



# Observations

A Monthly Publication Of The  
**CHESTER COUNTY ASTRONOMICAL SOCIETY**

Vol. 27, No. 4 **Three-Time Winner of the Astronomical League's Mabel Sterns Award** ☀ 2006, 2009 & 2016

April 2019

## In This Issue

CCAS Spring 2019 Events .....	2
March 2019 Meeting Minutes .....	2
April 2019 Meeting Agenda .....	2
Upcoming Launch from Wallops Flight Facility .....	3
Iron Planet Orbiting Star.....	3
The Sky Over Chester County: April 2019 .....	4
April 2019 Observing Highlights .....	5
CCAS Member Earns Messier Observing Award .....	7
Spring 2019 Astronomy Classes.....	7
Through the Eyepiece: M63, the Sunflower Galaxy.....	8
NASA Night Sky Network.....	10
CCAS Directions: Brandywine Valley Association .....	11
Membership Renewals .....	12
New Member Welcome.....	12
CCAS Directions: WCU Map.....	12
Treasurer's Report.....	12
CCAS Information Directory .....	13-14

## CCAS Awards Night



*Eighteen CCAS members were on hand at the March 12 monthly meeting to receive their NASA Night Sky Network outreach awards. See more awards on pg. 7.*

## Membership Renewals Due

04/2019	Hepler Imburgia Miller Richter Rossomando
05/2019	Cunningham Hertweck Klapholz LaFrance O'Hara Ostaneck
062019	Crabb Hanspal Harris Hebding Mazziotto & Calobrisi McCausland Poley Sigler-Quick Thomas

## Important April 2019 Dates

- 5th** • New Moon, 4:05 a.m. EDT
- 12th** • First Quarter Moon, 3:05 p.m. EDT.
- 19th** • Full Moon, the Full Pink Moon or the Birds Lay Eggs Moon, 7:12 a.m. EDT
- 21st-22nd** • The Lyrid Meteor shower peaks.
- 26th** • Last Quarter Moon, 6:18 p.m. EDT



## CCAS Upcoming Nights Out

CCAS has several "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.

☀ **Tuesday, April 16, 2019.** CCAS Special Observing Session at Hoopes Park, West Chester, PA. The observing session starts at sunset. The session is from 8:00 p.m. to 9:30 p.m.

☀ **Saturday, April 27, 2019.** CCAS Special Observing Session with the Atglen Public Library at Wolf's Hollow County Park, Atglen, PA. The session is from 8:15 p.m. to 9:45 p.m.

## Spring 2019 Society Events

### April 2019

**9th** • CCAS Monthly Meeting, Room 113, Merion Science Center (former Boucher Building), West Chester University. The meeting starts immediately after at 7:30 p.m. Guest speaker: Dr. Marc Gagne, West Chester University.

**16th** • CCAS Special Observing Session at Hoopes Park, West Chester, PA. The observing session starts at sunset. The session is from 8:00 p.m. to 9:30 p.m.

**18th-19th** • The von Kármán Lecture Series: [The Future is Cloudy: NASA's Look at Clouds and Climate](#), at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

**20th** • Open call for articles and photographs for the May 2019 edition of [Observations](#).

**26th** • Live public presentation, [Your Backyard Sky](#), at the West Chester University Mather Planetarium. Doors open at 6:30 p.m. with presentation starting at 7:00 p.m. Cost is \$6.00.

**26th** • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset. The session is from 7:00 p.m. to 9:00 p.m.

**26th** • Deadline for newsletter submissions for the May 2019 edition of [Observations](#).

**27th** • CCAS Special Observing Session with the Atglen Public Library at Wolf's Hollow County Park, Atglen, PA. The session is from 8:15 p.m. to 9:45 p.m.

### May 2019

**9th-10th** • The von Kármán Lecture Series: [Cubesats](#), at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

**10th** • CCAS monthly observing session at BVA. The observation session starts at dusk.

**10th** • [National Astronomy Day](#). CCAS Special Observing Session at [Anson Nixon Park](#), Kennett Square, PA. The observing session is from 8:00 p.m. to 9:30 p.m.

**14th** • CCAS monthly meeting in Room 113, Merion Science Center, WCU. Meet & Greet over coffee and refreshments from 7:10 to 7:30 p.m. The meeting starts at 7:30 p.m. Guest Speaker: Dr. Chris D'Andrea, "Supernovae: Going Out with a Bang."

**20th** • Open call for articles and photographs for the May 2019 edition of [Observations](#).

**25th** • CCAS Special Observing Session at [Welkinweir](#), Pottstown, PA. The observing session starts at sunset.

**26th** • Deadline for newsletter submissions for the May 2019 edition of [Observations](#).

**30th** • [Cherry Springs Star Party](#), Coudersport, PA. Through Sunday, June 2nd.

## Meeting Minutes from March 12, 2019

by Bea Mazziotta, CCAS Secretary

- Club President Dave Hockenberry called the March meeting to order and welcomed the 27 attendees and members.
- Winter is awards season and March 12, 2019, was awards night at CCAS.
  - Dave presented Don Knabb with the Astronomical League's Messier Club Certificate in recognition of Don's documented observation of 70 Messier objects.
  - Roger Taylor, former club president, received the E. T. Lurcott Founders Award for his outstanding leadership. As stated in a heartfelt letter written by Ed Lurcott, Roger's tenure saw the establishment of new learning programs and expansion of outreach resulting in many new members for the club.
  - Dave also presented a number of club members with Night Sky Network Certificates and lapel pins in recognition of their participation in viewing and educational events designed to share the wonders of the night sky with local students and the community.
  - This year's pin incorporated a stylized crescent moon and recognition of the 30th anniversary of Apollo 11. Congratulations to all.
- Don announced the following CCAS April observing events.
  - 4/6 Hoopes Park
  - 4/26 Brandywine Red clay Alliance
  - 4/27 Wolfs Hollow Park in conjunction with the Atglen Public Library and Chester County Parks System.
- Don told members about Mitaka, a Japanese space viewing program which can interactively display various celestial bodies and the hierarchical structure of the known universe. You can get more information and download the free software at the 4D2U web page. A recent webinar led by Dean Regas, co-host of the popular PBS series Star Gazers, took viewers on a whirlwind tour of the universe utilizing the Mitaka simulation software. Here is a link to the NSN page where you can find the webinar. <https://nightsky.jpl.nasa.gov/download->

(Continued on page 11)

## April 2019 CCAS Meeting Agenda

by Dave Hockenberry, CCAS President & Program Chair

Our next meeting will be held on April 9, 2019, starting at 7:30 p.m. The meeting will be held in Room 113, Merion Science Center (former Boucher Building), West Chester University. Our guest speaker is West Chester University professor Dr. Marc Gagne.

