bservations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 28, No. 3 ***Three-Time*** *Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016* *March 2020*

In This Issue

Night Sky Network Outreach Awards

CCAS Members Earned Recognition from NASA/JPL Organization Night Sky Network at February 10th Meeting.

Membership Renewals Due

03/2020	Angelini
	DellaPenna
	Fulton
	Sterrett
	Zandler
	Zibinski
04/2020	Hepler
	Imburgia
	Miller
	Rossomando
05/2020	Aylam & Mratin-Aylam
	Fletcher
	Klapholz
	O'Hara
	Quinn
	Toth

March 2020 Dates

2nd • First Quarter Moon, 2:57 a.m. EST; the Lunar Straight Wall is visible

8th • Daylight Saving Time begins

9th • Full Moon, the Full Worm Moon or the Blossoming Out Moon, 1:47 p.m. EDT

16th • Last Quarter Moon, 5:34 a.m. EDT

19th • Spring Equinox. First day of spring, northern hemisphere.

24th • New Moon, 5:28 a.m. EST.

CCAS Upcoming Nights Out

In addition to our monthly observing sessions at the Myrick Conservancy Center, BRC (see pg. 2), 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 27, 2020** - CCAS Monthly Observing Session, Myrick Conservancy Center, Brandywine Red Clay Alliance. The observing session starts at sunset.

☼ **Friday, April 24, 2020** - CCAS Monthly Observing Session, Myrick Conservancy Center, Brandywine Red Clay Alliance. The observing session starts at sunset.

☼ **Saturday, April 25, 2020** - CCAS Special Observing Session with Atglen Library at Wolf's Hollow County Park, Atglen, PA.

Winter/Spring Society Events

March 2020

5th-6th • The von Kármán Lecture Series: The Search for Life: Exploring Ocean Worlds, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

8th • Daylight Saving Time begins at 2:00 a.m. Turn clocks forward one hour.

14th • CCAS Monthly Meeting, Room 113, Merion Science Center (former Boucher Building), West Chester University. The meeting starts at 7:30 p.m. Guest Speaker: Marco Raveri, PhD, Center for Particle Cosmology, University of Pennsylvania – "The Hubble Constant 'Tension' - Impact on the Physics of Dark Matter and Dark Energy."

16th • Beginner Astronomy Class: Spaceship Earth. 7-8 p.m. EDT. Chester County Night School at Rustin High School.

17th • West Chester University Planetarium Show: "Our Amazing Sun," in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length. For more information and reservations, visit the WCU Public Planetarium Shows webpage.

19th • Vernal Equinox, 11:50 p.m. EDT. First day of spring.

20th • Open call for articles and photographs for the April 2020 edition of Observations.

23rd • Beginner Astronomy Class: Our Moon—Phases and Faces. 7-8 p.m. EDT. Chester County Night School at Rustin High School.

26th • Deadline for newsletter submissions for the April 2020 edition of Observations.

27th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset. Resumption of monthly observing sessions through November 2020.

30th • Beginner Astronomy Class: Other Kids on the Block. 7-8 p.m. EDT. Chester County Night School at Rustin High School.

April 2020

6th • Beginner Astronomy Class: Star Charts and Planetarium Software. 7-8 p.m. EDT. Chester County Night School at Rustin High School.

14th • CCAS Monthly Meeting, Room 113, Merion Science Center (former Boucher Building), West Chester University. The meeting starts at 7:30 p.m. Guest Speaker: Edward Guinan, PhD, Dept. of Astronomy and Planetary Science, Villanova University – "Martian Greenhouse Project – Growing Plants in Simulated Martian Regolith and its Implications."

16th-17th • The von Kármán Lecture Series: How NASA Observes Earth from Air & Orbit, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

20th • Beginner Astronomy Class: Using a Telescope. 7-8 p.m. EDT. Chester County Night School at Rustin High School.

20th • Open call for articles and photographs for the May 2020 edition of Observations.

21st • West Chester University Planetarium Show: "Exploring Asteroids," in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length. For more information and reservations, visit the WCU Public Planetarium Shows webpage.

24th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

25th • CCAS Special Observing Session with Atglen Library at Wolf's Hollow County Park, Atglen, PA.

26th • Deadline for newsletter submissions for the May 2020 edition of Observations.

27th • Beginner Astronomy Class: Beyond Naked-Eye Observing. 7-8 p.m. EDT. Chester County Night School at Rustin High School.

Minutes from the February 11, 2020, CCAS Monthly Meeting

by Bea Mazziotti, CCAS Secretary

- David Hockenberry welcomed approximately 40 members and guests.
- Don Knabb presented Night Sky Network awards to 36 members in recognition of their exceptional community outreach. Congratulations to all.
- Don shared a list of upcoming observing sessions, summer camping trips and star parties. Go to http://www.ccas.us/for more information. One event he noted is the upcoming York County Star Party (formerly the Mason Dixon Star Party). Pete Kellerman, Gary Calobrisi and Bea Mazziotta have attended this fun event in the past. Though the dark skies weren't pristine, the observing was decent and the activities, interesting. Go to http://www.skyshedpodpa.com/york-county-star-party.html for dates and details.
- Don Knabb shared a sky map from the website http://whatsouttonight.com/which provides free sky charts and a YouTube video chart tutorial.
- Don led our February night sky tour. Many members have already observed the reduction in brightness of Betelgeuse, a phenomena that astronomers worldwide have been watching closely.
- Stargazers Vineyard, located in Coatesville, contacted Don about hosting a star party at their vineyard. More information will follow as details are settled.
- David asked club members to contact him or any other executive committee member if they would be willing to host the club summer picnic.
- Bruce Ruggeri, program chair, introduced the evening's speaker, Dr. Ravi K Sheth. He is a UPenn professor of Physics and Astronomy and he spoke on "Gravitational Waves-The Discovery that Shook the Earth. Dr. Sheth earned his Ph.D. in astrophysics from Cambridge where he was a Marshall Scholar. He develops physical models and statistical methods which allow the data from large scale galaxy and cluster surveys to constrain models of galaxy formation and cosmology. He played a leading role in the development of what is now the standard model of nonlinear clustering and biasing: The Halo Model. He presented an interesting and informative program that kept attendees engaged throughout.

March 2020 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on January 10, 2020, starting at 7:30 p.m. The meeting will be held in Room 113, Merion Science Center (former Boucher Building), West Chester University. Guest Speaker: Marco Raveri, PhD, Center for Particle Cosmology, University of Pennsylvania, "The Hubble Constant 'Tension' - Impact on the Physics of Dark Matter and Dark Energy."

