



# Observations

A Monthly Publication Of The  
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 25, No. 10 **Three-Time** Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016 October 2017

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## Van den Bergh 141



Also known as the "Ghost Nebula". Image Credit: Dave Hockenberry. See pg. 3 for details.

## Membership Renewals Due

10/2017	Conrad Johanson Lane Lester Rosenblatt Skelton Zandler
11/2017	Buczynski Cavanaugh Holenstein Luttrell & Pollard Taylor
12/2017	Bogard Bogusch Kozik O'Leary

## October 2017 Dates

- 5th** • The Full Hunter's Moon or the Full Animal Fattening Moon, 2:40 p.m. EDT
- 12th** • Last Quarter Moon, 8:25 a.m. EDT
- 19th** • New Moon, 3:12 p.m. EDT
- 21st** • The Orionid meteors peak in the pre-dawn hours
- 23rd/24th** • Saturn is near the crescent Moon in the southwest at dusk
- 27th** • First Quarter Moon, 6:22 p.m. EDT
- 28th** • The Lunar Straight Wall (Rupes Recta) is visible



## 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, October 5, 2017** - Hoopes Park Star Party, 7:00-8:30 p.m.
- ☼ **Tuesday, October 17, 2017** - CCAS Special Star Party for Cub Scout Pack 136 in Avondale, PA.
- ☼ **Saturday, October 21, 2017** - Willistown Run-a-Muck., 6:00-8:00 p.m.
- ☼ **Friday, October 27, 2017** - CCAS Special Observing Session, Welkinwier Star Party, south of Pottstown, PA. Green Valleys Watershed Association. The observing session is scheduled for 6:30-8:30 PM.

## Autumn 2017 Society Events

### October 2017

**4th** • 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.

**5th** • CCAS Special Observing Session, Hoopes Park Star Party in West Chester, PA. The observing session is scheduled for 7:00-8:30 PM.

**10th** • CCAS Monthly Meeting starting at 7:30 p.m. in Room 113, Merion Science Center (former Boucher Building), West Chester University. CCAS Member Speaker: John Conrad, NASA Solar System Ambassador.

**17th** • CCAS Special Star Party for Cub Scout Pack 136 in Avondale, PA.

**19th-20th** • The von Kármán Lecture Series: [Sink or Swim? Using Radar to Protect California's Water Supply](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

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

**20th** • Open call for articles and photographs for the November 2017 edition of [Observations](#).

**21st** • CCAS Special Observing Session, [Willistown Conservation Trust Run-a-Muck](#). The observing session is scheduled for 6:30 – 8:00 p.m. The event is open only to registered participants.

**26th** • Deadline for newsletter submissions for the November 2017 edition of [Observations](#).

**27th** • CCAS Special Observing Session, Welkinwier Star Party, south of Pottstown, PA. Green Valleys Watershed Association. The observing session is scheduled for 6:30-8:30 PM.

### November 2017

**1st** • 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.

**10th** • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

**14th** • CCAS Monthly Meeting starting at 7:30 p.m. in Room 113, Merion Science Center (former Boucher Building), West Chester University. Guest Speaker: Phil Rossomando from the Planetary Society.

**16th-17th** • The von Kármán Lecture Series: [Mars 2020, or There and Back Again](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

**20th** • Open call for articles and photographs for the December 2017 edition of [Observations](#).

**26th** • Deadline for newsletter submissions for the December 2017 edition of [Observations](#).

## Minutes from the September 12, 2017, CCAS Meeting

by Ann Miller, CCAS Secretary

- Roger Taylor welcomed 27 CCAS members and guests to the September 12, 2017 meeting. The club officers were introduced to our newest members. Roger then gave a recap of our club history and an introduction of our club founder Ned Lurcott.
- Don Knabb shared pictures of Saturday, September 9, 2017 star party at Anson Nixon Park in Kennett Square, PA. Thanks to all of the members who helped to make this a successful event.
- Our club is a member of the Night Sky Network. NSN sent 500 pairs of solar glasses to our club to distribute to the public for the solar eclipse. Don was able to share glasses with the Hickman Friends Senior Community of West Chester. Don received and shared a photo of the seniors observing the August 21, 2017 solar eclipse with the glasses provided.
- Don announced upcoming CCAS events.
- September 15-17 CCAS camping trip to BMVO
- September 22-BRC program "The Universe is the Out There" held for The BRC during our monthly observing time
- September 23-Nottingham County Park Star Party
- September 27-Daylesford Crossing Continuing Care Facility in Paoli Star Party
  - October 7-Hoopes Park Star Party in West Chester, PA
  - October 17-Cub Scout Pack 136 in Avondale
  - October 20-BRC CCAS monthly observing session
  - October 21-Willistown Conservation Trust Run-amuck Star Party
  - October 27-Welkinwier Star Party, south of Pottstown, PA
  - November 10-BRC CCAS monthly Observing session
- Don presented the September Night Sky with Sky Safari. He also showed a simulation of the solar eclipse in totality. Cassini to complete its 20 year mission on Friday September 15 with a Grande Finale dive into Saturn's atmosphere.
- David Hockenberry introduced our evening's guest speaker, Dr. Gordon

