Observations

A Monthly Publication Of The CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 28, No. 11 ***Three-Time*** *Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016* *November 2020*

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Moon Over ISS

This image captured the International Space Station as it transited the waning gibbous moon on November 3, 2020, just one day after the space station's 20th anniversary.
Image Credit & Copyright: Derek Demeter (Emil Buehler Planetarium)

October 2020 Dates

1st • Daylight-Saving time ends, 2:00 a.m. ET

8th • Last Quarter Moon, 8:46 a.m. EST

15th • New Moon, 12:07 a.m. EST

17th • The Leonid meteor shower peaks in the pre-dawn hours

18th • Jupiter and Saturn are to the upper left of the Moon

21st • First Quarter Moon, 11:45 p.m. EST

30th • Full Moon, the Full Beaver Moon or the Freezing Rivers Moon, 4:29 a.m. EST

CCAS Upcoming Nights Out

In addition to our monthly observing sessions at the Myrick Conservancy Center, BRC, 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.

☼ Monthly observing sessions at Myrick Conservancy Center, BVA, have been cancelled until further notice as part of the national effort to limit the spread of the coronavirus. For more information about future observing opportunities, contact our Observing Chair, Don Knabb.

Autumn / Winter Society Events

November 2020

1st • Daylight Saving Time ends, 2:00 a.m. EST. Turn clocks back one hour.

12th • The von Kármán Lecture Series: Failure *is* an Option: The Agony & Inspiration of Defeat. Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

17th • CCAS Monthly Meeting, ONLINE via Zoom. **The meeting starts at 5:00 p.m.** Guest Speaker: Dr. Giovanna Tinnetti, Professor of Planetary Science, University College London and Program Leader for ESA ARIEL Mission. Her presentation is entitled, "ARIEL and Brave New Worlds: The Planets in Our Galaxy."

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

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

December 2020

13th-14th • Geminid Meteor shower peaks with approximately 75 meteors per hour. Look to the northeast for the point of origin of the shower.

20th • Open call for articles and photographs for the January 2021 edition of Observations.

21st • Winter Solstice, 5:02 A.M. EST, marking the first day of winter in the Northern Hemisphere.

26th • Deadline for newsletter submissions for the January 2021 edition of Observations.

Minutes from the October 13, 2020, CCAS Monthly Meeting

by Bea Mazziotti, CCAS Secretary

- Dave Hockenberry welcomed members and guests to the October 2020 CCAS meeting. Zoom and YouTube were the platforms. Attendance was great with about 80 between both. Dave confirmed that BVA observing sessions are still on hold.
- Don Knabb spoke about Mars which was in opposition on October 13th and just 39 million miles from earth (it will not be this close again until 2035). It was shining brightly in the night sky and there were several clear nights that allowed for very good telescopic viewing. For a 3D tour of Mars (as well as the rest of the known universe) download the ***Mitaka*** app. https://mitaka.apponic.com/
- Bruce Ruggeri introduced the evening's speaker, club member and NASA Solar System Ambassador, John Conrad. The title of his presentation was "Global Climate Change: The View from Space."
  - Utilizing NASA's 'one stop shop' for relevant FACTS, John guided members through climate changes that have occurred since the baseline study years 2013 through 2018.
  - The new data indicates worsening situations in the atmosphere - increasing greenhouse gases and methane; on land - melting ice-caps, deadlier fires, severe droughts and more frequent catastrophic weather events; and in the sea - more pollution, warmer waters, rising sea levels and coastal/island population displacement.
  - He presented a picture of the very challenging times at hand and stressed the need for awareness, continued study and a commitment to finding solutions. Though quite sobering, the presentation was timely, and served to bring those of us not current on the data up to 'NASA' speed.
  - Thank you John and all those involved in gathering, recording and sharing this critical information. Follow the ***NASA*** link to see the data. https://climate.nasa.gov/

November 2020 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

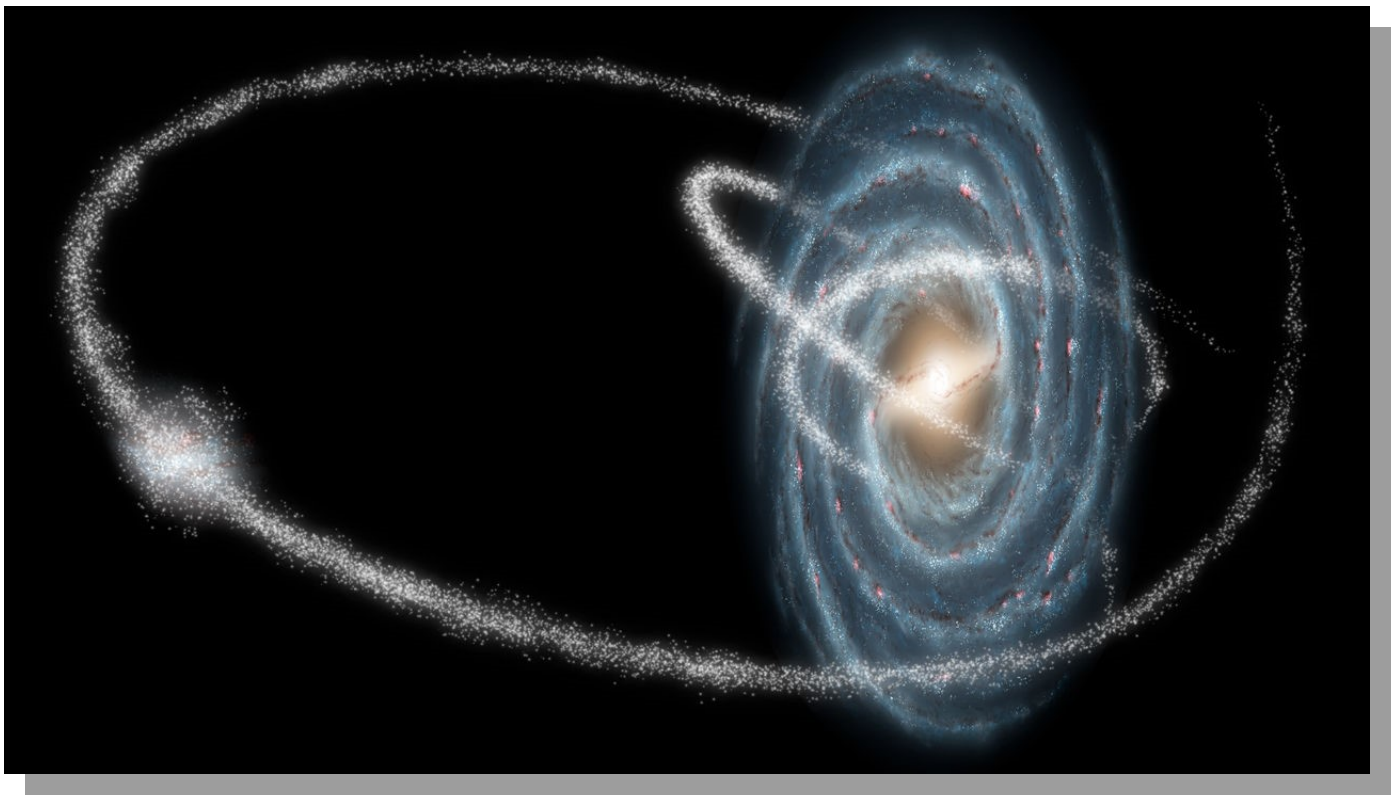
Our next meeting will be held on **October 17, 2020, starting at 5:00 p.m.** The meeting will be held ONLINE via Zoom.us. Guest Speaker: Dr. Giovanna Tinnetti, Professor of Planetary Science, University College London and Program Leader for ESA ARIEL Mission. Her presentation is entitled, "ARIEL and Brave New Worlds: The Planets in Our Galaxy." See page 10 for more details about our speaker and her research.

