



# Observations

A Monthly Publication Of The  
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 26, No. 2 **Three-Time Winner of the Astronomical League's Mabel Sterns Award** ☼ 2006, 2009 & 2016 February 2018

## In This Issue

CCAS Winter/Spring Events.....	2
February 2018 Meeting Agenda....	2
CCAS Original	
Astrophotography .....	3
Astronomers Hope to Glimpse	
Newborn Planet's Rings .....	3
The Sky Over Chester County:	
March 2018 .....	4
March 2018 Observing	
Highlights .....	5
Through the Eyepiece: M 109,	
the Vacuum Cleaner Galaxy .....	6
NASA Space Place.....	8
CCAS Directions:	
Brandywine Red Clay	
Alliance.....	9
Membership Renewals .....	10
New Member Welcome .....	10
CCAS Directions:	
WCU Map.....	10
Treasurer's Report.....	10
CCAS Information	
Directory.....	11-12

## The Antennae, NGC 4038 and 4039



See page 3 for details about this photograph

## Membership Renewals Due

02/2018	DiGiovanni Scovill Toth
03/2018	Angelini Fulton Sterrett
04/2018	Dennis Hepler Imburgia Miller Richter Rossomando

## February 2018 Dates

- 2nd-16th** • The Zodiacal Light is visible from a dark site
- 7th** • Last Quarter Moon
- 15th** • New Moon
- 16th** • Look low in the west to see a thin crescent Moon near Venus
- 23rd** • First Quarter Moon
- 23rd** • The Lunar Straight Wall is visible
- 28th** • The Moon is near Regulus in the constellation Leo



## CCAS Upcoming Nights Out

CCAS has several special "nights out" scheduled over the next few months. Members are encouraged to help out during these events any way they can. See below for more information.

- ☼ **Friday, March 16, 2018** - CCAS regular monthly observing session, Myrick Conservancy Center, BRC. The observing session starts at sunset.
- ☼ **Friday, April 13, 2018** - CCAS regular monthly observing session, Myrick Conservancy Center, BRC. The observing session starts at sunset.
- ☼ **Saturday, April 21, 2018** - CCAS special observing session, Hoopes Park, West Chester, PA.

## Winter/Spring 2018 Society Events

### February 2018

**7th** • PA Outdoor Lighting Council monthly meeting, 1438 Shaner Drive, Pottstown, PA 19465, starting at 7:30 p.m. For more information and directions, visit the [PA Outdoor Lighting Council](#) website.

**13th** • CCAS Monthly Meeting starting at 7:30 p.m. in Room 113, Merion Science Center (former Boucher Building), West Chester University. Theme: Member's Night and presentation of a brief new film mosaic called *SkyGlow*.

**20th** • Open call for articles and photographs for the March 2018 edition of [Observations](#).

**22nd-23rd** • The von Kármán Lecture Series: [Looking Deep—The InSight Mission to Mars](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

**26th** • Deadline for newsletter submissions for the March 2018 edition of [Observations](#).

### March 2018

**7th** • PA Outdoor Lighting Council monthly meeting, 1438 Shaner Drive, Pottstown, PA 19465, starting at 7:30 p.m. For more information and directions, visit the [PA Outdoor Lighting Council](#) website.

**13th** • CCAS Monthly Meeting starting at 7:30 p.m. in Room 113, Merion Science Center (former Boucher Building), West Chester University. Guest Speaker: TBA.

**16th** • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

**20th** • Open call for articles and photographs for the April 2018 edition of [Observations](#).

**22nd-23rd** • The von Kármán Lecture Series: [Cassini Science Results](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

**26th** • Deadline for newsletter submissions for the April 2018 edition of [Observations](#).

## Minutes from the January 9, 2018, CCAS Meeting

by Ann Miller, CCAS Secretary

- Roger Taylor welcomed 22 CCAS members and guests to the January 9, 2018, meeting.
- Steve Leiden gave an overview on a Popular Science article about the restriction zones for exploration on Mars.
  - These areas of Mars that contain water are to be isolated from our exploring craft so that they are not contaminated by the 300,000 type of bacteria on these crafts.
  - NASA has established a Planetary Protection Officers to address this problem, [Planetaryprotection.nasa.gov](#).
  - Several members expressed interest in a follow up lecture on this topic.
- Steve also announced that he would send an email about the next CCAS breakfast to be held on Thursday January 25.
- Don Knabb, observing chair, gave an overview of the highlights of the night sky for the months of January and February.
- David Hockenberry, program chair, announced that the February meeting program will be "Member's Night." All are invited to share their stories, photos, equipment, etc., with our group on Tuesday, February 13, 2018.
- David then introduced our evening's speaker, Dr. Paul Halpern, professor in physics at the University of the Sciences in Philadelphia, PA. Dr. Halpern presented "The Quantum Labyrinth—How Richard Feynman and John Wheeler Revolutionized Time and Relativity." The book was available for purchase after the meeting.