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 2020 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

Carl Sagan's Legacy: The Blue Dot

by CCAS Member Steve DellaPenna

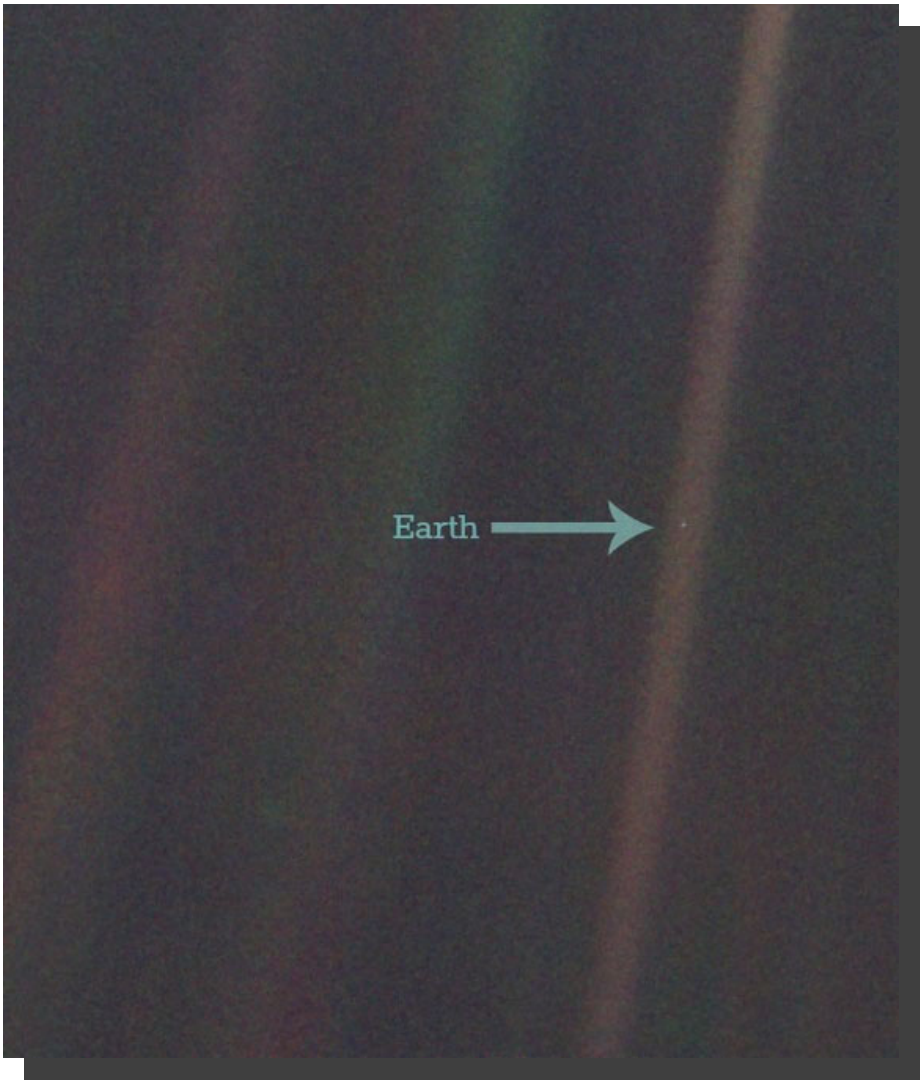

Image Credit: Voyager 1 —NASA/JPL

Friday, February 14, was the thirtieth anniversary of the famous Pale Blue Dot photo taken of Earth by Voyager 1 as it was leaving the solar system. Interestingly enough, taking the picture was first proposed by Carl Sagan in 1980, but took another ten years to get approval. If not for Sagan's perseverance, we would not have been afforded the opportunity to see our home planet from such a unique vantage point and perspective.

In some ways, this ethereal image is a testament to the message Sagan had been teaching us for years – this is our only home and we must cherish and protect it. Carl Sagan has been an influence in my life ever since I watched *Cosmos* on PBS forty years ago. In retrospect, many of my science-related endeavors, such as studying Earth sciences in college and gazing through a telescope on a clear, chilly night have been inspired by Dr. Sagan.

"Look again at that dot. That's here. That's home. That's us. On it everyone you love, everyone you know, everyone you ever heard of, every human being who ever was, lived out their lives."

~Sagan, 1994

His passion for knowledge and quest for understanding the universe enkindled in me a deep respect and reverence for the natural world, which has only grown with time. As the greatest and most renowned science communicator of our time, he inspired millions around the world to gaze up to the heavens on a clear, starry night and let their imagination run free.

As society seems to be more and more disconnected from nature, it's imperative we invite and encourage our children and grandchildren to perpetuate Sagan's legacy. The cosmos is a mysterious and captivating realm, with countless wonders and infinite possibilities. Dr. Sagan once said "The cosmos is within us. We are made of star-stuff. We are a way for the universe to know itself." These words especially ring true in an era of deep space exploration and discovery; in essence, we are discovering our origins. By being in touch with the cosmos we are more in touch with ourselves, and that is one of the lessons Sagan was trying to teach us. I often stand on my back deck and stare up into a star-strewn night sky, contemplating what is out there. Are there distant beings that, like us,