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 2020-2021 season and beyond. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

Milky Way's Shredded Companion Provides Clues about Dark Matter

by Adam Mann, Science Magazine



An artist's illustration shows streams of stars pulled from a companion galaxy circling the Milky Way. Similar streams originating from the Sagittarius dwarf galaxy can help reveal the shape of dark matter in our cosmic vicinity. NASA/JPL-CALTECH/R. HURT (SSC/CALTECH)

The Milky Way hasn't been kind to the Sagittarius dwarf galaxy. Located some 70,000 light-years away, the bundle of stars has been shredded and stretched into a filamentous stream by the gravity of the Milky Way. Now, scientists have mapped Sagittarius in exquisite detail, and they've used that map to provide a long-sought picture of the mysterious dark matter halo in which our Galaxy resides.

First spotted in 1994, Sagittarius is one of the Milky Way's closest companions. Across the ages, gravitational forces have ripped it apart, scattering stars into a stream that now completely encircles the Milky Way. That makes Sagittarius a sensitive scale for measuring the distribution of mass in our Galaxy, which includes not just the visible disk of stars, but also an unseen halo of dark matter, thought to comprise up to 90% of the total mass.

In principle, researchers could monitor the orbits of nearby star clusters and galaxies and use the laws of physics to calculate how much matter is tugging on them. But their motion across the sky is too slow to help within human lifetimes. The Sagittarius stream, on the other hand, already embodies those motions. "It's essentially like an orbit drawn for you on the sky," says Vasily Belokurov, an astronomer at the University of Cambridge.

For the past quarter-century, astronomers have tried to use maps of Sagittarius to calculate the shape of the Milky Way's dark matter halo. But identifying the stream from our vantage in the Milky Way's disk is challenging, and astronomers have come up with halo shapes as varied as eggs and rugby footballs.

Then along came the European Space Agency's Gaia satellite. Two years ago, the probe began to release its ultraprecise maps of the stars in the Milky Way—and stars in the surrounding streams. With the data, Belokurov and his colleagues could tell that the Sagittarius stream was being yanked indirectly by another gravitational player: that of the galaxy's largest companion, the Large Magellanic Cloud (LMC), which weighs between one-fifth and one-third as much as the Milky Way itself.