## February 2018 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on February 13, 2018, starting at 7:30 p.m. The meeting will be held in Room 113, Merion Science Center (former Boucher Building), West Chester University. Theme: Member's Night and presentation of a brief new film mosaic called *SkyGlow*.

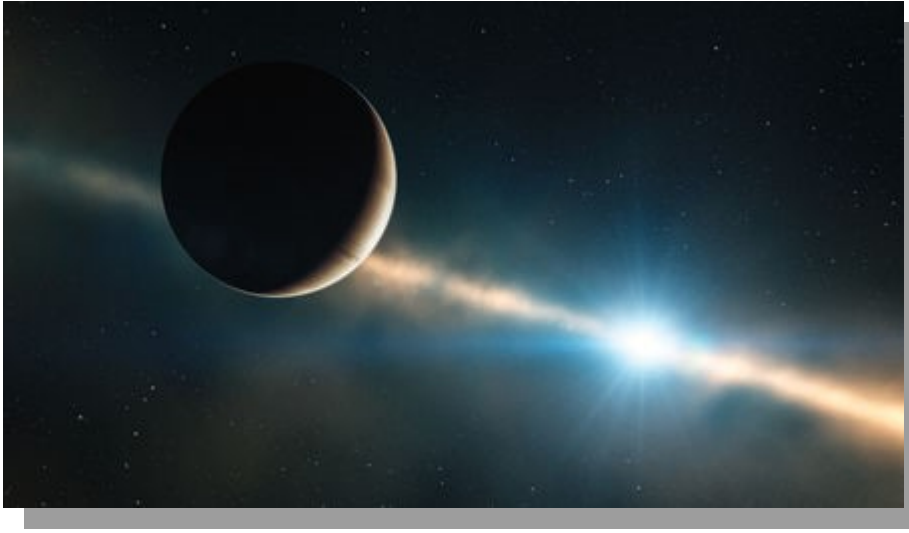
Please note that inclement weather or changes in speakers' schedules may affect the pro-

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 Spring 2018 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).

## Astronomers Hope to Glimpse Giant Newborn Planet's Rings and Moons During Rare Transit

by Daniel Clery, *Science Magazine*



*The exoplanet  $\beta$  Pictoris b plows a path through its star's disk of gas and dust in this illustration.  
ESO/L. CALÇADA*

Astronomers are staring at a nearby star in hopes of seeing a giant baby of a planet pass across its face, perhaps accompanied by dust clouds, rings, or newborn moons. Last week, the newest and tiniest telescope joined the vigil, when the French-built PicSat rode into orbit on an Indian rocket. It will be able to continuously monitor the star,  $\beta$  Pictoris, until chances of seeing the once-in-20-year transit event diminish in a few months' time. "We can't miss this. We would be kicking ourselves," says astronomer Matthew Kenworthy of Leiden University in the Netherlands.

Astronomers have seen thousands of exoplanets transit, or cross the face of their stars, eclipsing a fraction of their light. But  $\beta$  Pictoris, a bright star just 63 light-years away, is special. It is a natural laboratory for how solar systems form because it is only 24 million years old—the "equivalent of a baby of a few weeks," says Sylvestre Lacour of the Paris Observatory.

In 1984, astronomers observed a disk of gas and dust around it, the first protoplanetary disk to be seen. The disk, viewed nearly edge on, was warped and had gaps, a sign of planets in the

making. But it wasn't until 2009 that researchers spied the faint glow of a hot, young giant planet, 10 times the mass of Jupiter, in a roughly 20-year orbit. Now dubbed  $\beta$  Pictoris b, it is one of only a handful of exoplanets to be imaged directly.

The discovery could explain why, in 1981,  $\beta$  Pictoris's light dimmed erratically by up to 6% over 2 weeks, then brightened again. Another transit may have passed unnoticed 2 decades later, and the newfound planet appeared to be heading for yet another one in 2017 or 2018. Recent calculations suggest that the transit will be a near miss. But the planet's large "Hill sphere"—a zone of gravitational influence that may contain planetary rings, clouds of material, or newly formed moons—may yet reveal itself in dips in the light of  $\beta$  Pictoris.