Then on May 14th, CCAS will welcome Dr. Chris D'Andrea, astronomy professor at Haverford College. He will be presenting a talk entitled, "Supernovae: Going Out with a Bang."

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 2019-2020 season. 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).



## Upcoming Wallops Island Launch

by Pete Kellerman & Don Knabb



Information and photo credit: NASA Wallops Flight Center

*Resupply mission to the International Space Station to launch from NASA Wallops Island Flight Facility on April 17*

NASA commercial cargo provider Northrop Grumman is scheduled to launch its eleventh Cygnus mission to the International Space Station at 4:46 p.m. EDT Wednesday, Apr. 17 at NASA's Wallops Flight Facility on Wallops Island, Virginia. The Cygnus satellite will be launched on a Northrop Grumman Corporation Antares rocket. This is a large rocket, so it will be a great show and is a much shorter drive then going all the way to Florida to see a launch.

Each resupply mission to the station delivers scientific investigations in the areas of biology and biotechnology, Earth and

space science, physical sciences, and technology development and demonstrations. Cargo resupply from U.S. companies ensures a national capability to deliver critical science research to the space station, significantly increasing NASA's ability to conduct new investigations at the only laboratory in space.

This mission also is the inaugural launch of the Virginia Space ThinSat Program. NG-11 will release 63 ThinSats and the Student Aerothermal Spectrometer Satellite of Illinois and Indiana CubeSat, a collaborative effort between the University of Illinois Urbana-Champaign and Purdue University, from the second stage of Antares into extreme low Earth orbit. Students will collect and analyze data

*(Continued on page 9)*

## Astronomers Spy Iron Planet Around Burnt-Out Star

by Daniel Clery, *Science Magazine*

In a glimpse of what may be in store for our own solar system, astronomers have discovered what appear to be the shattered remains of a planet orbiting a white dwarf, the burned-out ember of a star like our sun. If the team's calculations are correct, the orbiting object may be the iron core of a small planet that had its outer layers ripped off by the white dwarf's intense gravity.

Although astronomers know of thousands of exoplanets in the Milky Way, they struggle to see anything much smaller than Earth. The new object is by far the smallest, more of an asteroid than a planet. Its discovery also provides a clue into the fate of planets as their stars age. When sunlike stars run out of hydrogen fuel and start to burn elements like helium and carbon, they swell up into red giants and consume any planets that orbit too close. Those that survive witness what can happen next when the red giant's fuel is exhausted: It collapses into a small and dense white dwarf, which cools over trillions of years. Its intense gravity can rip apart any surviving planets that stray too close, consuming some material and leaving the rest in a swirling disk of dust.

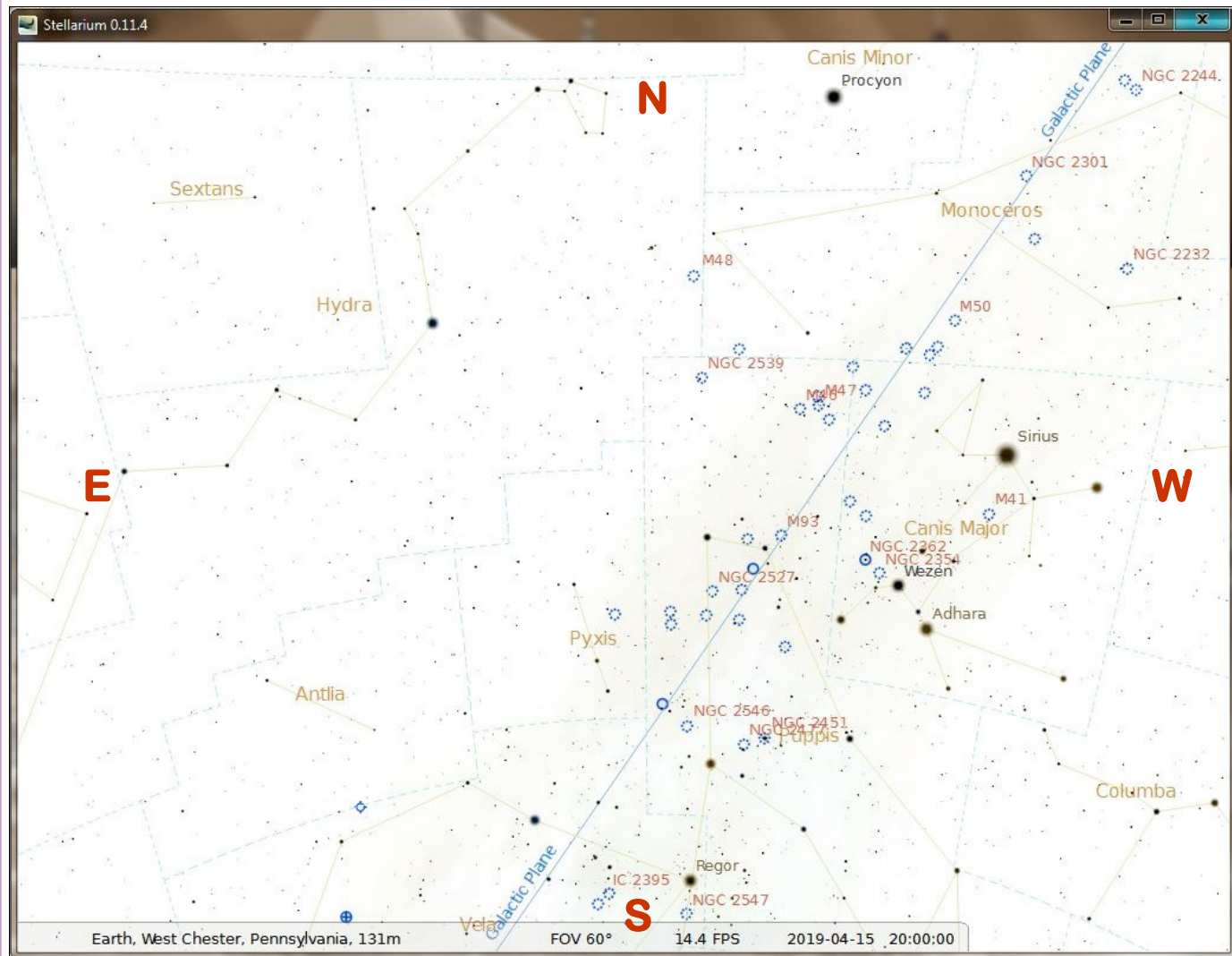
Finding the planetesimal, 400 light-years from Earth, wasn't easy. A team of astronomers, led by Christopher Manser of the University of Warwick in Cov-