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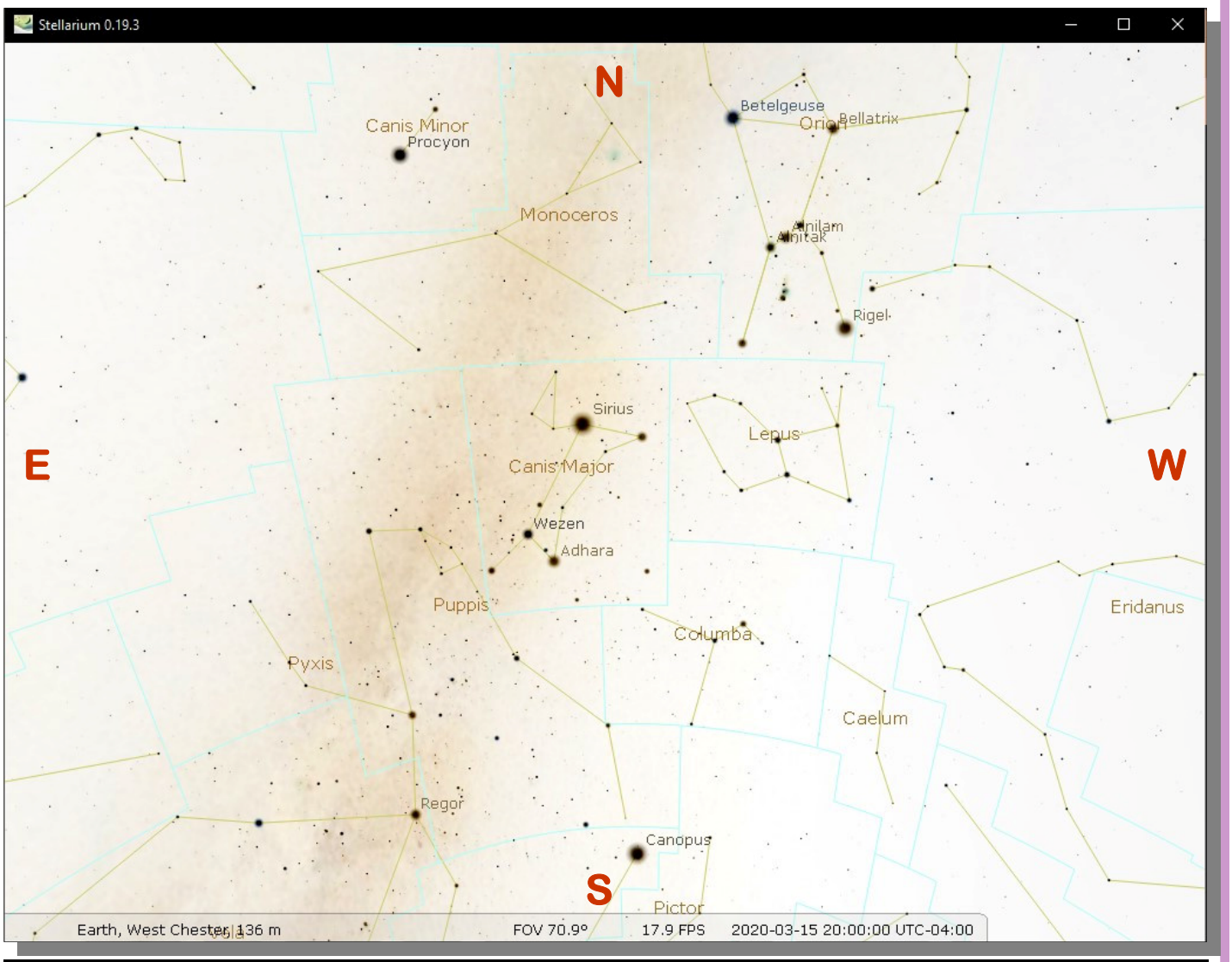
The Sky Over Chester County

March 15, 2020 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.



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
03/01/2020	6:06 a.m. EST	6:33 a.m. EST	5:53 p.m. EST	6:20 p.m. EST	11h 19m 59s
03/15/2020	6:44 a.m. EDT	7:11 a.m. EDT	7:08 p.m. EDT	7:35 p.m. EDT	11h 56m 45s
03/31/2020	6:18 a.m. EDT	6:45 a.m. EDT	7:24 p.m. EDT	7:51 p.m. EDT	12h 38m 58s

Moon Phases					
First Quarter	03/02/2020	2:57 p.m. EST	Full Moon	03/09/2020	1:47 p.m. EDT
Last Quarter	03/16/2020	5:34 a.m. EDT	New Moon	03/24/2020	5:28 a.m. EDT

March 2020 Observing Highlights
by Don Knabb, CCAS Treasurer & Observing Chair

1	**The Lunar X is visible around 8 p.m. and Aldebaran is near the Moon**
2	**First Quarter Moon, 2:57 a.m. EST; the Lunar Straight Wall is visible**
8	**Daylight Saving Time begins**
9	**Full Moon, the Full Worm Moon or the Blossoming Out Moon, 1:47 p.m. EDT**
11-25	**The Zodiacal Light is visible from a dark site after evening twilight**
16	**Last Quarter Moon, 5:34 a.m. EDT**
18/19	**Jupiter, Saturn, Mars and the Moon are in a tight group in the pre-dawn sky**
19	**Spring equinox**
24	**New Moon and Venus is at greatest elongation**
27/28	**Venus is near the Moon**
29/30	**The Moon is between the horns of Taurus**

The best sights this month: Venus is high in the western sky during March and shines at an incredible -4.5 magnitude. Our sister planet cannot be missed if you look toward the west after sunset. And for an amazing grouping of Jupiter, Saturn, Mars and the Moon get up before dawn on March 18th to see a nice grouping in the eastern sky.

Mercury: Mercury is in the pre-dawn sky but is poorly positioned for viewing during March.

Venus: As mentioned previously, Venus is the main attraction in the evening sky. The interval between sunset and Venus setting is more than 4 hours during March!

Mars: Mars is a dim red dot in the pre-dawn sky but has Jupiter and Saturn for company.

Jupiter: Jupiter rises about 3 hours before the Sun during March with Mars and Saturn close by.

Saturn: The ringed planet rises just after Jupiter in the pre-dawn sky.

Uranus and Neptune: Uranus can be found close to Venus on March 8th as soon as light fades from the sky. Neptune is passing behind the Sun during March so it cannot be observed.

The Moon: The Moon is full on March 9th. This is the Full Worm Moon according to Native Americans. As the temperature warms and the ground begins to thaw, earthworm casts appear (an earthworm cast is a nice word for worm poop), heralding the return of the robins. This full moon is also called the Full Crow Moon, the Full Crust Moon and the Full Sap Moon. Native Canadians called this the Maple Sugar or the Blossoming Out Moon.

Constellations: Early in the evening the "big guy" Orion dominates the sky in the southwest. See if you can detect the dimming of Betelgeuse that has been in the news recently. Bright Capella in Auriga is nearly overhead. Leo the Lion is in the southeast and as the night progresses you can see some spring constellations rising such as Boötes, Corona Borealis and Hercules.

Messier/deep sky: Take a few more gazes at the Orion Nebula before it settles into the west as spring marches on. The Big Dipper is high in the sky so take this opportunity to look for galaxies M81 and M82. With a low power eyepiece in your telescope they might be in the same field of view depending on your equipment. For more of a challenge, look for the 10th magnitude galaxies M65 and M66 in Leo.

Comets: There are no bright comets visible during March. But for an observing challenge seek out Comet PanSTARRS (C/2017 T2) as it cruises through Cassiopeia. A sky chart is in the March issue of Astronomy magazine.

Meteor showers: There are no meteor showers during March. However, from March 11th until March 25th is a good time to look for the Zodiacal Light, a cone-shaped glow of light that is created when sunlight reflects off dusty debris in the inner solar system.

Big Telescopes Join Hunt for Things That Go Flash in the Night

by Daniel Clery, Science Magazine

This past January, gravitational wave detectors picked up ripples in spacetime from a cosmic cataclysm: the possible merger of a black hole with a neutron star, an event never seen before. Responding to an alert, telescopes around the world swiveled toward the apparent source to watch for the collision's afterglow and confirm that it was a first. The array of telescopes joining the hunt was unprecedented, too: It included the 8.1-meter Gemini North telescope on Hawaii's Mauna Kea, one of the biggest in the world.

On this occasion, Gemini and the other telescopes saw nothing unexpected. Yet it was an important test of a new telescope network and software developed to automate observations of fast-moving events. Rejigging Gemini's nightly schedule normally takes hours, but this time it was accomplished in minutes with a few clicks of a mouse. "We're on the verge of a new era," says Andy Howell of Las Cumbres Observatory (LCO), an existing rapid response network, who helped develop the software. "It's a whole new way to observe the universe."