To catch those dips, astronomers needed to monitor the star 24 hours a day over most of a year—too big a commitment for most observatories. So Lacour and his colleagues decided to build a small one of their own. In 3 years, with €1.5 million from the European Research Council, they built PicSat, a 5-centimeter space telescope in a satellite only slightly larger than a toaster. "It was risky and not everyone believed in it," Lacour says.

Kenworthy, along with Eric Mamajek of NASA's Jet Propulsion Laboratory in Pasadena, California, decided to observe from the ground. They built two

*(Continued on page 7)*

### CCAS Original Astrophotography

by Dave Hockenberry

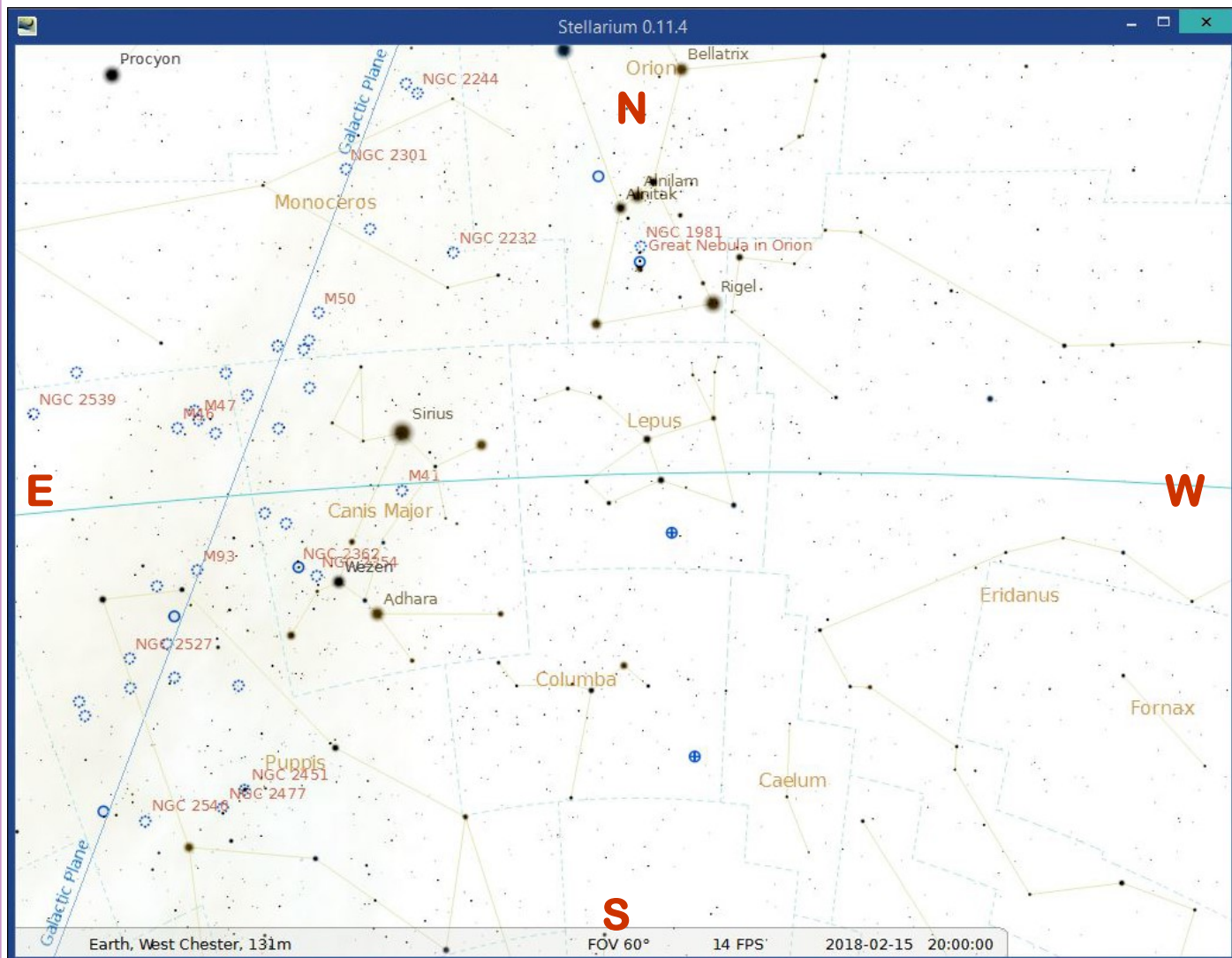
On the cover: the Antennae, NGC 4038 and 4039. Image acquired between 3/7/16 and 1/27/18 with a QSI 583wsg camera through Hyperion 12.5" astrograph, mounted on an AP 1200 mount. Guiding off-axis with SX Lodestar and SX AO Active Optics unit. Image acquisition and Observatory hardware control with MaxIm DL Pro and APCC. Image processing with CCDStack and Photoshop CC. These are two colliding galaxies in the constellation Corvus, about 45 million light years distance from us, and resemble a Valentine's Day heart with counter-tidal tails.