(Continued on page 10)

## October 2017 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on September 12, 2017, starting at 7:30 p.m. The meeting will be held in Room 113, Merion Science Center (former Boucher Building), West Chester University. Our member speaker is John Conrad, NASA/JPL Solar System Ambassador, who will present on the formation of the solar system.

Please note that inclement weather or changes in speakers'

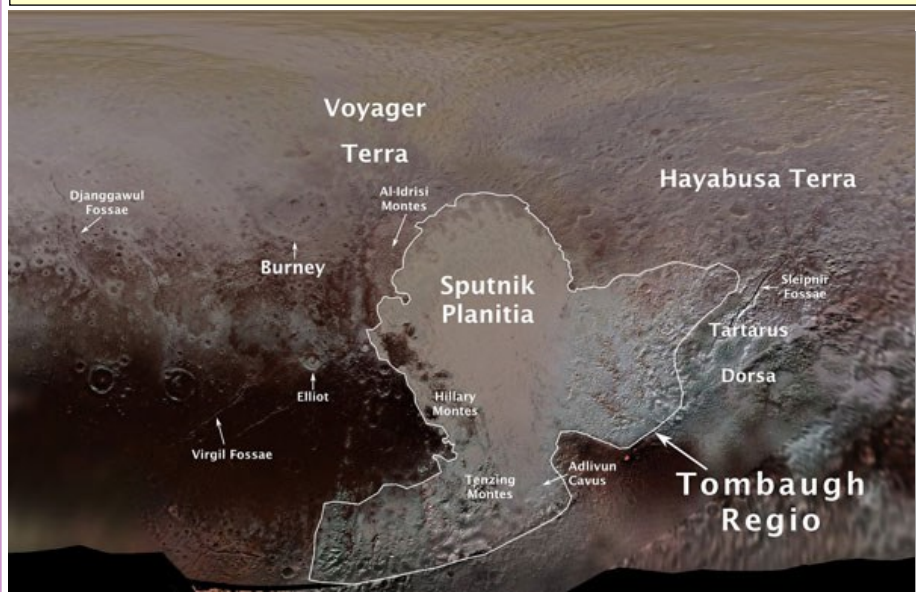
schedules may affect the program. In the event there is a change, CCAS members will be notified via e-mail with as much advance notice as possible.

As for future meetings, we are looking for presenters for our 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).



## First Pluto Features Officially Named

by Javier Barbuzano, *Sky & Telescope Magazine*



First official names of surface features on Pluto on a map compiled from images and data obtained by the New Horizons spacecraft during its flyby in 2015. Image Credit: NASA / JHU-APL / SwRI / Ross Beyer

The International Astronomical Union (IAU) has officially approved the names of 14 geological features on the surface of Pluto.

Several of the approved names include: **Tombaugh Regio** honors Clyde Tombaugh (1906–97), the U.S. astronomer who discovered Pluto in 1930 from Lowell Observatory in Arizona; **Sputnik Planitia** is a broad, low-lying plain named after Sputnik 1; **Al-Idrisi Montes**, which honors Ash-Sharif al-Idrisi (1100–65/66), a noted Arab mapmaker and geographer and **Voyager Terra**, which honors the twin NASA

spacecraft, launched in 1977, that performed the first “grand tour” of all four giant planets.

Pluto's just-approved names belong to four broad themes previously accepted by IAU. The themes are pioneering space missions, historic explorers who crossed new frontiers, scientists and engineers who contributed to our knowledge of Pluto and the Kuiper Belt, and underworld mythology (since the names of Pluto and its five moons already fell in that category). Read the entire article at <http://www.skyandtelescope.com/astronomy-news/first-pluto-features-officially-named/>

## CCAS Original Astrophotography

by CCAS Program Chair Dave Hockenberry

On page 1: Van den Bergh 141, also known as the “Ghost Nebula.” Image obtained with Hyperion 12.5 astrograph on an AP 1200 mount using a QSI 583wsg camera. Autoguiding with Lodestar X2 camera and SX Active Optics unit. Image capture and observatory control with MaxIm DL. Image processing with CCDStack, Photoshop CS5, and Photo Ninja. Exposure stack of 6.25 hours Luminance, 3 hours Red filter, 4 hours Blue filter, and 4.5 hours Green filter images. VdB 141 (also listed as Sharpless 2-136) is located in the constellation Cepheus and lies approximately 1,470 light years from Earth. The “ghosts” arising from this nebula are easily seen in this image, and make for timely viewing this Halloween season.