Telescopes and other detectors that scan the sky for events that change daily, hourly, or even by the minute are creating a need for fast follow-up observations. Setting the pace now is the Zwicky Transient Facility, a 1.2-meter survey telescope in California that produces up to 1 million transient alerts per night, flagging objects that include supernovae, flaring galactic nuclei, and passing asteroids. The telescope has even alerted astronomers to black holes in the act of swallowing stars. But in 3 years' time, its output will be dwarfed by that of the Vera C. Rubin Observatory (formerly the Large Synoptic Survey Telescope) in Chile. With an 8.4-meter mirror, the Rubin Observatory will look much deeper into the universe and generate roughly 10 million transient alerts per night.

Chasing those alerts will be a daunting task. LCO, a privately funded network of 23 small telescopes, has set an example for how to do it. The heart of the network is a dynamic scheduler that juggles urgent follow-up requests and the more routine observations planned for the telescopes, which can offer almost 24/7 access to the entire sky because they are scattered around the globe. "LCO is unique at the moment, changing schedule every 5 to 10 minutes," says Director Lisa Storrie-Lombardi. Such is its success that European astronomers are adapting LCO's scheduler for an expansion of their OPTICON network of about 60 telescopes. "Their software was so much better than ours for the control system," says principal investigator Gerry Gilmore of the University of Cambridge.

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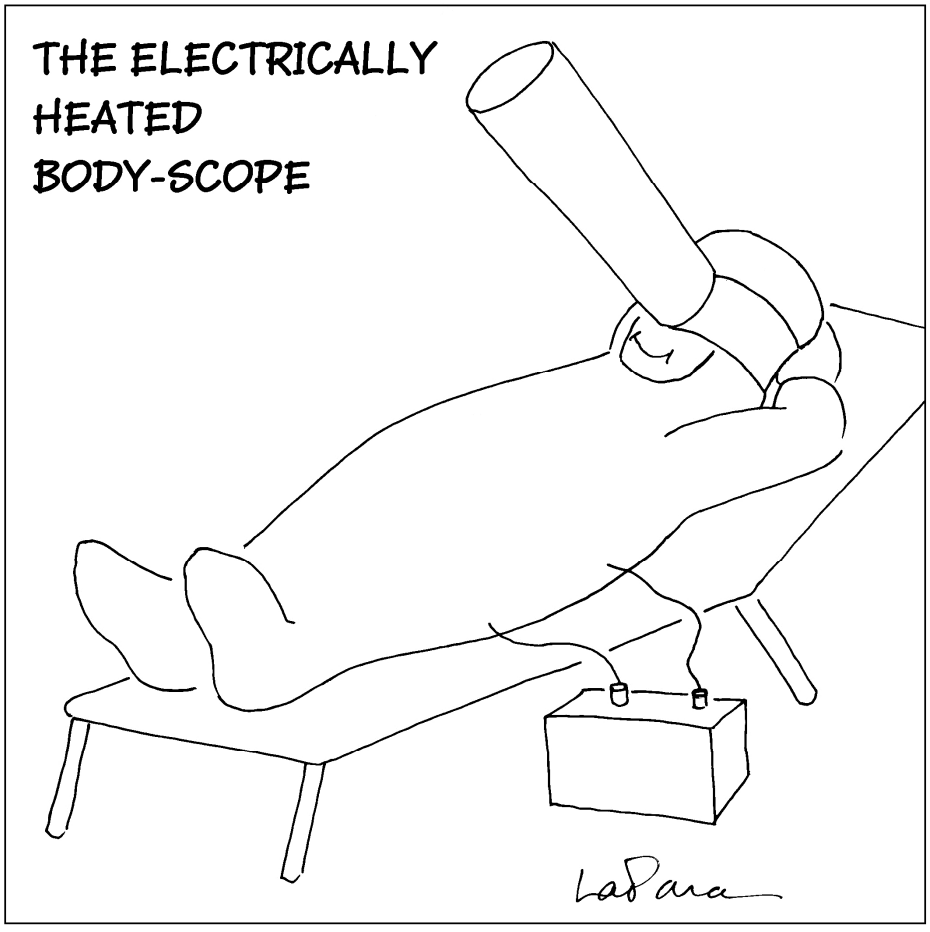
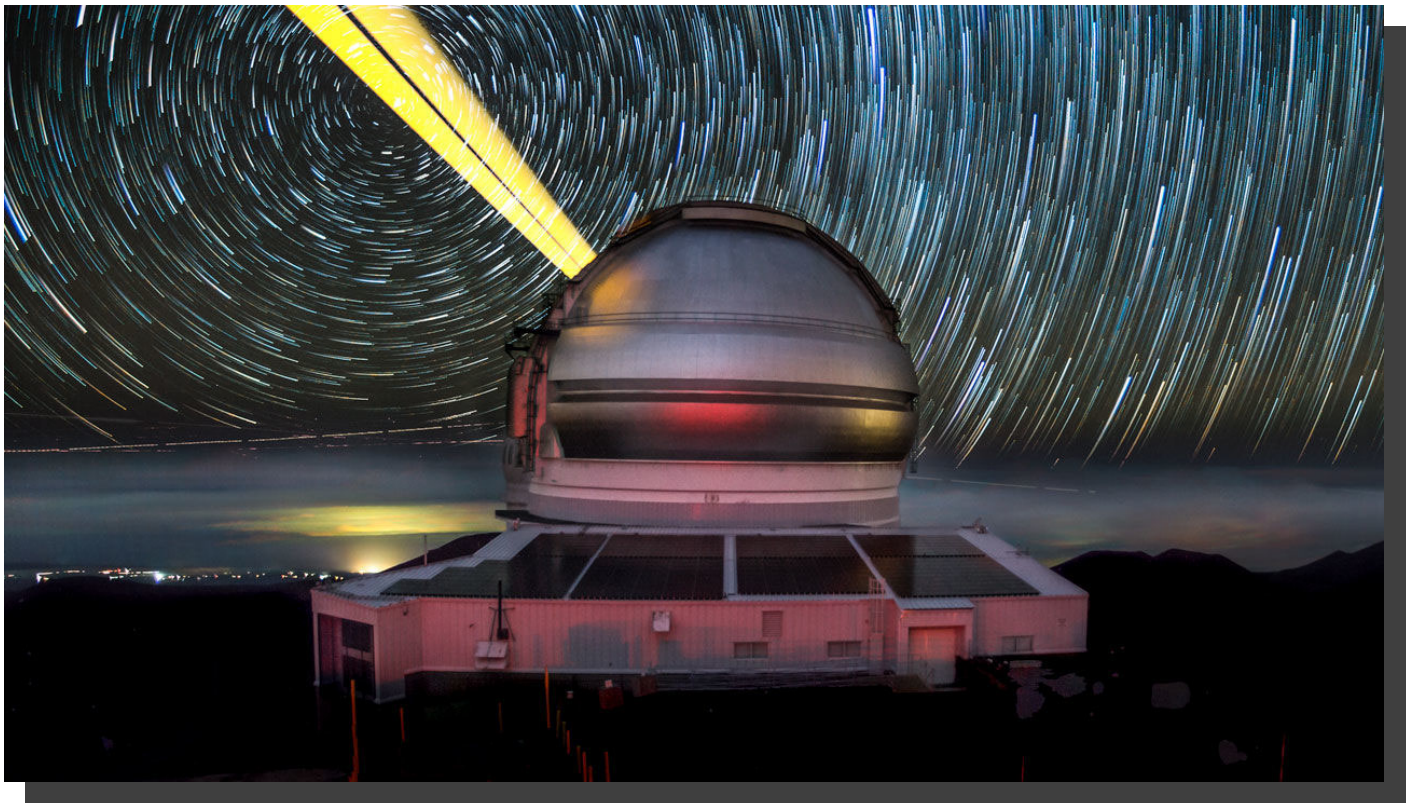
Classic La Para