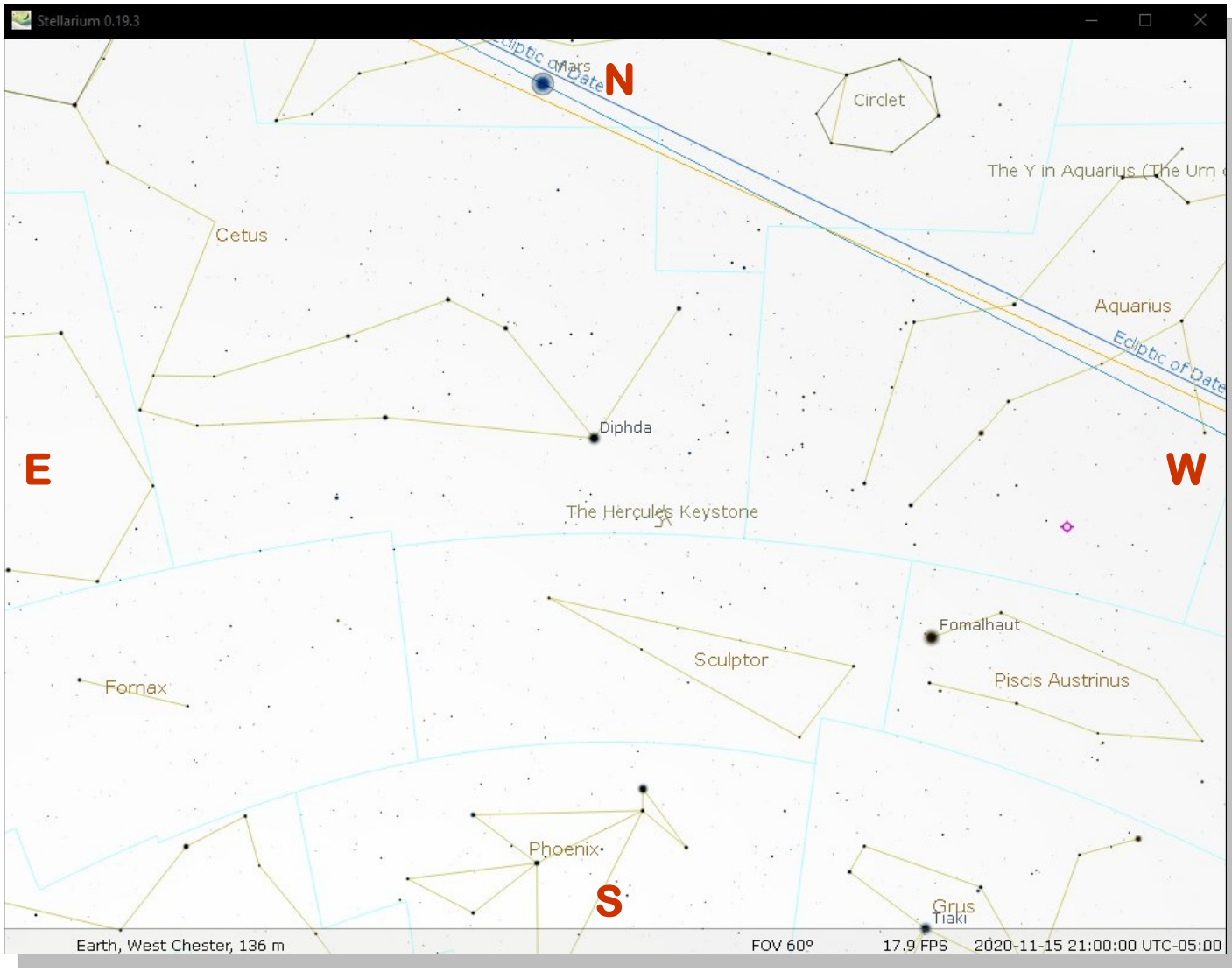
Rewinding the clock, the researchers modeled the pas de

(Continued on page 7)

The Sky Over Chester County

November 15, 2020 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.



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
11/01/2020	6:03 a.m. EST	6:32 a.m. EST	4:59 p.m. EST	5:27 p.m. EST	10h 27m 24s
11/15/2020	6:19 a.m. EST	6:48 a.m. EST	4:45 p.m. EST	5:14 p.m. EST	9h 57m 41s
11/30/2020	6:34 a.m. EST	7:04 a.m. EST	4:37 p.m. EST	5:07 p.m. EST	9h 33m 30s

Moon Phases					
Last Quarter	11/08/2020	8:46 a.m. EST	New Moon	11/15/2020	12:07 a.m. EST
First Quarter	11/21/2020	11:45 p.m. EST	Full Moon	11/30/2020	4:29 a.m. EST

November 2020 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

1	**Daylight-Saving time ends, 2:00 a.m. ET**
2	**The Moon is near Aldebaran in the east**
8	**Last Quarter Moon, 8:46 a.m. EST**
15	**New Moon, 12:07 a.m. EST**
17	**The Leonid meteor shower peaks in the pre-dawn hours**
18	**Jupiter and Saturn are to the upper left of the Moon**
19	**Jupiter and Saturn are to the upper right of the Moon**
21	**First Quarter Moon, 11:45 p.m. EST**
23	**The Lunar Straight Wall is visible**
25	**The Moon is near Mars**
30	**Full Moon, the Full Beaver Moon or the Freezing Rivers Moon, 4:29 a.m. EST**
30	**A penumbral lunar eclipse occurs at 4:30 a.m., but is hard to notice**

The best sights this month: Mars continues to rule the evening sky, with Jupiter and Saturn providing an opening act as the sky turns dark. Also this month we have the Leonid meteor shower and the Moon will not interfere with the show, which can include fast moving "shooting stars" that leave a luminous trail!

Mercury: If you rise extra early this is an excellent month to see Mercury in the pre-dawn sky. On November 10th Mercury rises an hour and a half before the Sun and shines at -0.6 magnitude.

Venus: Our sister planet rises 3 hours before the Sun and shines at a dazzling magnitude -3.9.

Mars: Although Mars is a bit smaller and dimmer from its peak in October it still rules the evening sky. Mars is highest in the sky when it transits the meridian, the imaginary line that runs from north to south, around 10 p.m. early in the month and as early as 8:30 by month's end. Don't miss this chance to see Mars up close and personal!

Jupiter: Jupiter and Saturn are near the meridian at sunset, but are much lower in the sky then Mars, so they will not appear as clear in a telescope. But they are still a glorious site in the eyepiece of a telescope.

Saturn: Saturn continues to follow Jupiter across the sky and the two gas giants get closer as each night passes, heading toward December when we will see their closest conjunction in centuries!

Uranus and Neptune: Both distant gas giants are in good viewing position during the evening hours with Neptune on the meridian about 2 hours after sunset and Uranus following a couple of hours later. I saw both planets in October and Uranus is easy to recognize as a greenish-blue disk while Neptune looks more like a small star with a slight blue tint.

The Moon: Full moon occurs on November 30th. This full Moon is the Full Beaver Moon. For Native Americans, the time of this full moon was the time to set beaver traps before the swamps froze, to ensure a supply of warm winter furs. It is sometimes also referred to as the Frosty Moon, but I don't think they were referring to the snowman, even though the Moon kind of looks like the head of a snowman. Native Canadian tribes called this the Rivers Freezing Moon.

A penumbral eclipse occurs on November 30th, but the shadow of the Earth on the Moon is only a "glancing blow" and will be difficult to notice in the pre-dawn sky.