## If You're Interested in the Formation of the Solar System

by CCAS Member John Conrad

Depending on the date, and whether you attended the October 10<sup>th</sup> October CCAS meeting, you've either just seen my talk on the Solar System or not.

This brief article complements that talk, because the topic was WAY too large to cover the subject adequately. I tried to give a fair amount of material (and credit) to the many contributions to our understanding from NASA: from its space telescopes (and supported research using terrestrial telescopes), and especially its robots journeying across the solar system – flybys, orbiters, landers, rovers, etc.

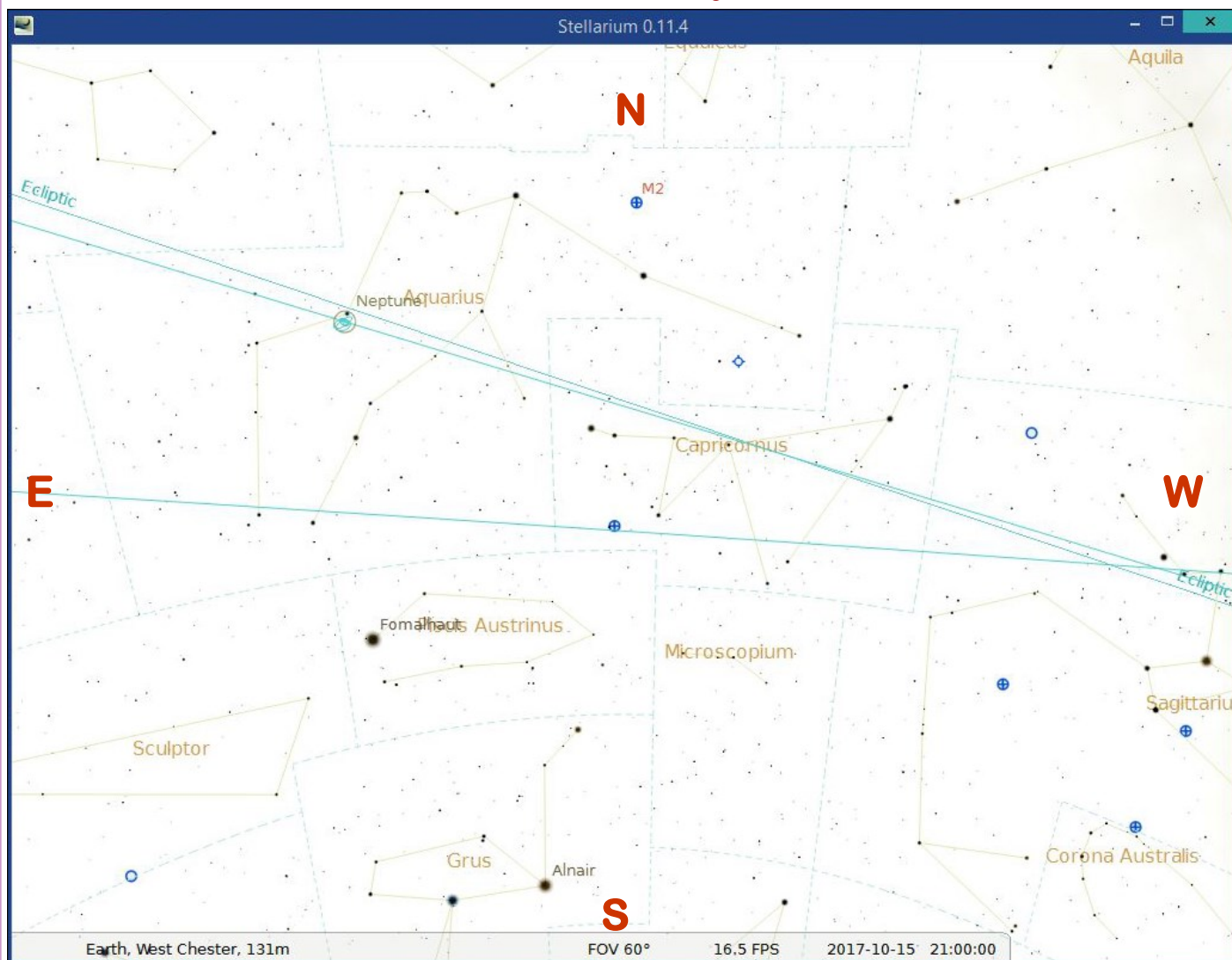
But one of the most interesting topics regarding the Solar System is the formation – and credit for our understanding (mostly theories and scenarios) – of that *formation and evolution* goes far beyond NASA and its researchers. So this is a brief encouragement to the reader to continue beyond the few minutes I was able to spend with those theories in my talk. There really are quite a few, remarkable - and varied - stories about the first few billion years of the SS. Just open your browser and