by Nicholas La Para



Big Telescopes Cont'd)



The Gemini North telescope in Hawaii is one of the world's largest. Now, it is also very fast. I
mage Credit: International Gemini Observatory/NSF's National Optical-Infrared Astronomy Research Laboratory/AURA

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The National Science Foundation (NSF), which owns a handful of large telescopes, also wants in on the action. About 18 months ago, it teamed up with LCO to create what it calls the Astronomical Event Observatory Network (AEON). Because many of the objects that trigger Rubin Observatory alerts will be faint, NSF will add some of its large telescopes to the network. The difficulty is that LCO's telescopes are entirely robotic and NSF's aren't, so the AEON team is designing software interfaces to bridge these two systems. The testbed has been the 4.1-meter Southern Astrophysical Research Telescope (SOAR) in Chile. For 20 nights last year, SOAR ran in "AEON mode," with an operator responding to a quickly changing list of targets provided by the LCO scheduler. Another 20 AEON nights on SOAR begins this month, and Gemini North is now accessible on a limited basis. NSF also hopes to include the 4-meter Victor M. Blanco Telescope in Chile in AEON.

Automating follow-up observations is just one part of coping with the coming deluge from the Rubin Observatory. Astronomers also need software to sift through transient alerts and take a first stab at deciding what an event is. Such programs, called event brokers, will divide alerts into categories: supernovae, flaring stars, or comets, for example. Researchers can pluck interesting events from these bins, or they can automate the task with a target and observation manager (TOM), which can automatically request follow-up observations and set up a web page for each event so astronomers can see and discuss data. "It's like Facebook for transients," says Eric Bellm, who leads the development of the Rubin Observatory alert pipeline at the University of Washington, Seattle.

Sherry Suyu of the Max Planck Institute for Astrophysics is leading the development of a TOM for gravitational lensing events. Sometimes, the light of distant supernovae is bent, or lensed, by an intervening galaxy, creating multiple images of the same supernova. Because the light for the images follows different paths to Earth, they may flare up days or weeks apart. "It's like a time machine," Suyu says. "We see the first one and wait for the second to appear,"

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NASA Mission Finalists Would Explore Venus or Outer-Planet Moons
by Paul Voosen, Science Magazine

Image of Venus Credit: Irina Dmitrienko/Alamy Stock Photo

Venus may be Earth's closest cousin, but for many planetary scientists, it can seem a distant dream. It's been nearly 30 years since a NASA spacecraft has visited the planet. But that could change, as missions to Venus are two of the four finalists for the agency's next two $500 million planetary missions, NASA announced today.

The Venus finalists have been here before: Versions of both proposals were in the same position in 2017, but NASA ultimately selected two missions to asteroids instead. This time, the Venus missions will face stiff competition from proposals to visit Io, Jupiter's large volcanic moon, and Triton, Neptune's icy moon, neither of which has been closely explored. Each proposal receives $3 million to flesh out their concept over the next year. After that, NASA plans to select two for flight. None would likely launch until the middle of this decade at the earliest.

The first Venus proposal, DAVINCI+ (Deep Atmosphere Venus Investigation of Noble gases, Chemistry, and Imaging Plus) from NASA's Goddard Space Flight Center, would send an armored pressure sphere plunging through the planet's atmosphere, its instruments measuring noble gases to sort out the planet's origins, and sniffing for sulfur and carbon near the surface for evidence of recent volcanic activity.

Unlike Goddard's past Venus proposal, this mission would also include an orbiter to map the planet's geology, including its mysterious highlands. (The previous DAVINCI proposal was led by Lori Glaze, now the chief of planetary science at NASA headquarters.)

The second Venus proposal, VERITAS (Venus Emissivity, Radio Science, InSAR, Topography, and Spectroscopy) from NASA's Jet Propulsion Lab (JPL), would use synthetic aperture radar to peer through the planet's thick clouds and recreate its topography, revealing whether volcanoes or variants of plate tectonics are active on its surface. Previous missions have revealed evocative evidence of hotspots but lacked the resolution to answer questions of why

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NASA Finalists (Cont'd)

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Venus's fate differed so starkly from Earth's.

The third proposal, the Io Volcano Observer (IVO), from the University of Arizona and the Johns Hopkins University Applied Physics Laboratory, would travel to the volcanic furnace that is Io, one of Jupiter's large moons. Heated by Jupiter's gravitational pull, Io's interior and surface remain a mystery. Through a series of flybys, IVO would answer questions such as whether a magma ocean sits in Io's interior and the volume of its eruptions.

Finally, the Trident mission, from the Lunar and Planetary Institute and JPL, would explore Triton, the icy moon of Neptune, at the Solar System's outskirts. Although Voyager 2 flew past the planet, Neptune and its moons have never seen a dedicated mission. Voyager 2 did reveal that Triton is active, with a young active surface that could host eruptive plumes and be hiding an interior ocean. Trident would fly past Triton once, much like New Horizons flew past Pluto, mapping the moon as it passed.

Unlike its larger mission lines, NASA's Discovery program is open to targets throughout the Solar System. The agency's two most recent selections—Lucy, set to fly past a series of asteroids that follow Jupiter's orbit, and Psyche, which will explore an oddball metallic asteroid—are set to launch in 2021 and 2022, respectively.

Big Telescopes (Cont'd)

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which makes it possible to study a supernova from its very first moments.

Only two such lensed supernovae have been discovered. But Suyu expects the Rubin Observatory will find hundreds, enabling astronomers to study supernovae in detail and use them to calculate the Hubble constant, the expansion rate of the universe. Suyu's TOM would take events categorized as supernovae by event brokers, automatically trigger observations to assess whether a new supernova is lensed, and, if so, schedule daily observations.