Constellations: During November the Great Square of Pegasus is at "center stage". To the left of the Great Square, sweeping up to the left is the constellation Andromeda. Use your binoculars to find our neighbor galaxy, which is also named Andromeda. It is a large fuzzy spot located between the constellation Andromeda and Cassiopeia. And by 9 p.m. the beautiful Pleiades, that really little dipper, is rising in the east ahead of Taurus the Bull. Capella in Auriga is a bright point of light upper left of Taurus. As it gets a bit later our old friend Orion returns from his summer vacation.

Messier/deep sky: I always look forward to autumn for viewing the Double Cluster between Cassiopeia and Perseus. This is a really nice binocular object. Rising behind Perseus is the constellation

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Astronomy Weather Resources

by Don Knabb

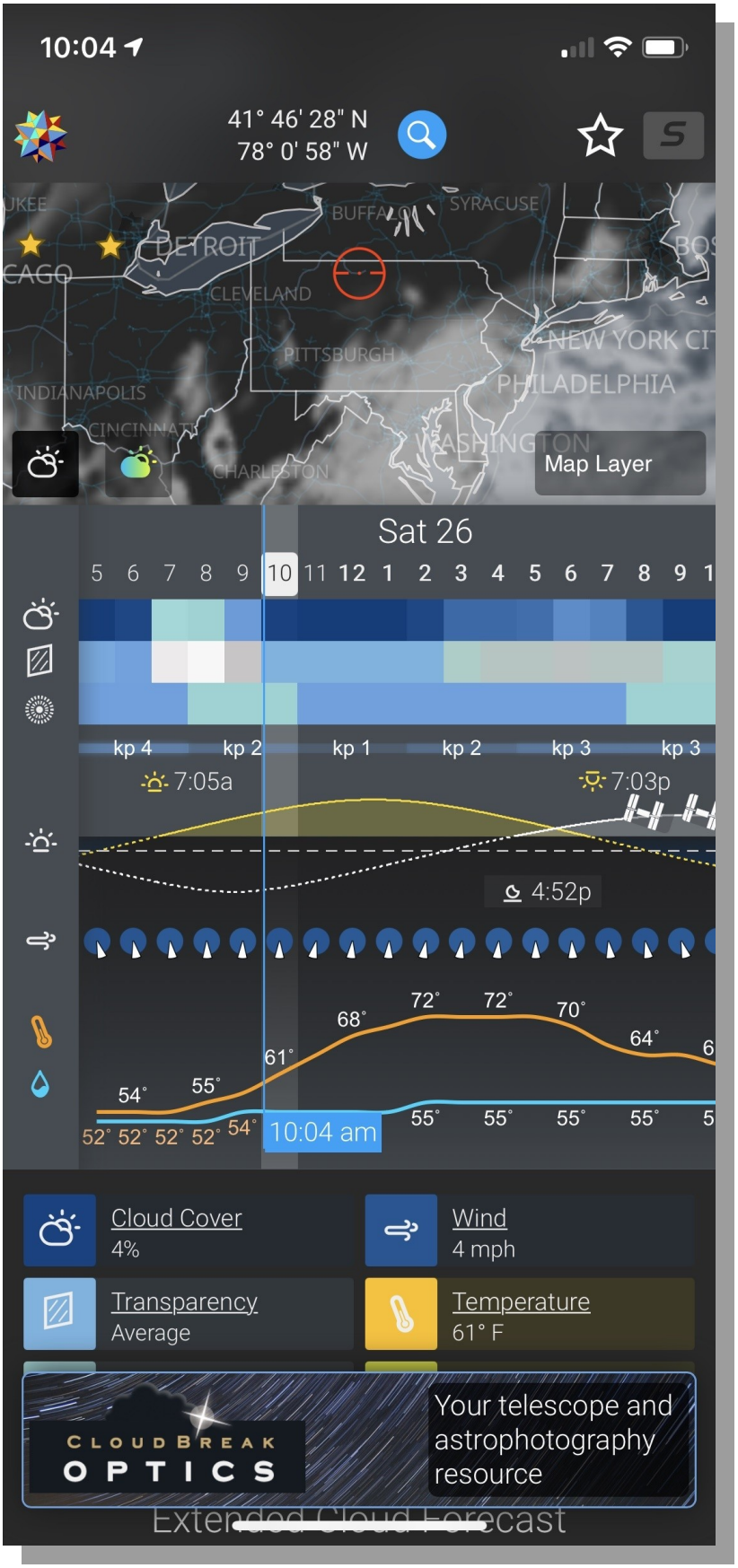
There are several weather resources that I routinely use to determine the conditions we can expect for stargazing. I use the Clear Sky Chart that has a link on the CCAS website and the National Weather Service website. But two weather resources that I was made aware of this year are the Meteoblue website and an iPhone app and website called Astrospheric.

Meteoblue is a very complete weather forecasting website that also provides information on astronomical seeing in a chart that lists a great deal of information. The most important information is clouds and seeing. Three cloud layers are shown, low, medium, and high. Seeing is shown in arc seconds and two indexes. On the opposite page is a screen capture from the Meteoblue website.

Astrospheric is an excellent iPhone app that provides a map of cloud cover and a graph of cloud cover, transparency and seeing. Astrospheric also has a webpage with all the same information as the app. On this page is a screen capture from the iPhone app.

If you would like to learn more about the websites and app, you can find them at the following websites:

- Meteoblue can be found at https://www.meteoblue.com
- Astrospheric can be found at https://www.astrospheric.com or the App Store



Shredded Companion (Cont'd)

(Continued from page 3)

trois over 3 billion years—and found that both the LMC and Sagittarius swooped close to the Milky Way, as recently as 50 million years ago. The LMC's significant heft pulled our Galaxy, which then induced a force affecting Sagittarius. That helps explain a peculiar sideways tug on the Sagittarius stream, say Belokurov and his colleagues, who report the results in a paper posted to the preprint server arXiv. Solving this puzzle made it easier to use the Sagittarius stream as a scale and to infer the shape of the galaxy's dark matter halo. "It's the lock you need before you can unlock the main lock," Belokurov says.