- Try YouTube – just search on “formation of the solar system” and you'll be off.
- Then try the *Wikipedia* article entitled “formation and evolution of the solar system.”
- Have fun!

# The Sky Over Chester County

October 15, 2017 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
10/01/2017	6:30 a.m. EDT	6:57 a.m. EDT	6:42 p.m. EDT	7:09 p.m. EDT	11h 45m 22s
10/15/2017	6:44 a.m. EDT	7:11 a.m. EDT	6:20 p.m. EDT	6:48 p.m. EDT	11h 09m 24s
10/31/2017	7:00 a.m. EDT	7:28 a.m. EDT	5:59 p.m. EDT	6:27 p.m. EDT	10h 30m 22s
Moon Phases					
Last Quarter	10/12/2017	8:25 a.m. EDT	Full Moon	10/05/2017	2:40 p.m. EDT
First Quarter	10/27/2017	6:22 p.m. EDT	New Moon	10/19/2017	3:12 p.m. EDT

## October 2017 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

5	Full Moon, the Full Hunter's Moon or the Full Animal Fattening Moon
12	Last Quarter Moon
17	The Moon, Mars and Venus make a nice grouping before dawn
19	New Moon
19	Uranus is at opposition
21	The Orionid meteors peak in the pre-dawn hours
23/24	Saturn is near the crescent Moon in the southwest at dusk
27	First Quarter Moon
28	The Lunar Straight Wall (Rupes Recta) is visible

**The best sights this month:** Seeing Saturn is the highlight of October since the other bright planets are either in the dawn sky or behind the Sun. But if you grab your binoculars or telescope you should be able to find Uranus, which is at opposition on October 19<sup>th</sup>. Uranus is small in the eyepiece, but it has a distinct green color so it is fairly easy to identify.

**Mercury:** Mercury is not well positioned to be seen during October, but you might find it very low in the glow of the sunset at the end of the month.

**Venus:** Our sister planet rises about 2 hours before the Sun and shines brightly in the predawn sky.

**Mars:** The red planet rises just before the Sun and you will probably need binoculars or a telescope to see it because of the glow of our favorite star.

**Jupiter:** Jupiter passes behind the Sun on October 26<sup>th</sup> so it is not visible during October.

**Saturn:** The ringed planet continues to delight us during October but it is sinking further into the southwest, setting about 3 hours after the Sun.

**Uranus and Neptune:** Uranus reaches opposition on October 19<sup>th</sup> so it will be visible all night. It is best observed when it is high in the sky around 1:00 a.m. Neptune is in good position for viewing in the

late evening in the constellation Pisces. The October issue of Sky and Telescope magazine has finder charts for both gas giants.

**The Moon:** The Moon is full on October 5<sup>th</sup>. This Full Moon is called the Hunter's Moon, Blood Moon, or Sanguine Moon. Many moons ago, Native Americans named this bright moon for obvious reasons. The leaves are falling from trees, the deer are fattened, and it is time to begin storing up meat for the long winter ahead. Because the fields were traditionally reaped in late September or early October, hunters could easily see fox and other animals that come out to glean from the fallen grains. Probably because of the threat of winter looming close, the Hunter's Moon is generally accorded with special honor, historically serving as an important feast day in both Western Europe and among many Native American tribes. Native Canadians called this the Animal Fattening Moon.

**Constellations:** During October the Summer Triangle and all the delights it holds sinks toward the west late in the evening, but here come the fall and winter treasures! The dim but huge Great Square of Pegasus dominates the southern sky and by 9:00 we can find the jewels of the night – the Pleiades – rising in the east. Stay up late and Taurus the Bull leads Orion the Hunter up from the eastern horizon.

**Messier/deep sky:** The deep sky highlight of this time of year for me is the Andromeda Galaxy, M31. You don't need to be up late to catch the wonderful Double Cluster in Perseus and the compact star cluster M34 is just a bit to the south, also in Perseus. Stay up until 10:00 and you can see the star clusters in Auriga rising: M36, M37 and M38.