Some astronomers are concerned that enlisting more telescopes to respond to transient

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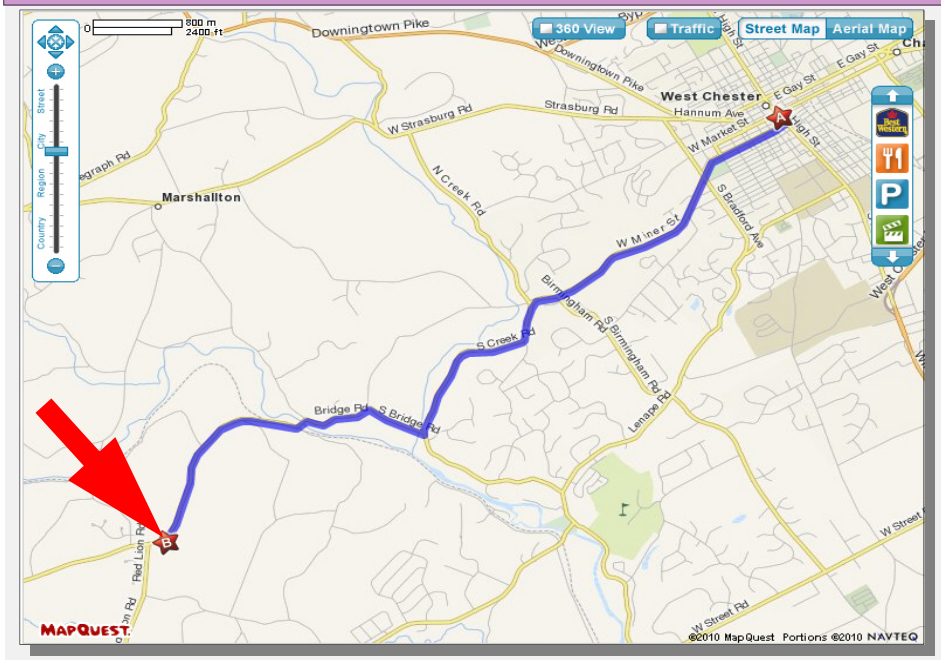
CCAS Directions



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 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).

Through the Eyepiece: M44, the Beehive Cluster

by Don Knabb, CCAS Treasurer & Observing Chair

Sky map made with Stellarium planetarium software

M44 (NGC 2632) is better known by the name the Beehive Cluster, or the Latin equivalent: Praesepe, which not only means a hive but also a crib, or manger.

M44 is found at the center of the constellation Cancer the Crab. It is a favorite object for star parties in early spring. Participants are simply amazed at all the stars in the eyepiece of your telescope, when they cannot even see the cluster in the sky.

This is a bright open cluster clearly visible to the naked eye on a dark night under excellent conditions, but in our Chester County skies it is best appreciated with binoculars or a telescope with a low power eyepiece. One of the largest clusters, its 1.5-degree size is equivalent to three full moons end-to-end.

According to the new determination by ESA's astrometric satellite Hipparcos, the cluster is 577 light years distant and its age is estimated at about 730 million years.

This grouping is so large it was well-known in antiquity, when it was thought to be a nebula, or gaseous region of the sky. The cluster often served to predict the weather: if the view of the cluster was not crystal-clear inclement weather might be on the way.

Galileo was the first to study its stars with a telescope. He counted over forty members, putting to rest the idea of its nebulosity and introducing the idea of star clusters.

There are approximately 350 stars in the Beehive. With larger telescopes more than 200 of the 350 stars in the cluster area have been confirmed as members (by their common motion). Some others are foreground or background stars, and others may not yet have been determined. It has been estimated that over a hundred of its stars are brighter than our Sun.

Greeks and Romans saw this "nebula" as the manger associated with two donkeys that eat from it, the gamma and delta stars of Cancer. The myth states

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Eyepiece (Cont'd)

Image credit: CCAS member Pete LaFrance from his Avondale observatory

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that these were the donkeys on which the gods Dionysos and Silenus rode into the battle against the Titans, who were frightened by the animals' braying so that the gods won. As a reward, the donkeys were put in sky.

So dress warmly, grab your binoculars, lay back in a lounge chair and enjoy the beautiful Beehive Cluster!

Spring 2020 Sponsored Introduction to Astronomy Classes

by Don Knabb & Dennis O'Leary, CCAS Education Chairs

CCAS has partnered with Chester County Night School to offer a six-week program meeting Monday nights at Bayard Ruston High School from 7:00 to 8:00 PM. The classes run from March 16, 2020 through April 27, 2020, with no class scheduled on April 13, 2020 (the day after Easter).

- March 16th: Spaceship Earth
- March 23th: Our Moon—Phases and Faces
- March 30th: Other Kids on the Block
- April 6th: Star Charts and Planetarium Software
- April 20th: Using a Telescope
- April 27th: Beyond Naked-Eye Observing

The cost for the courses is $59.00 per person. Bayard Rustin High School is located at 1100 Shiloh Road, West Chester, PA 19382.

NASA Night Sky Notes: Dim Delights in Cancer

by David Prosper

This article is distributed by the NASA Night Sky Network, a coalition of hundreds of astronomy clubs across the US dedicated to astronomy outreach.

Visit nightsky.jpl.nasa.gov to find local clubs, events, stargazing info and more.

