasurer's Report by Don Knabb

##### August 2021 Financial Summary

Beginning Balance	\$520
Deposits	\$0
Disbursements	-\$0
Ending Balance	\$520

#### New Member Welcome!

Welcome new CCAS members Gary Hodson, from West Chester, PA, and the John Lindtner family from West Grove, 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](mailto: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](mailto: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](mailto: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](mailto: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](mailto: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 **\$54.95**.

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.