**Comets:** There are no bright comets visible during October.

**Meteor showers:** The Orionid meteor shower peaks in the early morning hours of October 21st. You could see up to 15 "shooting stars" per hour. The absence of the Moon makes this a good opportunity to see this shower which is made up of dust particles from Comet Halley. The peak of this shower is broad, so look for shooting stars a few days before and after the peak.



## Through The Eyepiece: The Double Cluster in Perseus

by Don Knabb, CCAS Treasurer & Observing Chair

At any CCAS observing session during the fall or winter, one of the first “treats of the night sky” is sure to be the Double Cluster. Take a salt shaker and give a few shakes over a dark table, move a couple of inches and do that again. That will give you a good idea of what the Double Cluster looks like in a pair of binoculars or a telescope with a low power eyepiece.

The Double Cluster is a favorite of amateur astronomers. These bright clusters are often photographed or observed with small telescopes. Easy to find, the clusters are visible in a dark sky with the unaided eye between the constellations of Perseus and Cassiopeia as a brighter patch in the autumn and winter Milky Way. Terence Dickinson calls the Double Cluster “Superb in binocs and small scopes”.

The Double Cluster is the common name for the naked-eye open clusters NGC 884 and NGC 869, which are close together in the constellation Perseus. They are close to one another in space as well. The Double Cluster is also known as Caldwell 14.

NGC 869 is located 6800 light years away in the constellation Perseus. The cluster is most likely around 19 million years old. It is the westernmost of the Double Cluster with NGC 884. Both clusters are located physically close to one another, only a few hundred light years apart. The clusters were first recorded by Hipparchus, but have likely been known since antiquity.



Image Credit: Stellarium, the Free Planetarium Software

NGC 884 is located 7600 light years away in the constellation Perseus. The cluster is most likely around 12.5 million years old. It is the easternmost of the Double Cluster with NGC 869.

Open clusters are also known as galactic clusters. Using a small telescope with a wide angle eyepiece to give a 1 degree field of view will show both clusters in one view.

In small telescopes the cluster appears as a beautiful assemblage of bright stars located in a rich star field. Dominated by bright blue stars the cluster also hosts a few orange stars that add to the visual interest. Both clusters together offer a spectacular low magnification view.

The Double Cluster is in the Milky Way spiral arm beyond

*(Continued on page 7)*

## Eyepiece (Cont'd)



Image credit: [https://commons.wikimedia.org/wiki/File:Double\\_Cluster.jpg](https://commons.wikimedia.org/wiki/File:Double_Cluster.jpg) taken by /u/ItFrightensMe

(Continued from page 6)  
our own. Under dark skies the Double Cluster is visible to the naked eye as a brightening in the

Milky Way or extended blurs of light. Binoculars just reveal the brighter individual stars of both clusters.

The Double Cluster rates among the most magnificent deep-sky objects not to be included in the famous Messier catalog. Charles Messier was looking for deep-sky objects that could be mistaken for comets. He must have thought nobody would see this pair of glittery clusters as a comet in the sky.

Information sources:

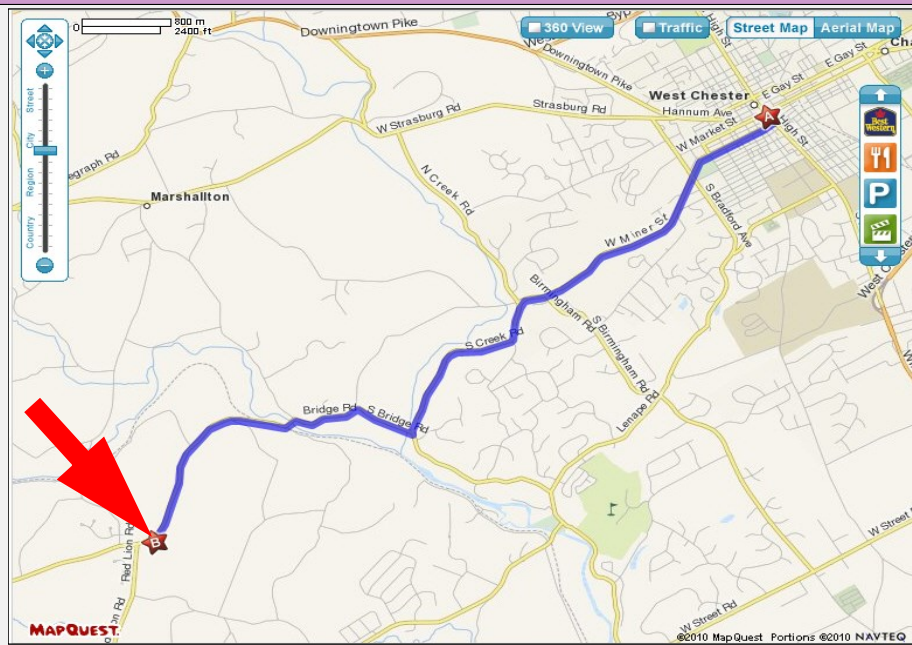
[http://en.wikipedia.org/wiki/NGC\\_869](http://en.wikipedia.org/wiki/NGC_869)  
[http://en.wikipedia.org/wiki/NGC\\_884](http://en.wikipedia.org/wiki/NGC_884)  
<http://www.seds.org/messier/xtra/ngc/n0869.html>