The team's results suggest the distribution of dark matter around the Milky Way is complex. Closer to the disk of our Galaxy, where the dark matter is expected to be most dense, the halo takes the shape of a squashed sphere—a bit like a pumpkin, with the pumpkin's top pointing out of the galactic plane. But farther out, about 65,000 light-years from the galactic center, the shape of the halo changes: The pumpkin tips over on its side, so that its stem is aligned with the disk of the galaxy.

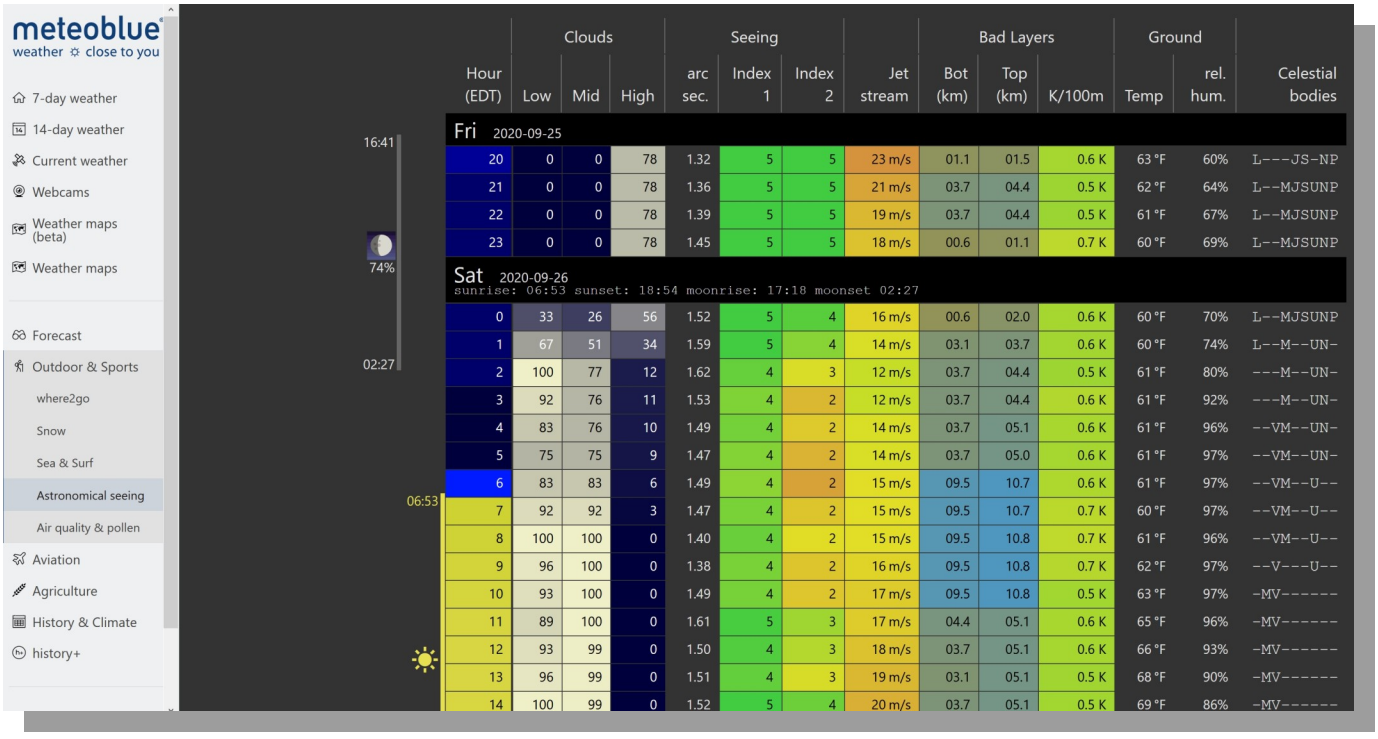
The twists and turns of this convoluted shape could provide hints as to how the Milky Way's halo is connected to the local network of dark matter filaments, called the cosmic web, that strings together neighboring large galaxies, Belokurov says.

Kathryn Johnston, an astronomer at Columbia University who was not involved in the work, agrees. "We've never been able to see anything beyond the simplest shape of the dark matter halo," she says. "This is a hint of large-scale global deformation, and that's very exciting."

Gaining even this limited view of the Milky Way's dark matter halo is important, Belokurov says, because it's the closest halo we have access to: It could help researchers understand how light or heavy dark matter particles might be, and improve models that trace the evolution of the cosmic web from the big bang to today.

Read the entire article at doi:10.1126/science.abf1744

Weather Resources (Cont'd)



A screen capture of the Meteoblue website. Taken from https://www.meteoblue.com

Through the Eyepiece: The Triangulum Galaxy, Messier 33

by Don Knabb, CCAS Treasurer & Observing Chair

Image credit: Stellarium.org

During November the skies are clear but it is not too cold yet, so this is a great time of year to seek out some of the faint fuzzies that would leave you with chattering teeth and frozen toes if you try to find them when winter settles in. One such object on my list for this time of year is m33, the Triangulum Galaxy.

The constellation Triangulum is easy find using some of the fall constellations as guides. If you first find the Great Square of Pegasus and then find the Pleiades, just look between them for a small constellation in the shape of a triangle (I suppose you could have guessed its shape). Then use the sky map to star hop to the area of M33.

Don't expect M33 to stand out in the sky. Although it is considered to be a naked eye object under dark skies, those will need to be very dark skies indeed! M33 is a very large object in the night sky and it has low surface brightness. The galaxy covers approximately a full degree of sky which is about 1/3 of the field of view of average binoculars and is typically too large for an average telescope eyepiece. So grab your binoculars and lie back, let your eyes adjust for

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Eyepiece (Cont'd)

Image credit: CCAS Member Pete LaFrance

(Continued from page 8)
about a half an hour and stare into the abyss to seek out this faint fuzzy!