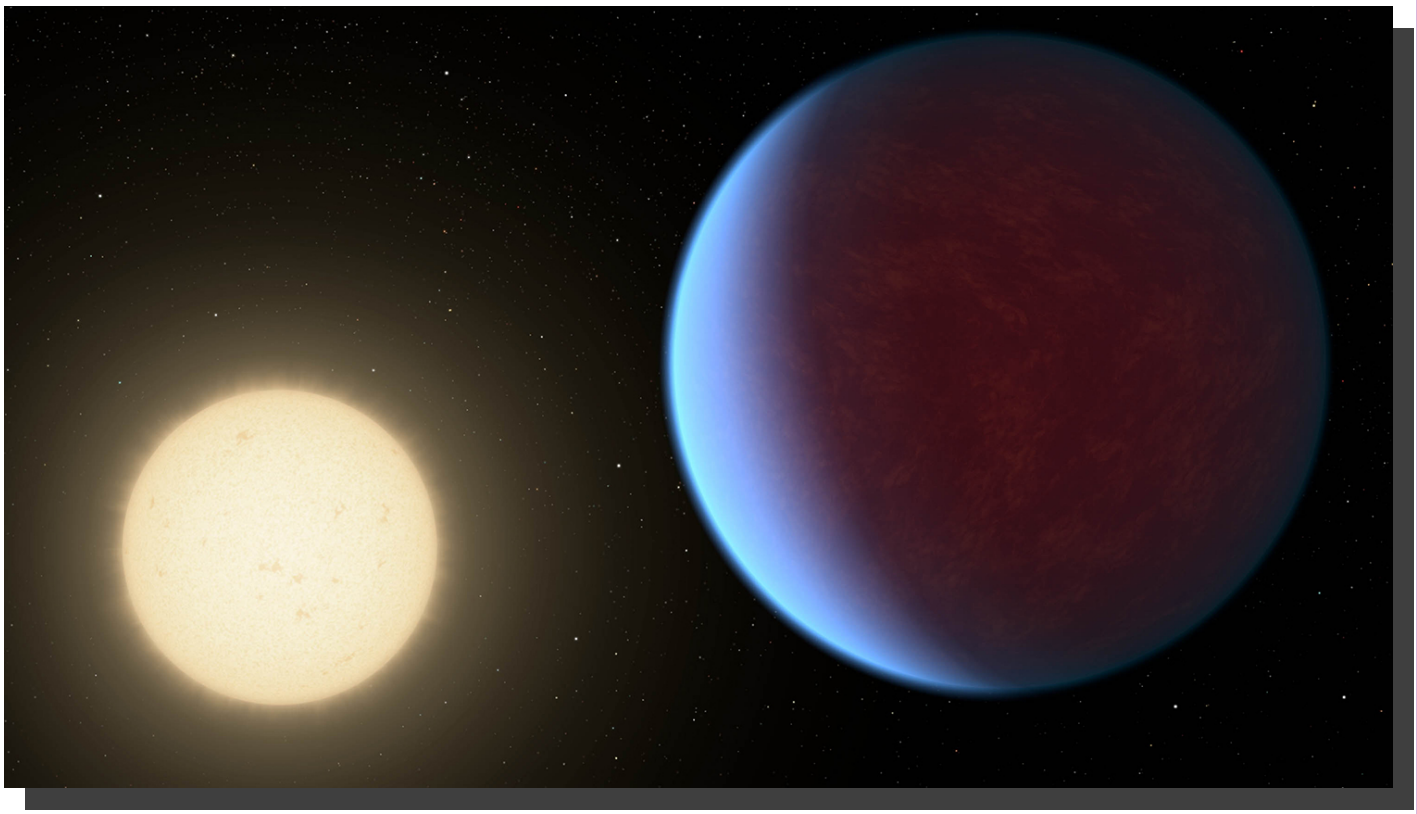
Cancer the Crab is a dim constellation, yet it contains one of the most beautiful and easy-to-spot star clusters in our sky: the **Beehive Cluster**. Cancer also possesses one of the most studied exoplanets: the superhot super-Earth, **55 Cancri e**.

Find **Cancer's** dim stars by looking in between the brighter neighboring constellations of Gemini and Leo. Don't get frustrated if you can't find it at first, since Cancer isn't easily visible from moderately light polluted

areas. Once you find Cancer, look for its most famous deep-sky object: the **Beehive Cluster**! It's a large open cluster of young stars, three times larger than our Moon in the sky. The Beehive is visible to unaided eyes under good sky conditions as a faint cloudy patch, but is stunning when viewed through binoculars or a wide-field telescope. It was one of the earliest deep-sky objects noticed by ancient astronomers, and so the Beehive has many other names, including Praesepe, Nubilum, M44, the Ghost, and Jishi qi. Take a look at it on a clear night through binoculars. Do these stars look like a hive of buzzing bees? Or do you see something else? There's no wrong answer, since this large star cluster has intrigued imaginative observers for thousands of years.

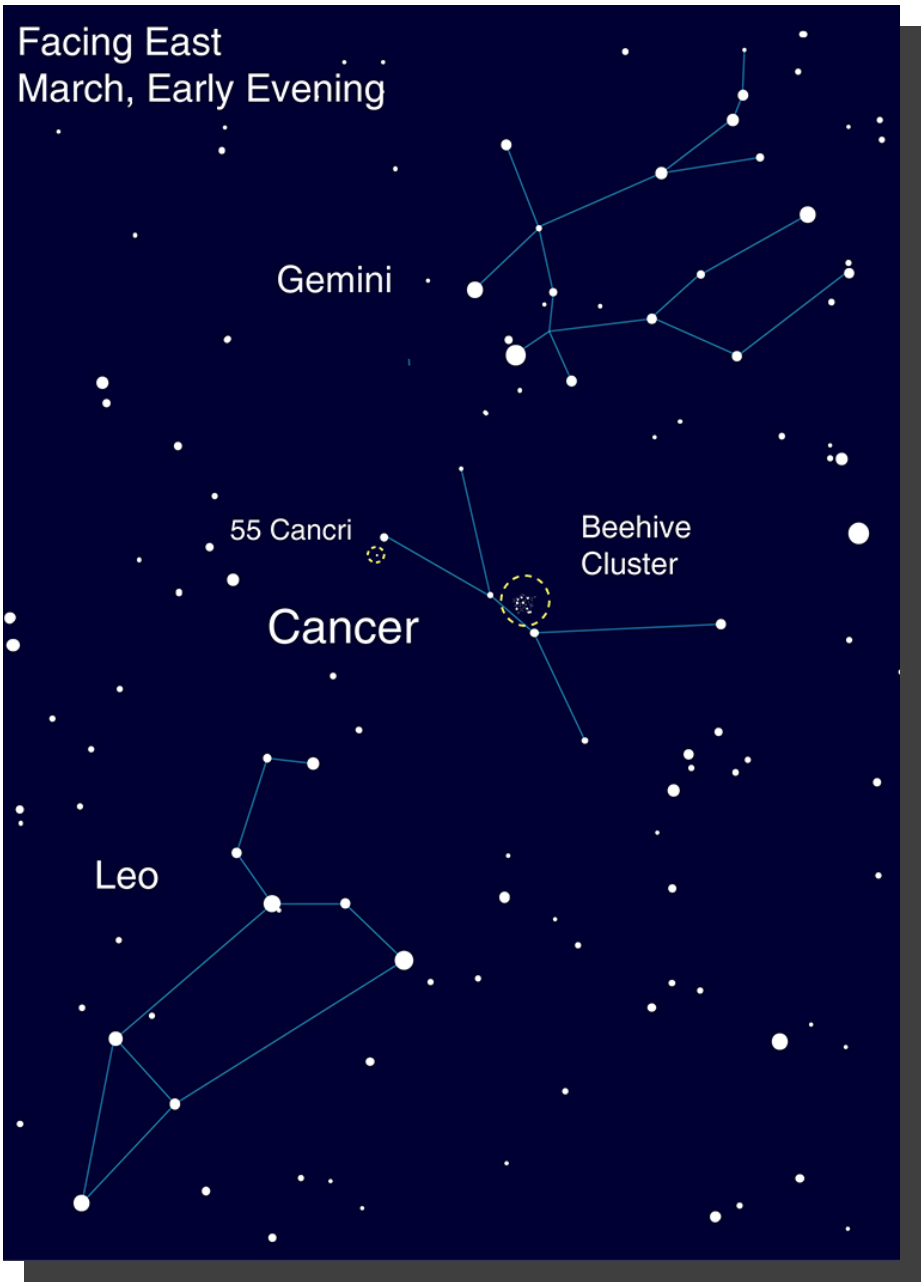
55 Cancri is a nearby binary star system, about 41 light years from us and faintly visible under excellent dark sky conditions. The larger star is orbited by at least five planets including **55 Cancri e**, (a.k.a. Janssen, named after one of the first telescope makers). Janssen is a "super-