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://earthsky.org/clusters-nebulae-galaxies/double-cluster-clusters-of-supergiant-suns>

## 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

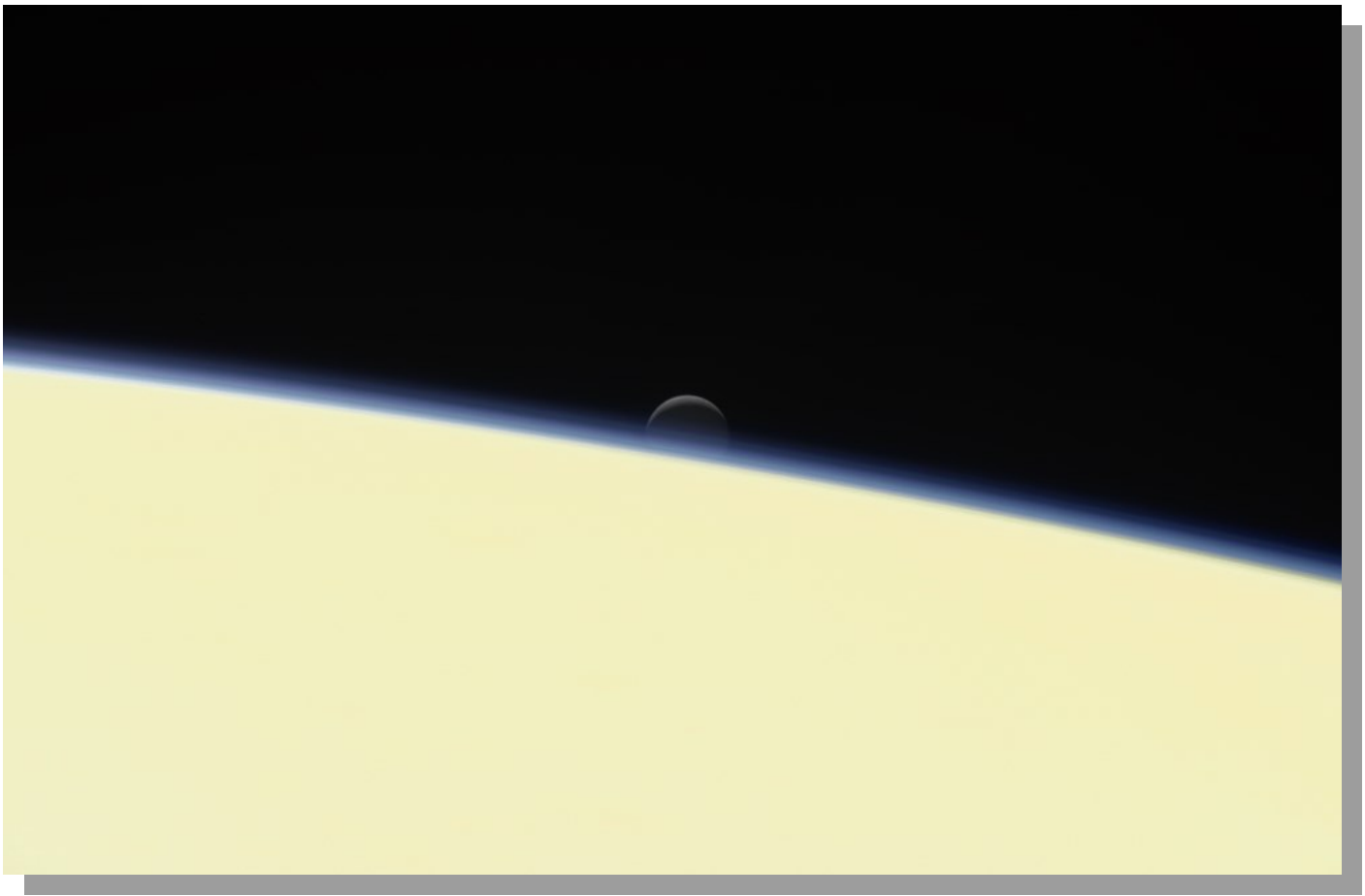
<http://brandywinewatershed.org/>

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.