# The Sky Over Chester County

February 15, 2018 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
02/01/2018	6:40 a.m. EST	7:08 a.m. EST	5:19 p.m. EST	5:48 p.m. EST	10h 10m 59s
02/15/2018	6:25 a.m. EST	6:53 a.m. EST	5:36 p.m. EST	6:04 p.m. EST	10h 43m 15s
02/28/2018	6:08 a.m. EST	6:35 a.m. EST	5:51 p.m. EST	6:18 p.m. EST	11h 16m 03s

### Moon Phases

			Full Moon	01/31/2018	8:26 a.m. EST
Last Quarter	02/07/2018	10:53 a.m. EST	New Moon	02/15/2018	4:05 p.m. EST
First Quarter	02/23/2018	3:09 a.m. EST			

## February 2018 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

2-16	The Zodiacal Light is visible from a dark site
7	Last Quarter Moon
15	New Moon
16	Look low in the west to see a thin crescent Moon near Venus
23	First Quarter Moon
23	The Lunar Straight Wall is visible
28	The Moon is near Regulus in the constellation Leo

**The best sights this month:** February is unusual in that there is no Full Moon during the month. Also, there are no bright planets in the evening sky until the end of the month when we can look low in the west just after sunset for Venus to return as the “evening star”. Early risers can see Saturn, Mars and Jupiter spread out in a line with Saturn low in the east, Mars up and to the right and Jupiter further up and to the right.

**Mercury:** Mercury passes behind the Sun (superior conjunction) on February 17th and is not observable during February.

**Venus:** Our sister planet passed behind the Sun in January and will appear low in the western sky after sunset at the end of February.

**Mars:** The red planet is rising a bit after 2:00 a.m. during February and is not far from the similar colored red star Antares in Scorpius the Scorpion. Antares means “rival of Mars” so it will be interesting to compare the appearance of these two red objects.

**Jupiter:** The king of the planets rises just before Mars and is quite high before dawn. Jupiter is in the constellation Libra where it will spend most of 2018.

**Saturn:** Saturn is rising just before 5:00 a.m. and is in the constellation Sagittarius. When you see Saturn rise above the eastern horizon, far to the right and up will be bright Jupiter and about half-way between them is dim Mars.

**Uranus and Neptune:** February is your last chance to see Neptune until the fall. Look low in the west after the sky has just turned fully dark and use your favorite astronomy app to seek out this dim planet. Uranus is also best viewed just after the sky turns fully dark. This blue-green gas giant sets around 11:00 p.m.

**The Moon:** With both January and March having two full Moons, there is no full Moon in February. However, there will be plenty of moonlight at the beginning and end of the month since there are full Moons on the last day of January and on the first day of March. If you happen to be in southern South America or part of Antarctica, you can see a partial solar eclipse on February 15th. Road trip anyone?

**Constellations:** During February look to the west early to see the Great Square of Pegasus setting. Behind Pegasus and Andromeda, the winter constellations take control of center stage for all of February. My favorite part of the February sky is the south in which we see several constellations with bright stars. This includes Taurus with Aldebaran, Orion with Betelgeuse and Rigel, Canis Major with Sirius and Canis Minor with Procyon. Betelgeuse, Sirius and Procyon make up the Winter Triangle. Stay up late and see bright Arcturus in Bootes rising in the east.

**Messier/deep sky:** Grab your binoculars to search the February sky for deep sky objects since binoculars have nearly zero set up time compared to a cold telescope. The hardest part of telescopic viewing during the cold months is setting up and putting a telescope away. It’s hard to handle a telescope and tripod wearing gloves so the cold metal parts chill your hands to the bone very quickly. Binoculars however, once you get them focused, can be easily handled with gloves on your hands. And even a small pair of binoculars will bring many deep sky objects within view.