(Continued on page 13)



Artist concept of 55 Cancri e orbiting its nearby host star. Find details from the Spitzer Space Telescope's close study of its atmosphere at: bit.ly/spitzer55cancrie and the Hubble Space Telescope's observations at bit.ly/hubble55cancrie Credit: NASA/JPL-Caltech

Night Sky Notes (Cont'd)



Look for Cancer in between the "Sickle" or "Question Mark" of Leo and the bright twin stars of Gemini. You can't see the planets around 55 Cancri, but if skies are dark enough you can see the star itself. Can you see the Beehive Cluster?

(Continued from page 12)

earth," a large rocky world 8 times the mass of our Earth, and orbits its star every 18 hours, giving it one of the shortest years of all known planets! Janssen was the first exoplanet to have its atmosphere successfully analyzed. Both the Hubble and recently-retired Spitzer space telescopes confirmed that the hot world is enveloped by an atmosphere of helium and hydrogen with traces of hydrogen cyanide: not a likely place to find life, especially since the surface is probably scorching hot rock. The NASA Exoplanet Catalog has more details about this and many other exoplanets at bit.ly/nasa55cancrie.

How do astronomers find planets around other star systems? The Night Sky Network's "How We Find Planets" activity helps demonstrate both the transit and wobble methods of exoplanet detection: bit.ly/findplanets. Notably, 55 Cancri e was discovered via the wobble method in 2004, and then the transit method confirmed the planet's orbital period in 2011!

Want to learn more about exoplanets? Get the latest NASA news about worlds beyond our solar system at nasa.gov.

Big Telescopes (Cont'd)

(Continued from page 9)

alerts could disrupt everyday research. Gemini, for example, is partly funded by international partners, and "not all partners are turned on by time-domain," says Gemini's Andy Adamson. In this fast-moving new world, time-domain astronomers may end up alienating others who have long-planned observations. "We're working out the politics," Howell says.

And despite all these efforts, there's still widespread concern among astronomers that the sheer volume of Rubin Observatory alerts will swamp them. LCO's Rachel Street led the development of a toolkit for designing TOMs, but she says, "We're already saturated with more targets than we can possibly observe and it's going to get worse."

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).

Blue Dot (Cont'd)

(Continued from page 3)

that have not yet traveled to the stars, wondering if they are alone in the eternal cosmic void? The vastness of the cosmos is both humbling and awe-inspiring. To see our planet in the context of the Pale Blue Dot is a sobering reminder of how insignificant a role we play in the immense cosmic tapestry. Here's to Carl Sagan, a man ahead of his time whose wisdom and humility touched the lives of and inspired millions. Perhaps, somewhere out there, he is inspiring a whole new race of beings.

References

Sagan, C. (1997). *A pale blue dot: A vision of the human future in space.* Ballantine.

CCAS Membership Information and Society Financials

Treasurer's Report

by Don Knabb

Feb. 2020 Financial Summary

Beginning Balance	$1034
Deposits	$90
Disbursements	-$293
Ending Balance	$831

New Member Welcome!

Welcome new CCAS members Fran Murphy from Devon, Steve Kraynik from West Chester, and Bernard Tronel from Chester Springs. 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**

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 LIGHTING COUNCIL

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!

Starry Night Lights

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

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

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

★ ★ ★ ★ ★

Spectrum Scientifics
Quality Science Products for All Ages

Located in Manayunk, Spectrum Scientifics educates and entertains customers with an array of telescopes, microscopes, binoculars, science toys, magnets, labware, scales, science instruments, chemistry sets, and much more.

4403 Main Street
Philadelphia, PA 19127

Phone: **215-667-8309**
Fax: **215-965-1524**

Hours:
Tuesday thru Saturday: 10AM to 6PM
Sunday and Monday: 11AM to 5PM

http://www.spectrum-scientifics.com

CCAS Information Directory

CCAS Lending Telescopes

Contact Don Knabb to make arrangements to borrow one of the Society's lending telescopes. CCAS members can borrow a lending telescope for a month at a time; longer if no one else wants to borrow it after you. Don's phone number is 610-436-5702.

CCAS Lending Library

Contact our Librarian, Barb Knabb, to make arrangements to borrow one of the books in the CCAS lending library. Copies of the catalog are available at CCAS meetings, and on the CCAS website. Barb's phone number is 610-436-5702.

Contributing to *Observations*

Contributions of articles relating to astronomy and space exploration are always welcome. If you have a computer, and an Internet connection, you can attach the file to an e-mail message and send it to: **newsletter@ccas.us**

Or mail the contribution, typed or handwritten, to:

Dr. John C. Hepler
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**.

CCAS Website

Dr. John Hepler is the Society's Webmaster. You can check out our Website at:

http://www.ccas.us

Dr. Hepler welcomes any additions to the site by Society members. The contributions can be of any astronomy subject or object, or can be related to space exploration. The only requirement is that it is your own work—no copyrighted material! Give your contributions to Dr. Hepler at (410) 639-4329 or e-mail to webmaster@ccas.us

CCAS Purpose

The Chester County Astronomical Society was formed in September 1993, with the cooperation of West Chester University, as a non-profit organization dedicated to the education and enjoyment of astronomy for the general public. The Society holds meetings (with speakers) and observing sessions once a month. Anyone who is interested in astronomy or would like to learn about astronomy is welcome to attend meetings and become a member of the Society. The Society also provides telescopes and expertise for "nights out" for school, scout, and other civic groups.

CCAS Executive Committee

For further information on membership or society activities you may call:

President:	Dave Hockenberry 610-558-4248
Vice President:	Pete Kellerman 610-873-0162
ALCor, Observing, & Treasurer:	Don Knabb 610-436-5702
Secretary:	Beatrice Mazziotta 610-933-2128
Librarian:	Barb Knabb 610-436-5702
Program:	Bruce Ruggeri 484-883-5092
Education:	Don Knabb 610-436-5702 Dennis O'Leary 610-701-8042
Webmaster & Newsletter:	John Hepler 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**

*Sky & Tele*scope 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.**