If you use a telescope to find M33 be sure to select your lowest power (highest number) eyepiece, such as a 32mm or 40mm eyepiece. Any light pollution or moonlight will make finding the Triangulum Galaxy very difficult.

Some sources refer to M33 as the Pinwheel Galaxy, but that name is more generally given to Messier 101. The Triangulum Galaxy is the third-largest member of the Local Group of galaxies, which includes the Milky Way Galaxy, the Andromeda Galaxy and about 30 other smaller galaxies. It is one of the most distant permanent objects that can be viewed with the naked eye under ideal conditions. The picture above taken by CCAS member Pete LaFrance shows the pinwheel structure of this galaxy.

While the Triangulum Galaxy was probably first observed by Hodierna before 1654 (back when skies were dark), it was independently rediscovered by Charles Messier, and cataloged by him on August 25, 1764. Messier writes: "I have discovered a nebula between the head of the northern Fish and the large Triangle."

Sir William Herschel was an astronomically curious soul and studied M33 intently on his own, writing: "There is a suspicion that the nebula consists of exceedingly small stars. With this low power it has a nebulous appearance." He would continue to observe this grand galaxy again and again over the years, cataloging its various regions with their own separate numbers and keeping track of his findings: "The stars of the cluster are the smallest points imaginable."

Herschel also cataloged the Triangulum Galaxy's brightest and largest nebula separately

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Our November 2020 Guest Speaker: Dr. Giovanna Tinnetti

by Bruce Ruggeri, CCAAS Program Chair

Our guest speaker for our November 2020 meeting on Tuesday, November 17, 2020, is Dr. Giovanna Tinnetti, Professor of Planetary Science, University College London and Program Leader for ESA ARIEL Mission. Her presentation is entitled, "ARIEL and Brave New Worlds: The Planets in Our Galaxy."

Dr. Giovanna Tinetti, Professor of Planetary Science, University College London and Program Leader for ESA ARIEL Mission

Presentation Synopsis

The Earth is special to us – it's our home. But is it really special as a planet? Every star we can see in the night sky is likely to be orbited by planets. There are probably a thousand billion planets in our galaxy alone.

In about twenty years, over 4300 "exoplanets" have been discovered in distant solar systems. There are planets completing a revolution around their mother star in less than one day, as well as planets orbiting two or even three stars or moving on trajectories so eccentric as to resemble comets. Some of them are freezing cold, some are so hot that their surface is molten. But beyond that our knowledge falters: What are they made of? How did they form? What's the weather like there? Are they habitable?

Finding out why are these new worlds as they are and what is the Earth's place in our galaxy and –ultimately– in the universe, is one of the key challenges of modern astrophysics.

Speaker Bio

Professor Giovanna Tinetti is the Head of Group of Astrophysics at University College London and Director of the UCL Centre for Space Exochemistry Data at Harwell. She is the Principal Investigator of Ariel, the European Space Agency's next medium-class (M4) science mission. She is also co-founder and co-director of Blue Skies Space Ltd, which aims at creating new opportunities for science space satellites.

Select appointments and achievements include Principal Investigator of the European Research Council-funded program Exo-Lights, Cattedra Enrico Fermi 2019 - La Sapienza University, Rome and Institute of Physics Moseley Medal 2011.

Awarded a PhD in Theoretical Physics from the University of Turin in Italy in 2003, Giovanna Tinetti has continued her academic career as NASA Astrobiology Institute Fellow at Caltech/JPL and then as European Space Agency external Fellow in Paris, before moving to UCL in 2007 as STFC Aurora and then Royal Society URF Fellow.

Prof. Tinetti has authored / co-authored over 200 research papers and has delivered over 260 talks, seminars and public lectures internationally.

Observing (Cont'd)

(Continued from page 5)

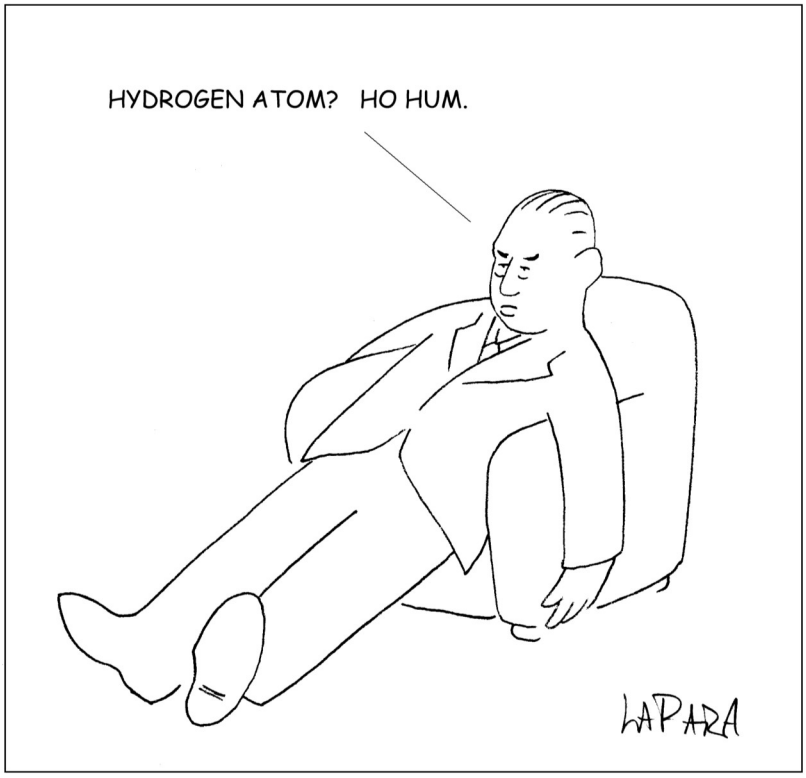
Auriga and its three star clusters M36, M37 and M38. If you stay up for late night observing you can get an early view of M42, the Great Orion Nebula.