*(Continued on page 9)*

# The Sky Over Chester County

April 15, 2019 at 8:00 p.m. ET

Note: This screen capture is taken from Stellarium, the free planetarium software available for download at [www.stellarium.org](http://www.stellarium.org).



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
04/01/2019	6:19 a.m. EDT	6:46 a.m. EDT	7:26 p.m. EDT	7:53 p.m. EDT	12h 39m 37s
04/15/2019	5:57 a.m. EDT	6:25 a.m. EDT	7:40 p.m. EDT	8:08 p.m. EDT	13h 15m 36s
04/30/2019	5:34 a.m. EDT	6:04 a.m. EDT	7:55 p.m. EDT	8:25 p.m. EDT	13h 51m 41s

## Moon Phases

			New Moon	04/05/2019	4:50 a.m. EDT
First Quarter	04/12/2019	3:05 p.m. EDT	Full Moon	04/19/2019	7:12 a.m. EDT
Last Quarter	04/26/2019	6:18 p.m. EDT			

## April 2019 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

5	<b>New Moon, 4:05 a.m. EDT</b>
8	<b>A waxing crescent Moon, Mars, the Pleiades and Aldebaran form a nice group in Taurus.</b>
11	<b>Mars is near Aldebaran for the next week.</b>
12	<b>First Quarter Moon, 3:05 p.m. EDT. The Lunar X and the Lunar Straight Wall are visible.</b>
13	<b>The Moon is near the Beehive Cluster</b>
19	<b>Full Moon, the Full Pink Moon or the Birds Lay Eggs Moon, 7:12 a.m. EDT</b>
21/22	<b>The Lyrid Meteor shower peaks.</b>
26	<b>Last Quarter Moon, 6:18 p.m. EDT</b>

**The best sights this month:** We can see a nice grouping of objects on April 8<sup>th</sup> when Mars, the Pleiades, Aldebaran and a thin crescent Moon are close in the evening sky. April is also a great month to go galaxy hunting, and I always start with the Leo Triplet of galaxies under Leo the Lion's tail. For lunar fans, we are treated to a chance to see the Lunar Straight Wall and the elusive Lunar X on the night of First Quarter Moon, April 12<sup>th</sup>. Look for the Lunar X to appear near midnight.

**Mercury:** After a wonderful performance in March, Mercury is an early morning planet during April.

**Venus:** Venus and Mercury are fairly close in the morning sky on April 16<sup>th</sup>.

**Mars:** Mars continues to fade in brightness throughout April, but has a nice trip through the constellation Taurus the Bull. The red planet starts April near the Pleiades and on April 8<sup>th</sup> makes a nice group with the Pleiades, Aldebaran and a thin crescent Moon. By the end of the month Mars is far above Aldebaran.

**Jupiter:** Jupiter is rising around midnight during April and is growing brighter as the month progresses and ends the month at magnitude -2.5.

**Saturn:** The ringed planet rises around 2:00 a.m. and grows brighter through the month, although at magnitude +0.5 it compares poorly to Jupiter.

**Uranus and Neptune:** Neither gas giant is in good viewing position during April.

**The Moon:** The Moon is full on April 19<sup>th</sup>. Native Americans called this the Full Pink Moon. This name came from the herb moss pink, or wild ground phlox, which is one of the earliest flowers of the spring. Other names for this full Moon are the Full Sprouting Grass Moon and among coastal tribes the Full Fish Moon because this was the time that the shad swam upstream to spawn. Native Canadians called this The Full Birds Lay Eggs Moon.

**Constellations:** We say good-bye to the winter constellations as April progresses. But the spring constellations are here to enjoy and if you are up late you will even see the Summer Triangle peeking over the eastern horizon. Leo the Lion is at center stage and Ursa Major is high overhead. In the east we have bright Arcturus in Boötes, followed by Corona Borealis the Northern Crown. If you are up a bit later you will see Hercules rising.