Look for the three open clusters in Auriga – they might be in one field of view, or nearly so. Look also for two groups of stars called “The Waves” near the three open clusters. Then find one of my favorites, the Beehive Cluster, in Cancer the Crab. Also aim at Orion’s belt and see the beautiful “S”

(Continued on page 10)

## Through The Eyepiece: M 109, the Vacuum Cleaner Galaxy

by Don Knabb, CCAS Treasurer & Observing Chair

During the deep winter I am always encouraged by the sight of Leo the Lion jumping out of the eastern horizon late in the evening. But to see Leo clearly one must stay up quite late and it is so cold during February. What Leo means to me is that galaxy time is approaching, and with it warmer weather.

But we don't need to wait until April to see galaxies. One that is easily found and observed during February is M109, also called the Vacuum Cleaner Galaxy. Why is it called the Vacuum Cleaner Galaxy? This name was proposed by Devon J. Moore, who writes: "The name I've suggested was the Vacuum Cleaner Galaxy for a few reasons. The first it being a cyclonic looking galaxy, so I named it after a cyclonic vacuum cleaner. The second is... well... I like vacuum cleaners... go figure."

M109, also known as NGC 3992, is found just below the Big Dipper's bowl in the northern constellation Ursa Major, the Great Bear. It is just to the left of the star named Phad, the bottom-rear star of the Big Dipper. In the sky, M109 will be just below Phad because the Dipper is pointing straight up during February.

But just because it is easy to find doesn't mean it is easy to see! Although it is considered rather large, the outer spiral arms are quite faint and only the bright central bar and nucleus region show well to smaller telescopes. Messier 109 will require dark, clear skies and at least mid



Sky map made using Stellarium planetarium software

-sized aperture to begin seeing details.

In telescopic views, its striking central bar gives the galaxy the appearance of the Greek letter "theta",  $\theta$ , a common mathematical symbol representing an angle. M109 is the brightest galaxy in the M109 Group, a large group of galaxies that may contain over 50 galaxies.

Messier 109 was discovered by Pierre Méchain in 1781. In 1783 Charles Messier catalogued it as his 109th object. William Her-

schel found this galaxy independently on April 12, 1789, and cataloged it as H IV.61. He incorrectly misclassified it as a planetary nebula. He writes: "Considerably bright. Irregularly formed. Extended meridionally [along the Meridian, i.e. North-South]. Little brighter Nucleus. With faint branches 7 or 8' long, and 5 or 6' broad." His son John would also go on to add it to his catalog on February 17, 1831 when he writes: "Bright; Large; very suddenly brighter to the

(Continued on page 7)



## Eyepiece (Cont'd)



M109: Photo by CCAS member Pete LaFrance

(Continued from page 6)

Middle; round; 3' diameter. Fine object."

Between the 1920s through the 1950s, it was considered that Messier objects over 103 were

not official, but in later years the additions became more widely accepted. David H. Levy mentions the modern 110 object catalog while Sir Patrick Moore gave the original to 104 but has M105-M109 listed as an adden-

dum. By the late 1970s all 110 objects were commonly used among astronomers as they still are today.

It is also by far the most distant object in the Messier Catalog, followed by M91.

So there is no need to wait for "galaxy season" to seek out these distant "island universes". With the Big Dipper as your guide M109 is an excellent target as a preview of the many galaxies to see later in spring.

Information credits:

Pasachoff, Jay M. 2000. A Field Guide to the Stars and Planets. New York, NY. Houghton Mifflin.

Dickinson, Terence 2006. Nightwatch: a practical guide to viewing the universe. Buffalo, NY. Firefly Books

<http://apod.nasa.gov/apod/ap130523.html>

## Giant Newborn Planet (Cont'd)

(Continued from page 3)

washing machine-size robotic observatories, dubbed bRing, sited in Australia and South Africa.

A few existing telescopes have also joined the hunt: the Bright Target Explorer Constellation, five microsatellites designed to study luminous stars; and a 40-centimeter telescope that's part of the Antarctic Search for Transiting Exoplanets, which can watch  $\beta$  Pictoris continuously during the darkness of the southern winter. "We had to en-

sure we didn't drop the ball and had at least one scope on the star during the transit," Kenworthy says. The researchers also lined up agreements with larger telescopes to swing into action if they did see something. PicSat, scheduled for launch in September 2017 but delayed by a launcher failure, finally reached orbit on 12 January.