Comets: There are no bright comets visible during November.

Meteor showers: The Leonid meteor shower peaks during the predawn hours of November 17th. We can expect up to 15 fast moving meteors per hour and this is a great time to see meteors because the Moon will have set early. The Leonids are considered the fastest of any meteors so the chance of seeing a bright fireball is good, and many will leave a luminous trail!

Classic La Para

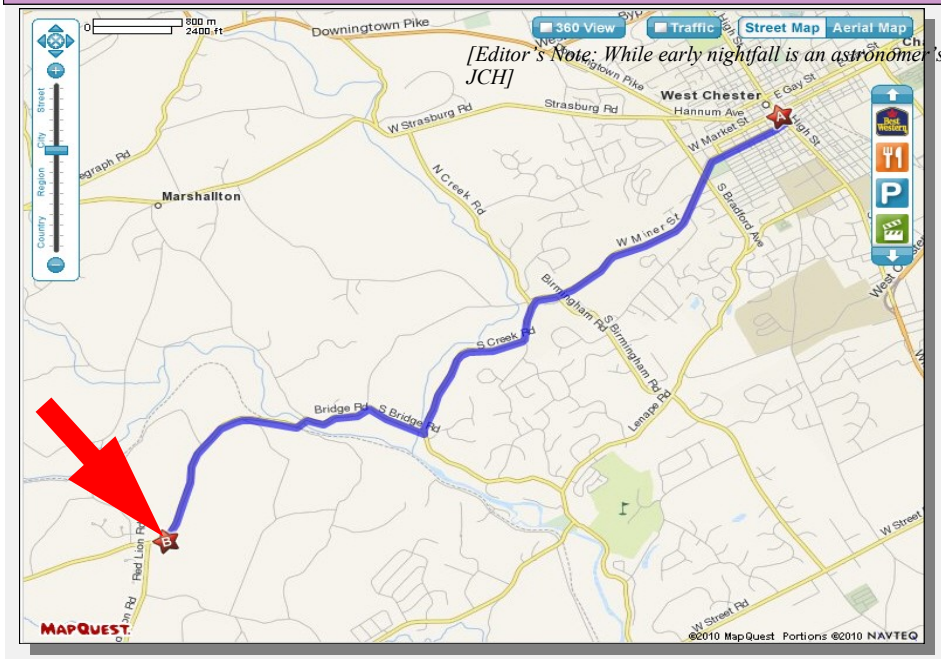
by Nicholas La Para



NEILS BOHR IN HIS LOWEST ENERGY STATE.

CCAS Directions

[Editor's Note: While early nightfall is an astronomer's friend, for some of us the effect is less energetic. JCH]



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 Night Sky Notes: The International Space Station—20 Continuously Crewed Years of Operation

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.

Did you know that humans have been living in the International Space Station, uninterrupted, for twenty years? Ever since the first crew members docked with the International Space Station (ISS) in November 2000, more than 240 people have visited this outpost, representing 19 countries working together. They have been busy building, upgrading, and maintaining the space station - while simultaneously engaging in cutting-edge scientific research.

The first modules that would later make up the ISS were launched into orbit in 1998: the Russian Zarya launched via a Proton-K rocket, and the US-built Unity module launched about a week and a half later by the Space Shuttle Endeavour. Subsequent missions added vital elements and modules to the Space Station before it was ready to be inhabited. And at last, on November 2, 2000, Expedition-1 brought the first three permanent crew members to the station in a Russian Soyuz capsule: NASA astronaut William M. Shepherd and Russian cosmonauts Sergei Krikalev and Yuri Gidzenk. Since then, an entire generation has been born into a world where humans continually live and work in space! The pressurized space inside this modern engineering marvel is roughly equal to the volume of a Boeing 747, and is sometimes briefly shared by up to 13 individuals, though the average number of crew members is 6. The unique microgravity environment of the ISS means that long-term studies can be performed on the space station that can't be performed anywhere on Earth in many fields including

The ISS photobombs the Sun in this amazing image taken during the eclipse of August 21, 2017, from Banner, Wyoming. Photo credit: NASA/Joel Kowsky More info: bit.ly/eclipseiss

Night Sky Notes (Cont'd)

A complete view of the ISS as of October 4, 2018, taken from the Soyuz capsule of the departing crew of Expedition 56 from their Soyuz capsule. This structure was built by materials launched into orbit by 37 United States Space Shuttle missions and 5 Russian Proton and Soyuz rockets, and assembled and maintained by 230 spacewalks, with more to come! Credit: NASA/Roscosmos More info: bit.ly/issbasics

(Continued from page 12)

space medicine, fluid dynamics, biology, meteorology and environmental monitoring, particle physics, and astrophysics. Of course, one of the biggest and longest experiments on board is research into the effects of microgravity on the human body itself, absolutely vital knowledge for future crewed exploration into deep space.