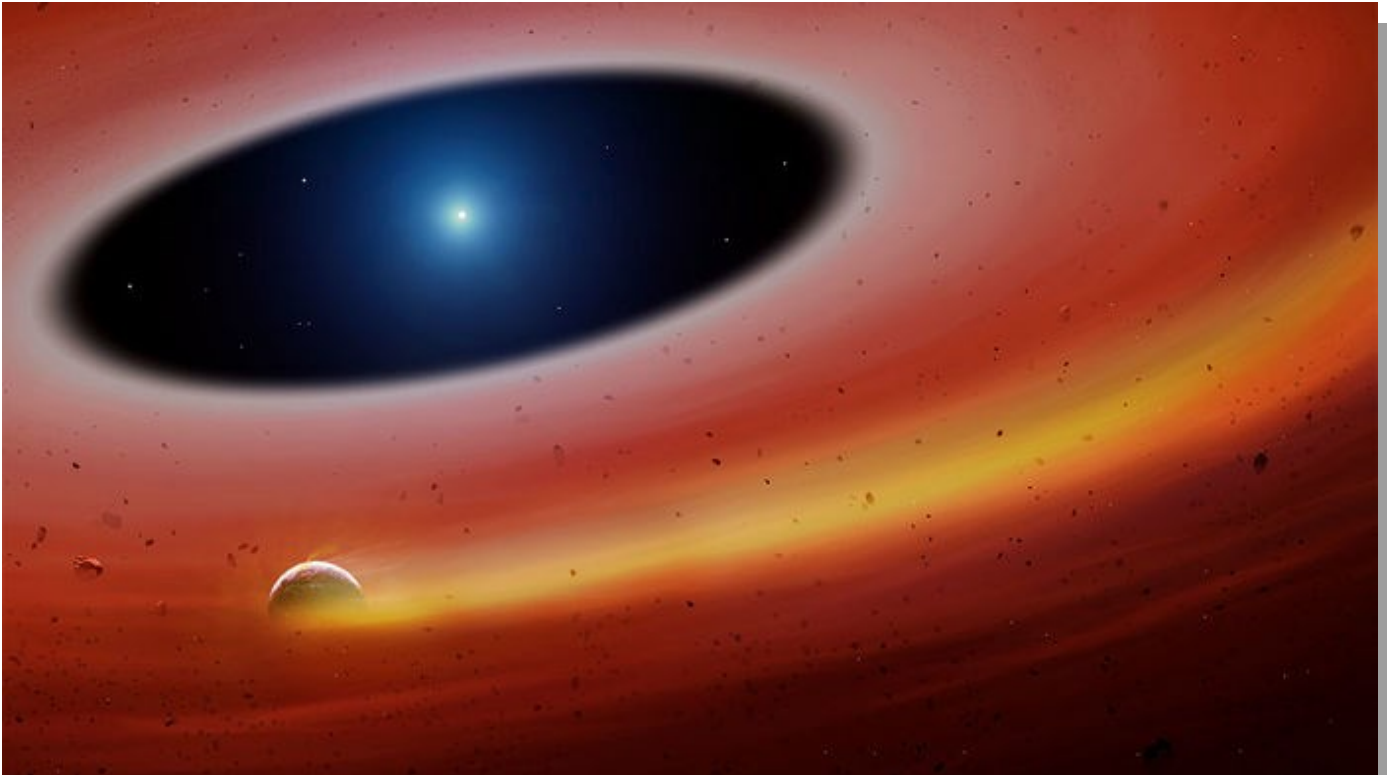
**Messier/deep sky:** April is a good month to go galaxy hunting. Look for M63 in Canes Venatici, M64 in Coma Berenices, M51, M81 and M82 in Ursa Major and M104 near bright Spica in Virgo. My favorite grouping of galaxies is the Leo Triplet, below Leo the Lion's tail. Of course, you will need to go hunting on a night with no bright Moon.

**Comets:** There are no bright comets in the sky during April.

**Meteor showers:** The Lyrid meteor shower occurs on the night of April 21/22. Expect up to 20 meteors per hour at the peak of the shower in the hours before dawn. Unfortunately, a waning gibbous Moon will wash out all but the brightest shooting stars.



## Iron Planet (Cont'd)



Astronomers have discovered a small planet around a white dwarf, which in this artist's conception is plowing through a disk of dust and leaving a trail of gas in its wake. UNIVERSITY OF WARWICK/MARK GARLICK

(Continued from page 3)

entry, U.K., had been watching this particular white dwarf for 15 years. They gained some observing time on the world's largest optical telescope, the 10.4-meter Gran Telescopio Canarias on La Palma in Spain's Canary Islands, in 2017 and 2018. The white dwarf, known as SDSS J122859.93+104032.9, or SDSS J1228+1040 to its friends, is one of only a handful of white dwarfs with a surrounding disk of both gas and debris, and the team wanted to study minute-by-minute changes in the gas.

Most exoplanets can't be seen directly, but are found when they cast a shadow crossing the face of their star or when they tug their star back and forth with

the force of their gravity. Manser's team used a similarly indirect method. They picked apart the light coming from the disk to see its spectrum of frequencies and zoomed in on three bright spectral lines produced by calcium ions, which act as a flag for the gas circulating in the disk.

As the gas—including the calcium ions—zips around the white dwarf, its light gets Doppler shifted to slightly higher frequencies when moving toward Earth and lower frequencies when moving away. The effect also spreads out the normally narrow calcium emission lines into broad bands with peaks at each end—shaped like a hammock slung between two poles.

Manser says his team had expected to see such broadened lines with perhaps some random fluctuations in the peaks, caused by pieces of debris colliding and producing flares of gas. Instead they saw that the two peaks in each calcium line rose and fell in opposition to each other every 2 hours like clockwork. "It was a really exciting discovery," Manser says.

The researchers give several possible explanations for the metronomic peaks, including a large planet in orbit and vortices in the dust disk. But writing in *Science* today, they reject all but one: that this is the signature of a planetesimal orbiting the star. They argue that the calcium

(Continued on page 7)

## Iron Planet (Cont'd)

(Continued from page 6)

lines are not from the planetesimal itself, but from a cloud of gas that surrounds it, either because it is being battered by disk debris or because radiation from the star causes it to emit gas. As that gas cloud follows the planetesimal in its orbit, it boosts one emission peak while moving toward Earth and, an hour later, the other peak while moving away.

“It’s amazing to me that they can deduce the existence of an object so small,” says astronomer Ben Zuckerman of the University of California, Los Angeles, who was not involved in the work. But he and astronomer Mukremin Kilic of the University of Oklahoma in Norman agree that

the team’s explanation is the likeliest one. “Is it a planetesimal?” Kilic asks. “Given the information available, that’s probably the best conclusion.”