The Paris team is now checking its health. Sadly, it is joining the party toward its end; the transit of the Hill sphere is expected to end in February. "Maybe we

won't see anything. We knew from the start it was risky," Lacour says.

Kenworthy remains optimistic. "We're not discounting anything," he says. Even a null result will imply that just 24 million years after its birth, the baby planet has already cleared out its Hill sphere. And once the predicted transit of  $\beta$  Pictoris b is over, the astronomers will keep watching the star and its planet nursery, hoping to see something else, like the fleeting transit of a smaller baby planet.

## Sixty Years of Observing Our Earth

by Teagan Wall

*This article is provided by NASA Space Place.*

*With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.*

Visit [spaceplace.nasa.gov](http://spaceplace.nasa.gov) to explore space and Earth science!

Satellites are a part of our everyday life. We use global positioning system (GPS) satellites to help us find directions. Satellite television and telephones bring us entertainment, and they connect people all over the world. Weather satellites help us create forecasts, and if there's a disaster—such as a hurricane or a large fire—they can help track what's happening. Then, communication satellites can help us warn people in harm's way.

There are many different types of satellites. Some are smaller than a shoebox, while others are bigger than a school bus. In all, there are more than 1,000 satellites orbiting Earth. With that many always around, it can be easy to take them for granted. However, we haven't always had these helpful eyes in the sky.

The United States launched its first satellite on Jan. 31, 1958. It was called Explorer 1, and it weighed in at only about 30 pounds. This little satellite carried America's first scientific instruments into space: temperature sensors, a microphone, radiation detectors and more.

Explorer 1 sent back data for four months, but remained in orbit for more than 10 years. This small, relatively simple satellite kicked off the American space age. Now, just 60 years later, we depend on satellites



every day. Through these satellites, scientists have learned all sorts of things about our planet. For example, we can now use satellites to measure the height of the land and sea with instruments called altimeters. Altimeters bounce a microwave or laser pulse off Earth and measure how long it takes to come back. Since the speed of light is

*(Continued on page 9)*



This photo shows the launch of Explorer 1 from Cape Canaveral, Fla., on Jan. 31, 1958. Explorer 1 is the small section on top of the large Jupiter-C rocket that blasted it into orbit. With the launch of Explorer 1, the United States officially entered the space age.

*Image credit: NASA*



## Space Place (Cont'd)

(Continued from page 8)

known very accurately, scientists can use that measurement to calculate the height of a mountain, for example, or the changing levels of Earth's seas.

Satellites also help us to study Earth's atmosphere. The atmosphere is made up of layers of gases that surround Earth. Before satellites, we had very little information about these layers. However, with satellites' view from space, NASA scientists can study how the atmosphere's layers interact with light. This tells us which gases are in the air and how much of each gas can be found in the atmosphere. Satellites also help us learn about the clouds and small particles in the atmosphere, too.

When there's an earthquake, we can use radar in satellites to figure out how much Earth has moved during a quake. In fact, satellites allow NASA scientists to observe all kinds of changes in Earth over months, years or even decades.

Satellites have also allowed us—for the first time in civilization—to have pictures of our home planet from space. Earth is big, so to take a picture of the whole thing, you need to be far away. Apollo 17 astronauts took the first photo of the whole Earth in 1972. Today, we're able to capture new pictures of our planet many times every day.

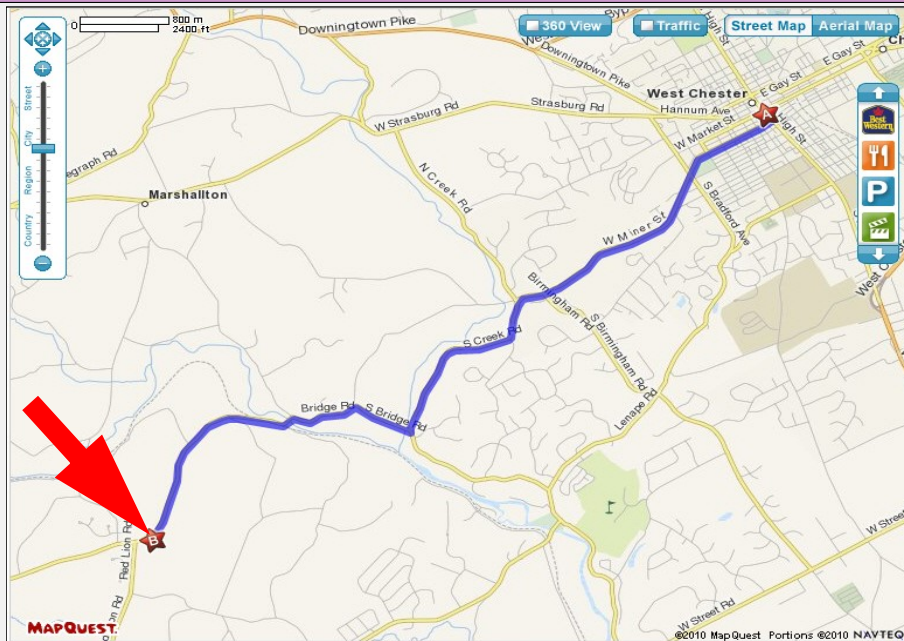
Today, many satellites are buzzing around Earth, and each one plays an important part in how