## NASA's Cassini Spacecraft Ends Its Historic Exploration of Saturn

courtesy NASA/Jet Propulsion Laboratory



*Saturn's active, ocean-bearing moon Enceladus sinks behind the giant planet in a farewell portrait from NASA's Cassini spacecraft. This view of Enceladus was taken by NASA's Cassini spacecraft on Sept. 13, 2017. It is among the last images Cassini sent back. Image Credit: NASA/JPL*

A thrilling epoch in the exploration of our solar system came to a close on September 15, 2017, as NASA's [Cassini spacecraft](#) made a fateful plunge into the atmosphere of Saturn, ending its 13-year tour of the ringed planet.

"This is the final chapter of an amazing mission, but it's also a new beginning," said Thomas Zurbuchen, associate administrator for NASA's Science Mission Directorate at NASA Headquarters in Washington. "Cassini's discovery of ocean worlds at Titan and Enceladus changed everything, shaking our views to the core about surprising places to search for potential life beyond Earth."

Telemetry received during the plunge indicates that, as expected, Cassini entered Saturn's atmosphere with its thrusters firing to maintain stability, as it sent back a unique final set of science observations. Loss of contact with the Cassini spacecraft occurred at 4:55 a.m. PDT (7:55 a.m. EDT), with the signal received by NASA's Deep Space Network antenna complex in Canberra, Australia.

"It's a bittersweet, but fond, farewell to a mission that leaves behind an incredible wealth of discoveries that have changed our view of Saturn and our solar system, and will continue to shape future missions and research," said Michael Watkins, director

of NASA's Jet Propulsion Laboratory in Pasadena, California, which manages the Cassini mission for the agency. JPL also designed, developed and assembled the spacecraft.

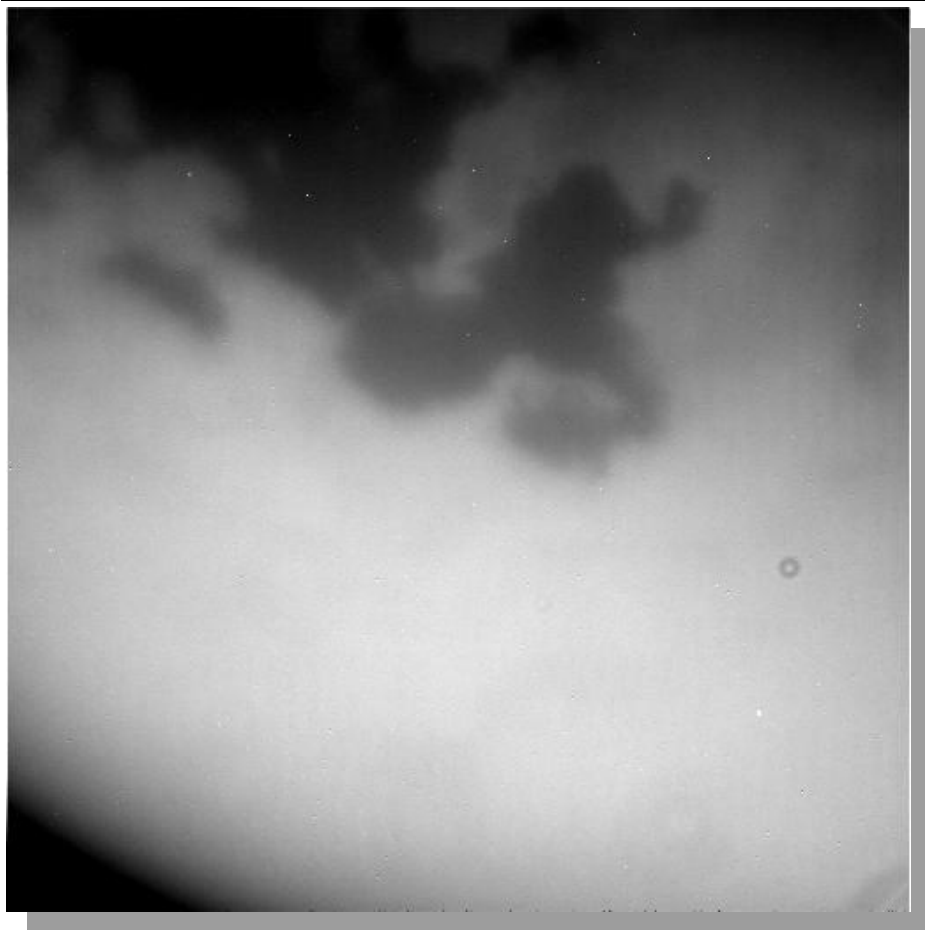
Cassini's plunge brings to a close a series of 22 weekly "Grand Finale" dives between Saturn and its rings, a feat never before attempted by any spacecraft.