The result is also surprising because the object is so close to its Earth-size star. If it was in our solar system, it would be orbiting inside the surface of the sun. Any object that close to a white dwarf would normally be torn apart. The researchers calculate that if the planetesimal were simply held together by its own gravity, the entire thing would need to be the density of iron, making it similar to the metallic asteroids found in our solar system. If it had differentiated layers to give it strength, it could be

less dense and as large as 720 kilometers across, on a par with the dwarf planet Ceres. Whatever the object was originally like, the researchers say, it must have had its outer rocky layers ripped away by the white dwarf, leaving only its metallic core.

The fact that this object was found around one of the very few white dwarfs that has both dust and gas in its disk suggests gas could be “a smoking gun for planetesimals,” Manser says. So the team is hoping to look at other white dwarfs that have gassy disks in search of more orbiting survivors.

Meanwhile, the fate of SDSS

(Continued on page 12)

## CCAS Member Earns Astroleague Messier Award

by Dave Hockenberry



CCAS President Dave Hockenberry presented Observing Chair & Treasurer Don Knabb the Astronomical League’s Messier Observing Award at the March 12, 2019 monthly meeting.

## Spring Astronomy Classes

by Don Knabb & Dennis O’Leary

Our class, *Astronomy, a Beginner’s Guide*, continues this month. In collaboration with the [Chester County Night School](#), the classes are Monday evenings from 7:00 to 8:00 p.m. at Rustin High School. The registration fee is \$59.00.

- April 1 - Other Kids on the Block – Dennis
- April 8 - Star Charts and Planetarium Software – Don
- April 15 - Using a Telescope – Dave
- April 29 - Beyond Naked Eye Observing (Deep Sky Stuff) – Don Miller or John Conrad

No class scheduled on April 22nd due to the Easter holiday weekend. Please contact Don Knabb if you can assist the instructors.

## Through the Eyepiece: M63 the Sunflower Galaxy in Canes Venatici

by Don Knabb, CCAS Treasurer & Observing Chair

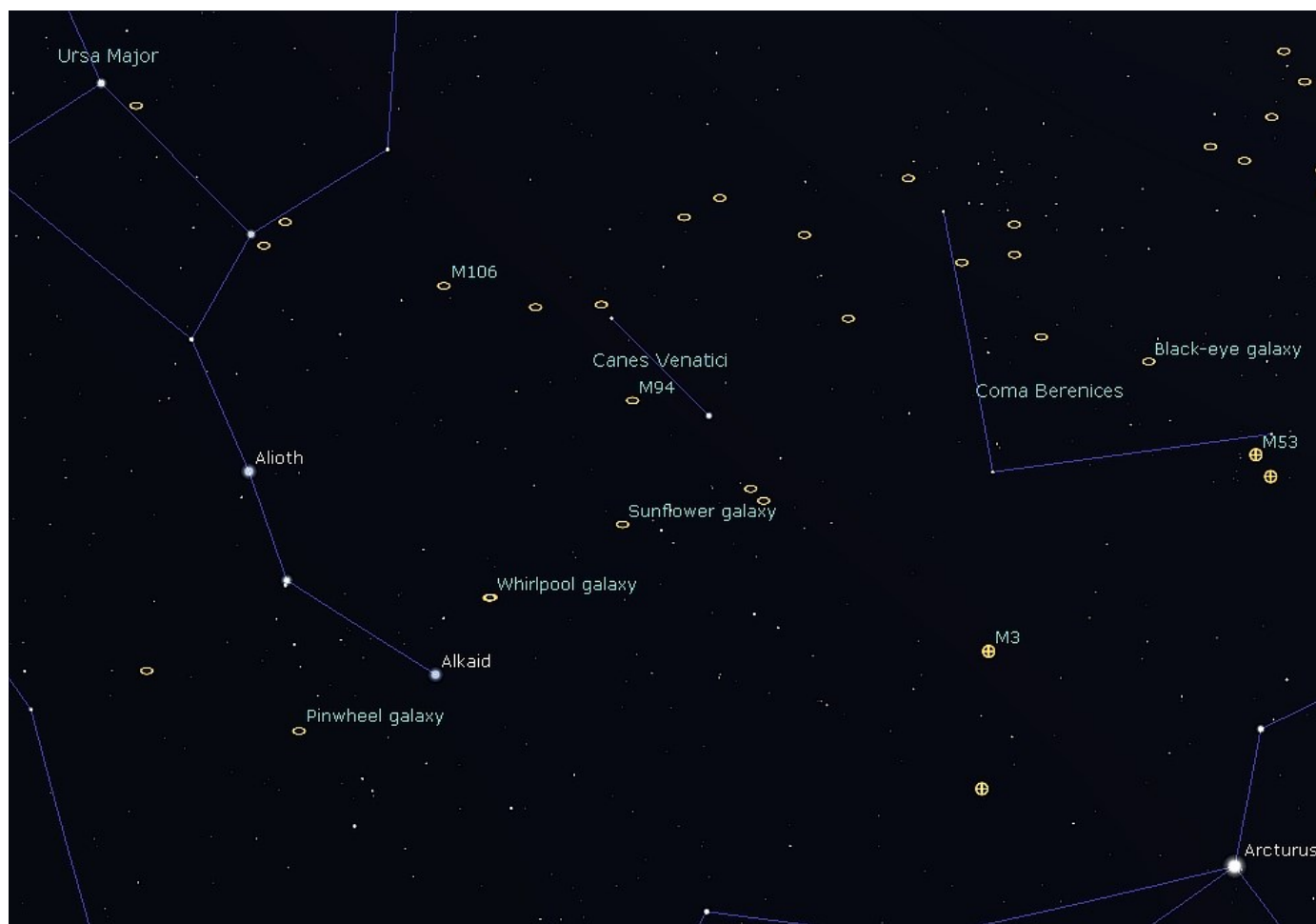


Image credit: Stellarium, the free planetarium software

Spring has sprung and it is galaxy time! And what better galaxy to go looking for than one named after a flower: M63, the Sunflower Galaxy.