we understand our planet and live life here. These satellite explorers are possible because of what we learned from our first voyage into space with Explorer 1—and the decades of hard work and scientific advances since then.

To learn more about satellites, including where they go when they die, check out NASA Space Place:

<https://spaceplace.nasa.gov/spacecraft-graveyard>

## CCAS Directions



### Brandywine Red Clay Alliance

1766 Unionville Wawaset Rd  
West Chester, PA 19382  
(610) 793-1090

<http://brandywinewatershed.org/>

BRC was founded in 1945 and is committed to promoting and protecting the natural resources of the Brandywine Valley through educational programs and demonstrations for all ages.

### Brandywine Red Clay Alliance

The monthly observing sessions (held February through November) are held at the Myrick Conservation Center of the Brandywine Red Clay Alliance.

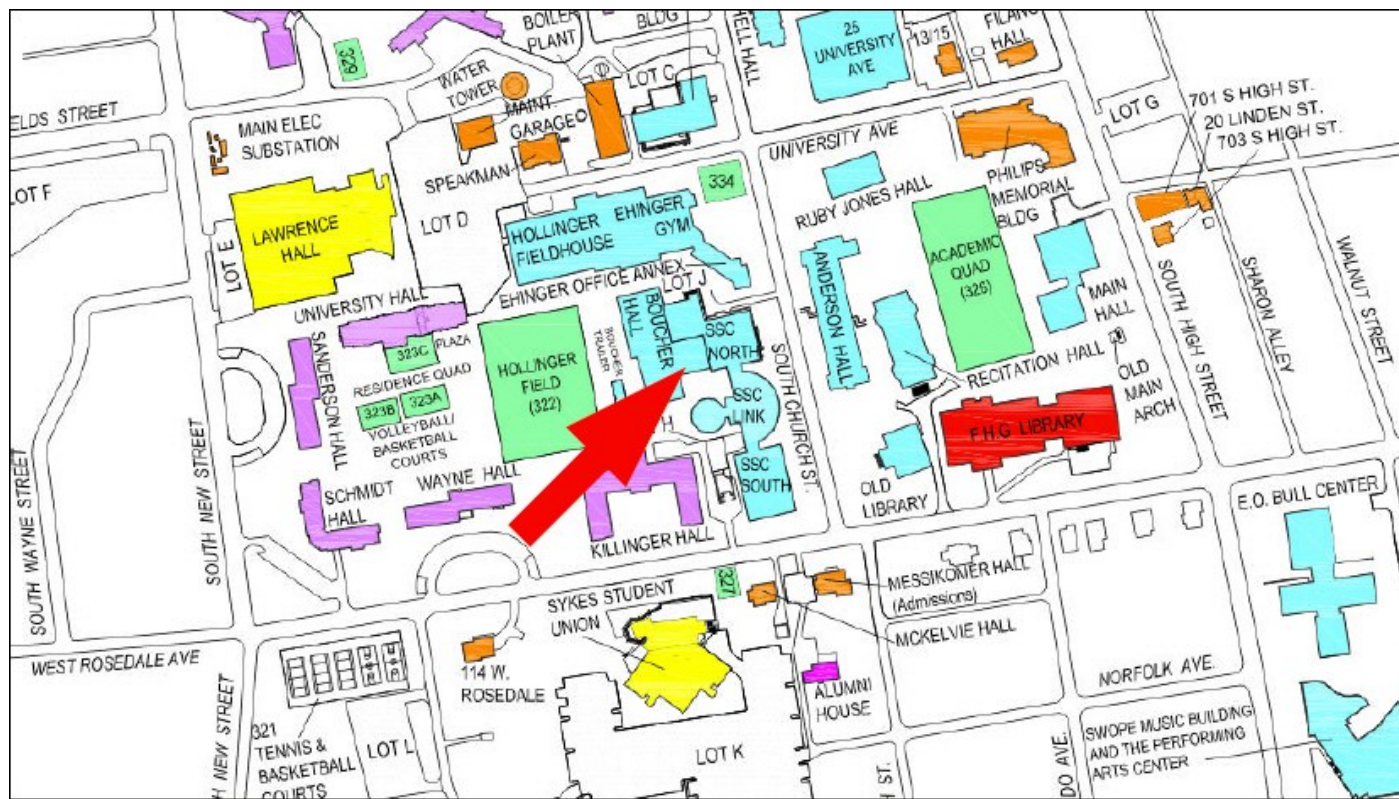
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BRC property, turn left off Route 842 into the parking lot by the office: look for the signs to the office along Route 842. From that parking lot, go left through the gate and drive up the farm lane about 800 feet to the top of the hill. The observing area is on the right.