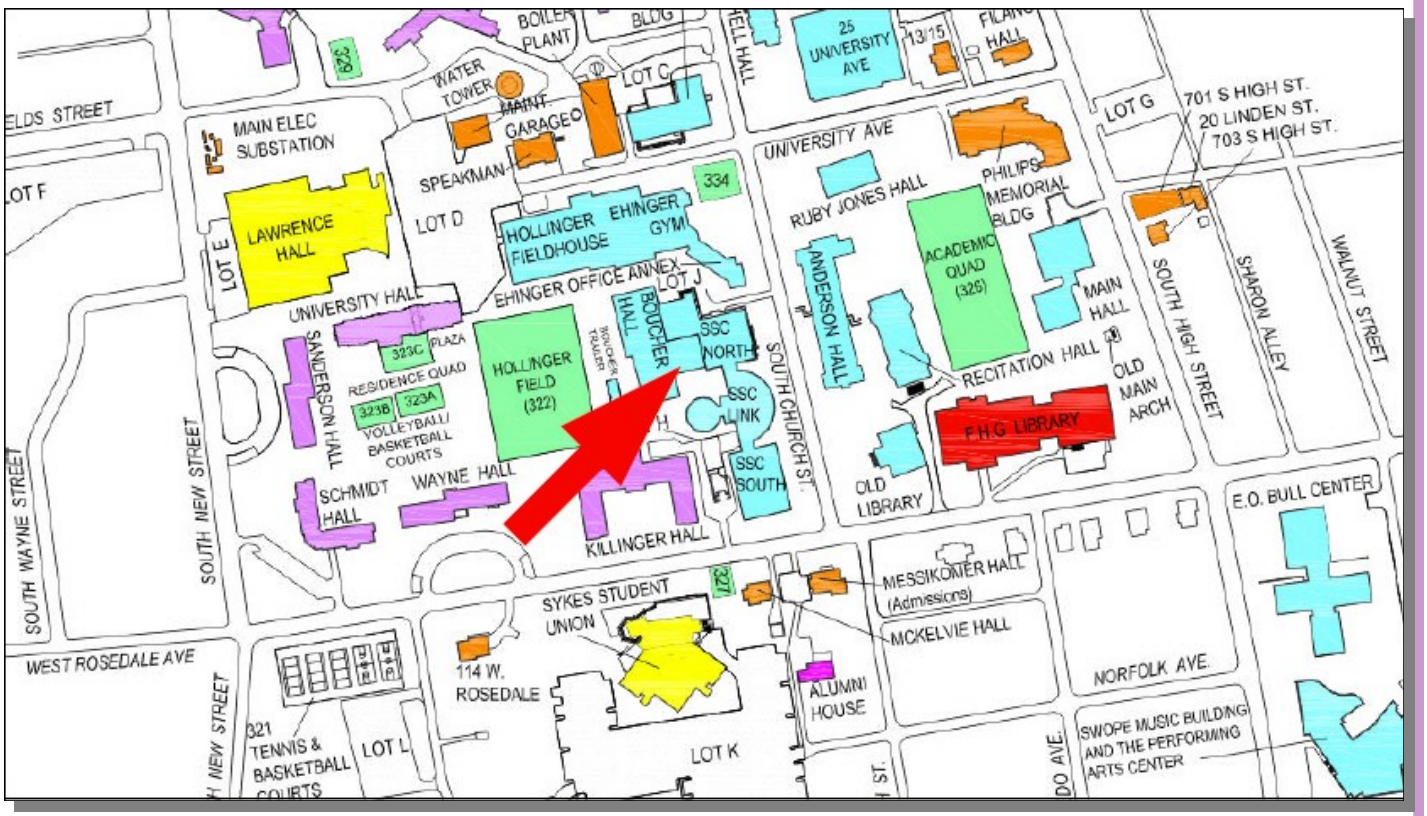
Stargazers have also enjoyed the presence of the ISS as it graces our skies with bright passes overhead. This space station is the largest object humans have yet put into orbit at 357 feet long, almost the length of an American football field (if end zones are included). The large solar arrays – 240 feet wide - reflect quite a bit of sunlight, at times making the ISS brighter than Venus to observers on the ground! Its morning and evening passes can be a treat for stargazers and can even be observed from brightly-lit cities. People all over the world can spot the ISS, and with an orbit only 90 minutes long, sometimes you can spot the station multiple times a night. You can find the next ISS pass near you and receive alerts at sites like NASA's Spot the Station website (spotthestation.nasa.gov) and stargazing and satellite tracking apps.

Hundreds of astronauts from all over the world have crewed the International Space Station over the last two decades, and their work has inspired countless people to look up and ponder humanity's presence and future in space. You can find out more about the International Space Station and how living and working on board this amazing outpost has helped prepare us to return to the Moon - and beyond! - at nasa.gov.

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 9)

from the galaxy itself, which eventually obtained NGC number 604. As seen from Earth NGC 604 is located northeast of the galaxy's central core.

So before temperatures drop below freezing and the winds of winter howl, try to find this faint fuzzy and add it to your Messier list!

Credits:

- http://en.wikipedia.org/wiki/Triangulum_Galaxy
- http://www.skyandtelescope.com/community/skyblog/stargazing/69562222.html?pageSize=0
- http://www.universetoday.com/34008/messier-33/

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

Oct. 2020 Financial Summary

Beginning Balance	$828
Deposits	$50
Disbursements	-$0
Ending Balance	$878

New Member Welcome!

Welcome new CCAS members Janis Romer from Pottstown, PA, and Laura Watson & Gary Metts from Coatesville, PA. We're glad you decided to join us under the stars! Clear skies to you!

Membership Renewals

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

Don Knabb
988 Meadowview Lane
West Chester PA 19382

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

CCAS Information Directory

Join the Fight for Dark Skies!

You can help fight light pollution, conserve energy, and save the night sky for everyone to use and enjoy. Join the nonprofit International Dark-Sky Association (IDA) today. Individual memberships start at $30.00 for one year. Send to:

International Dark-Sky Association
3225 North First Avenue
Tucson, AZ 85719

Phone: **520-293-3198**
Fax: **520-293-3192**
E-mail: **ida@darksky.org**

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

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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

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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 & Tel*escope Magazine

The club membership subscription cost for *Sky and Telescope* magazine has increased to **$43.95**. This is still a good saving from the regular rate of **$54.95**.

There is no need to go through the CCAS treasurer for subscriptions or renewals. Just go to the Sky and Telescope website and select "Magazine", then under the FAQs you can subscribe at the club rate.

https://skyandtelescope.org/subscribe/

If you have **any** questions call Don Knabb at 610-436-5702.

Astronomy Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **$34.00** which is much less than the individual subscription price of **$42.95** (or $60.00 for two years).

There is no need to go through the CCAS treasurer for subscriptions or renewals. Just call customer service at 877-246-4835 and request the club rate for your new subscription or renewal.