"The Cassini operations team did an absolutely stellar job guiding the spacecraft to its noble end," said Earl Maize, Cassini project manager at JPL. "From designing the trajectory seven years ago, to navigating

*(Continued on page 9)*



## Saturn (Cont'd)



*Titan. Taken: Sep. 12, 2017 7:07 AM Received: Sep. 13, 2017 8:12 AM  
The camera was pointing toward TITAN, and the image was taken using the CL1 and CB3 filters. This image has not been validated or calibrated. A validated/calibrated image will be archived with the NASA Planetary Data System.  
Image Credit: NASA/JPL-Caltech/Space Science Institute*

*(Continued from page 8)*

through the 22 nail-biting plunges between Saturn and its rings, this is a crack shot group of scientists and engineers that scripted a fitting end to a great mission. What a way to go. Truly a blaze of glory."

As planned, data from eight of Cassini's science instruments was beamed back to Earth. Mission scientists will examine the spacecraft's final observations in the coming weeks for new insights about Saturn, including hints about the planet's formation and evolution, and pro-

cesses occurring in its atmosphere.

"Things never will be quite the same for those of us on the Cassini team now that the spacecraft is no longer flying," said Linda Spilker, Cassini project scientist at JPL. "But, we take comfort knowing that every time we look up at Saturn in the night sky, part of Cassini will be there, too."

Cassini launched in 1997 from Cape Canaveral Air Force Station in Florida and arrived at Saturn in 2004. NASA extended its mission twice – first for two years, and then for seven more.

The second mission extension provided dozens of flybys of the planet's icy moons, using the spacecraft's remaining rocket propellant along the way. Cassini finished its tour of the Saturn system with its Grand Finale, capped by Friday's intentional plunge into the planet to ensure Saturn's moons – particularly Enceladus, with its subsurface ocean and signs of hydrothermal activity – remain pristine for future exploration.

While the Cassini spacecraft is gone, its enormous collection of data about Saturn – the giant planet, its magnetosphere, rings and moons – will continue to yield new discoveries for decades to come.

"Cassini may be gone, but its scientific bounty will keep us occupied for many years," Spilker said. "We've only scratched the surface of what we can learn from the mountain of data it has sent back over its lifetime."

An online toolkit with information and resources for Cassini's Grand Finale is available at:

<https://saturn.jpl.nasa.gov/grandfinale>

The [Cassini-Huygens](#) mission is a cooperative project of NASA, ESA (European Space Agency) and the Italian Space Agency. JPL, a division of Caltech in Pasadena, manages the mission for NASA's Science Mission Directorate in Washington.

## 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).



### Minutes (Cont'd)

(Continued from page 2)

Richards, professor of Physics at Drexel University presented "Supermassive Black Holes and the Large Synoptic Survey Telescope." (lsst.org). First light is projected for 2019 in the Chilean Andean Plain near the Gemini site. Dr. Richards gave an overview of his research of quasars powered by black holes.

- Roger concluded the meeting with a solar eclipse story about his mailman. Roger shared eclipse glasses with this postman and the postman in turn was able to share a look at the eclipse with his delivery route customers at each stop. He reminded the club that "little acts can do great good."

### CCAS Membership Information and Society Financials

#### Treasurer's Report by Don Knabb

##### Sept. 2017 Financial Summary

Beginning Balance	\$1,182
Deposits	\$130
Disbursements	\$0
Ending Balance	\$1,312

#### New Member Welcome!

Welcome new CCAS members Gloria & Ed Kresch from Havertown, 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!

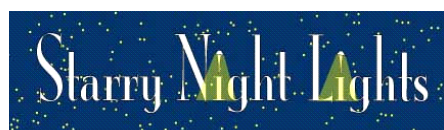
Anyone who spends much time outdoors, whether you're stargazing, or gardening, or whatever, needs to know about Lyme Disease and how to prevent it. You can learn about it at:

<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:

**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 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**.