Messier 63, also known as NGC 5055, is a spiral galaxy in the constellation Canes Venatici. This constellation is a fairly small northern constellation that was created by Johannes Hevelius in the 17th century. Its name is Latin, and refers to the hunting dogs of Boötes the Herdsman, a neighboring constellation. Canes Venatici is easy to find by looking “under” the arc of the handle of the Big Dipper.

See the chart above of Canes Venatici with the location of the Sunflower Galaxy, M63 marked.

The Sunflower Galaxy is one of the easiest of the Messier objects to find. It’s located almost precisely between Cor Caroli in Canes Venatici and Alkaid, the last star of the handle of the Big Dipper.

While this spiral galaxy has a nice overall brightness, it’s going to be very faint for binoculars, only showing as the tiniest contrast change in smaller binoculars. However, even a modest telescope will easily see a faint

oval shape with a concentrated nucleus. The larger your telescope, the more details you will see. As size approaches 8” and larger, expect to see spiral structure!

M63 is a spiral galaxy, consisting of a central disc surrounded by many short spiral arm segments. Drifting along in space some 37,000 light years from our own galaxy, we know it interacts gravitationally with M51 (the Whirlpool Galaxy that I wrote about for the March 2019 newsletter) and we also

*(Continued on page 9)*



## Sunflower Galaxy (Cont'd)



Image source: Dave Hockenberry, CCAS President & Program Chair

*(Continued from page 8)*

know that its outer regions are rotating so quickly that if it weren't for dark matter it would rip itself apart.

Messier 63 was the very first discovery by Charles Messier's friend and assistant Pierre Mechain, who observed it on June 14, 1779. On the same day, Charles Messier included it in his catalog.

Above is a picture of the Sunflower Galaxy taken by Dave Hockenberry.

Canes Venatici will be high in the sky during April, not far from the zenith, which positions it well for long stares with a telescope. Or lie on your back and for a challenge find the Sunflower with your binoculars.

Information credits:

<http://www.universetoday.com/37581/messier-63/>  
<http://sed.seds.org/messier/m/m063.html>  
[http://en.wikipedia.org/wiki/Canes\\_Venatici](http://en.wikipedia.org/wiki/Canes_Venatici)

## Launch (Cont'd)

*(Continued from page 3)*

transmitted from their satellite for approximately five days before the ThinSat or CubeSat de-orbits and burns up in the atmosphere.

Several CCAS members have plans in place to view this launch from a location nearby to the launch pad. If you are interested in more information, contact [Don Knabb](#) or [Pete Kellerman](#).

## Mars the Wanderer

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

April's skies find Mars traveling between star clusters after sunset, and a great gathering of planets just before sunrise.

**Mars** shows stargazers exactly what the term "planet" originally meant with its rapid movement across the evening sky this month. The ancient Greeks used the term *planete*, meaning *wanderer*, to label the bright star-like objects that travelled between the constellations of the zodiac year after year.

You can watch Mars as it wanders through the sky throughout April, visible in the west for several hours after sunset. Mars travels past two of the most famous star clusters in our night sky: the **Pleiades** and **Hyades**. Look for the red planet next to the tiny but bright Pleiades on April 1st. By the second week in April, it has moved eastward in Taurus towards the larger V-shaped Hyades. Red Mars appears to the right of the slightly brighter red-orange star **Aldebaran** on April 11th. We see only the brightest stars in these clusters with our unaided eyes; how many additional stars can you observe through binoculars?

Open clusters are made up of young stars born from the same

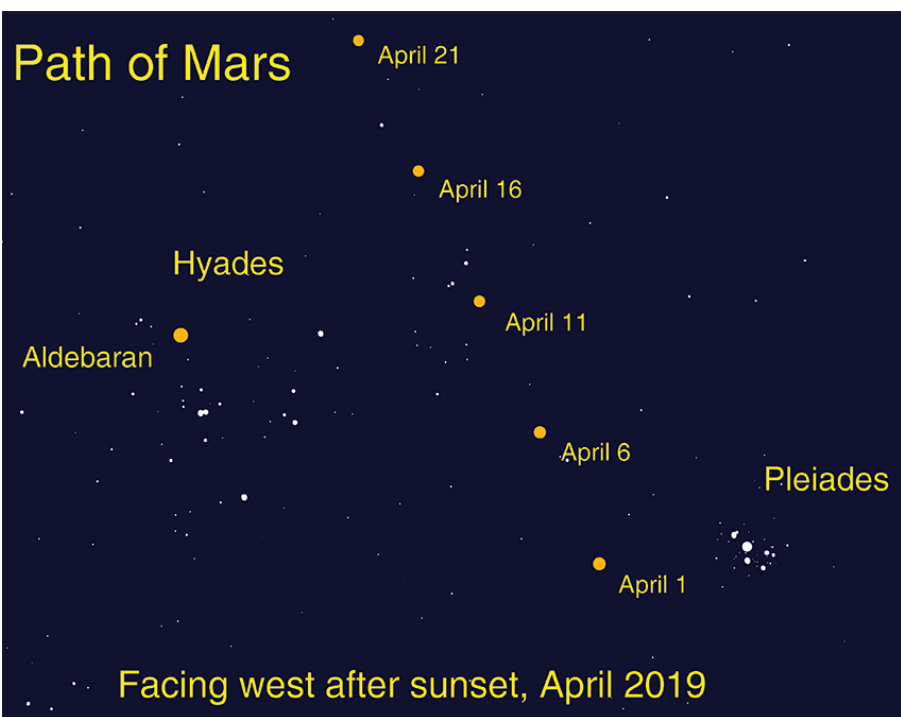


“star nursery” of gas and dust. These two open clusters are roughly similar in size. The Pleiades appears much smaller as they are 444 light years away, roughly 3 times the distance of the Hyades, at 151 light years distant. Aldebaran is in the same line of sight as the Hyades, but is actually not a member of the cluster; it actually shines just 65 light years away! By compari-

son, Mars is practically next door to us, this month just a mere 18 light minutes from Earth - that's about almost 200 million miles. Think of the difference between how long it takes the light to travel from these bodies: 18 minutes vs. 65 years!