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

## 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)*

curve of stars on the right side of his belt. And of course take a long look at the Great Nebula in Orion, M42!

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

**Meteor showers:** There are no major meteor showers during February.

### CCAS Membership Information and Society Financials

#### Treasurer's Report by Don Knabb

**Jan. 2018 Financial Summary**

Beginning Balance	\$1,408
Deposits	\$40
Disbursements	\$0
Ending Balance	\$1,448

#### New Member Welcome!

Welcome new CCAS members Keith Baker from Glen Mills, PA, Kathy McNeal & Walt Talunas also from West Chester, PA, Ed Damerau from West Chester, PA, and Ralph Marshall from Sarasota, FL. 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**

PENNSYLVANIA OUTDOOR



The Pennsylvania Outdoor Lighting Council has lots of good information on safe, efficient outdoor security lights at their web site:

<http://www.POLCouncil.org>

**Find out about Lyme Disease!**

Anyone who spends much time outdoors, whether you're stargazing, or gardening, or whatever, needs to know about Lyme Disease and how to prevent it. You can learn about it at:

<http://www.LymePA.org>

Take the time to learn about this health threat and how to protect yourself and your family. It is truly "time well spent"!

**Good Outdoor Lighting Websites**

One of the biggest problems we face in trying to reduce light pollution from poorly designed light fixtures is easy access to good ones. When you convince someone, a neighbor or even yourself, to replace bad fixtures, where do you go for good lighting fixtures? Check out these sites and pass this information on to others. Help reclaim the stars! And save energy at the same time!



Light pollution from poor quality outdoor lighting wastes billions of dollars and vast quantities of valuable natural resources annually. It also robs us of our heritage of star-filled skies. Starry Night Lights is committed to fighting light pollution. The company offers the widest selection of ordinance compliant, night sky friendly and neighbor friendly outdoor lighting for your home or business. Starry Night Lights is located in Park City, Utah.

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

<http://www.starrynightlights.com>



Lighthouse Outdoor Lighting is a dedicated lifetime corporate member of the [International Dark-Sky Association](http://www.darksky.org). 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:

**John Hepler**  
21103 Stripper 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 John Hepler, the newsletter editor, at: [newsletter@ccas.us](mailto:newsletter@ccas.us).

### CCAS Website

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:

<b>President:</b>	Roger Taylor 610-430-7768
<b>Vice President:</b>	Liz Smith 610-842-1719
<b>ALCor, Observing, and Treasurer:</b>	Don Knabb 610-436-5702
<b>Secretary:</b>	Ann Miller 610-558-4248
<b>Librarian:</b>	Barb Knabb 610-436-5702
<b>Program:</b>	Dave Hockenberry 610-558-4248
<b>Education:</b>	Kathy Buczynski 610-436-0821
<b>Webmaster and Newsletter:</b>	John Hepler 410-639-4329
<b>Public Relations:</b>	Deb Goldader 610-304-5303



### CCAS Membership Information

The present membership rates are as follows:

<b>REGULAR MEMBER</b> .....	\$25/year
<b>SENIOR MEMBER</b> .....	\$10/year
<b>STUDENT MEMBER</b> .....	\$ 5/year
<b>JUNIOR MEMBER</b> .....	\$ 5/year
<b>FAMILY MEMBER</b> .....	\$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**.