The rest of the bright planets rise before dawn, in a loose lineup starting from just above the eastern horizon to high above the south: **Mercury, Venus, Saturn, and Jupiter**. Watch this month as the apparent gap widens considerably between the gas giants and terrestrial planets. Mercury hugs the horizon all month, with Venus racing down morning after morning to join its dimmer inner solar system companion right

(Continued on page 11)



Caption: The path of Mars between the Pleiades and Hyades in April. Image created with assistance from Stellarium.



## Wanderer (cont'd)

(Continued from page 10)

before sunrise. In contrast, the giants Jupiter and Saturn move away from the horizon and rise earlier all month long, with Jupiter rising before midnight by the end of April.

The **Lyrids** meteor shower peaks on April 22nd, but sadly all but the brightest meteors will be washed out by the light of a bright gibbous Moon.

You can catch up on all of NASA's current and future missions at [nasa.gov](http://nasa.gov)

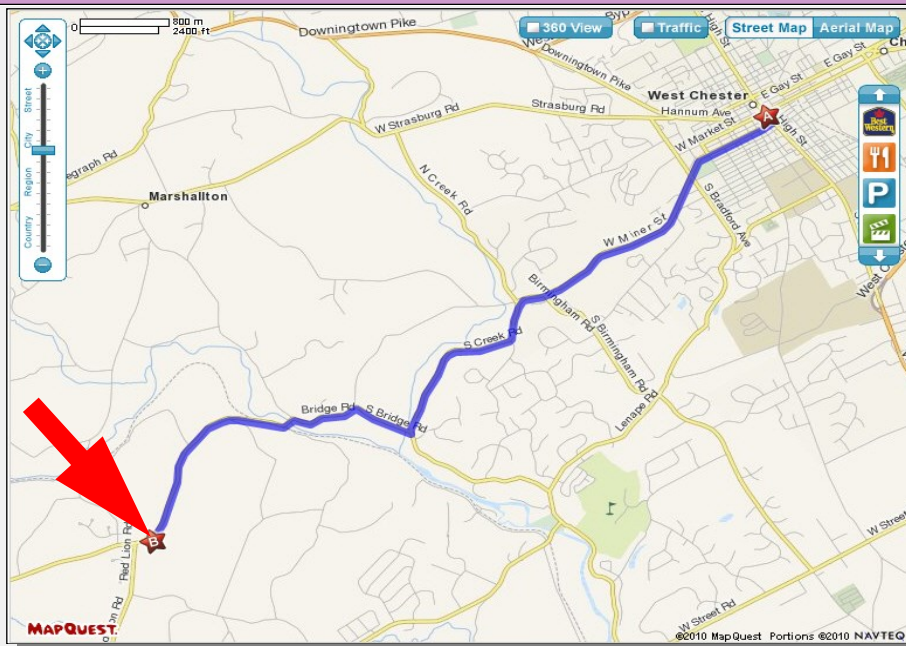
## Minutes (Cont'd)

(Continued from page 2)

[view.cfm?Doc\\_ID=636](http://www.ccas.us/view.cfm?Doc_ID=636)

- Don discussed objects in the March night sky, noting that March is “Galaxy Season.”
  - Leo, Coma Berenices and Virgo are ideal for observing galaxies.
  - Especially worth finding is Markarian's Chain, which includes two Messier and numerous NGC galaxies.
  - He also noted NGC 1502, an open cluster at the southern end of Kemble's Cascade.
- Dr. Veronique Petit, Professor of Physics and Astronomy at the University of Delaware was our guest speaker for the evening.
  - Her presentation was entitled “Massive Stars: The Powerhouses of our Galaxy.” Her focus was Super Massive Stars and Gravitational Waves.
  - With infectious enthusiasm and humor, she described the composition and life cycle of super massive stars. She explained how the recent confirmation of the existence of gravitational waves would greatly enhance our ability to understand the life cycle of massive stars. That research will in turn give us insights into our own evolution from the matter expelled during their death.
  - Members listened to a recording of the actual sound of gravitational waves as the program ended.
- Dr. Petit invited club members to attend the upcoming University of Delaware April 24, 2019 Harcourt Vernon lecture - From Einstein's Theory to Gravity's Chirp. Admission is free but registration is required.

## 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 BVA 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.

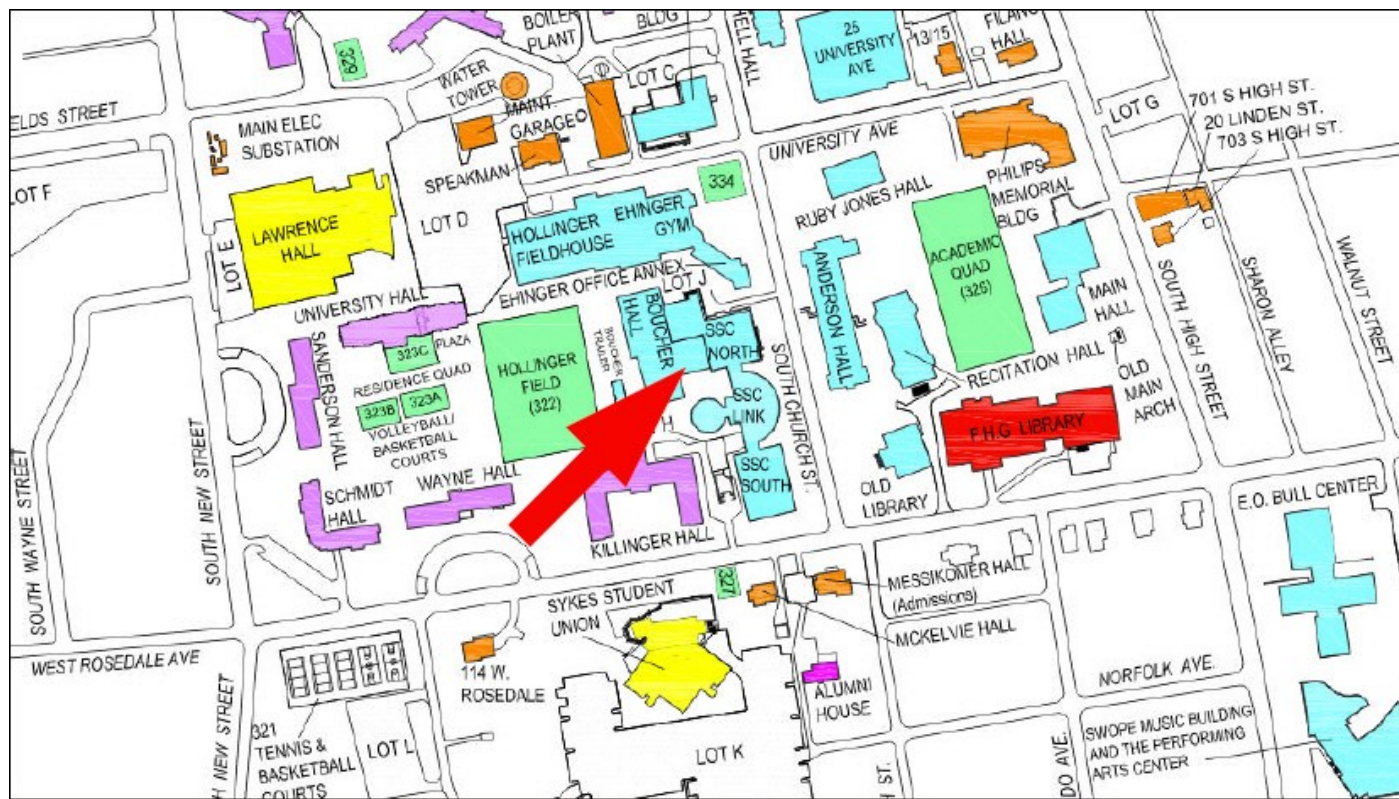
If you arrive after dark, *please turn off your headlights and just use parking lights* as you come up the hill (so you don't ruin other observers' night vision).



## 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).



### Iron Planet (cont'd)

*(Continued from page 7)*

J1228+1040 and its companion gives us a sobering picture of our solar system's future. It is thought that when the sun swells into a red giant, it will consume Mercury, Venus, and Earth. The other planets may move outward and survive, but those movements could cause gravitational jostling that ejects planets entirely or sends them spiraling inward to their doom. Not a pretty thought, but we do have about 6 billion years to contemplate our fate.

### CCAS Membership Information and Society Financials

#### Treasurer's Report by Don Knabb

##### March 2019 Financial Summary

Beginning Balance	\$1,153
Deposits	\$35
Disbursements	<u>\$0</u>
Ending Balance	1,188

#### **New Member Welcome!**

Welcome new CCAS members Steve DellaPenna from Coatesville, and Chris Etherington from West Chester, PA. We're glad you decided to join us under the stars! Clear skies to you!

#### **Membership Renewals**

You can renew your CCAS membership by writing a check payable to "Chester County Astronomical Society" and sending it to our Treasurer:

**Don Knabb**  
**988 Meadowview Lane**  
**West Chester PA 19382**

The current dues amounts are listed in the *CCAS Information Directory*. Consult the table of contents for the directory's page number in this month's edition of the newsletter.

## 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](mailto:ida@darksky.org)

For more information, including links to helpful information sheets, visit the IDA web site at:

<http://www.darksky.org>

Note that our CCAS Webmaster John Hepler has a link to the IDA home page set up on our Society's home page at <http://www.ccas.us>.

### 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"!

### CCAS Event Information

We've set up a special phone number you can dial to find out if our monthly observing session and other scheduled events will be held or postponed. Call **610-436-0829** after 5 PM ET to hear a recording to find out the latest news.

### 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>



Green Earth Lighting is a dedicated lifetime corporate member of the International Dark-Sky Association. GEL's products are designed to reduce or eliminate the negative effects outdoor lighting can have while still providing the light you need at night.

Green Earth Lighting LLC  
620 Onion Creek Ranch Rd  
Driftwood, Texas 78619

Phone: 512-944-7354

<http://www.greeneearthlighting.com>

### Local Astronomy-Related Stores

Listing retail sites in this newsletter does not imply endorsement of any kind by our organization. This information is provided as a service to our members and the public only.



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 Hepler**  
21103 Striper Run  
Rock Hall, MD 21661

### 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>

John 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 John 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  
610-993-2128

**Librarian:** Barb Knabb  
610-436-5702

**Program:** Dave Hockenberry  
610-558-4248

**Education:** Don Knabb  
610-436-5702  
Dennis O'Leary  
610-701-8042

**Webmaster &  
Newsletter:** John Hepler  
410-639-4329

**Public Relations:** Ann Miller  
610-558-4248



### CCAS Membership Information

The present membership rates are as follows:

**REGULAR MEMBER**.....\$25/year  
**SENIOR MEMBER**.....\$10/year  
**STUDENT MEMBER**.....\$ 5/year  
**JUNIOR MEMBER**.....\$ 5/year  
**FAMILY MEMBER**.....\$35/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 Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **\$32.95**, much less than the newsstand price of \$66.00, and also cheaper than individual subscriptions (\$42.95)! Buying a subscription this way also gets you a 10% discount on other Sky Publishing merchandise.

To **start** a new subscription, make **sure** you make out the check to the **Chester County Astronomical Society**, note that it's for *Sky & Telescope*, and mail it to Don Knabb.

To **renew** your "club subscription" contact Sky Publishing directly. Their phone number and address are in the magazine and on their renewal reminders. If you have **any** questions call Don first 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). If you want to participate in this special Society discount offer, **contact our Treasurer Don Knabb**.