

Southwest Florida Astronomical Society, Inc. SWFAS



The Eyepiece September 2019

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A MESSAGE FROM THE PRESIDENT

Our calendar is filling up. Mike McCauley is coordinating several private and school events. Mike and our speaker this month Scott Flaig have been very involved out at the planetarium too.

We have Big Cypress events, the full schedule of Charlotte observing and solar observing events along with a number of our other regular events and star parties on the calendar.

International Observe the Moon Night is October 5th. We are not doing a day program, just night observing. I am working on seeing about doing it at North Fort Myers Rec Center, but that is not firm yet.

Even though we called off the 8/3 star party, the weather changed and I went out. Turned out to be one of the best nights I had with the planets. A few other astronomers and a member or two came out along with Jim Farrell and his son.

Please see John's notes in the AL section about access to the 'Reflector' magazine.

Note, John MacLean has taken over Treasurer duties for the remainder of the year.

Brian

Program this Month

Would you like to earn instant fame and have your name be forever mentioned in conversations regarding the scientific contributions of Newton, Planck, and Einstein? No problem! Just come up with a mathematical equation that explains how the universe works from its very beginning to its ultimate demise. Easy, peezy. The scientist/s who combine all levels of physics under one mathematical expression to explain the mechanics of the universe will be considered among the greatest scientists of all time and will no doubt earn a Nobel Prize for their efforts. Winner, winner; chicken dinner!

Scott Flaig, fellow SWFAS member and published author, will be presenting his version of "The Theory of Everything" at the September meeting of the South West Florida Astronomical Society. Scott's presentation will be expressed in common terminology, not scientific jargon, and will be inclusive of worldviews as expressed through theology and philosophy in addition to cosmology and particle physics. Scott's presentation will begin at 7:30pm on Thursday, September 5, 2019 at the Calusa Nature Center and Planetarium. If you want a chance at scientific fame and glory you better not miss this one. See you there!

The program will begin promptly at 7:30pm with the regular monthly business meeting following immediately thereafter.

Michael J. McCauley
VP/Program Coordinator SWFAS

Star Party Schedule 2019

SeaHawk Park – Sept 28th, Nov 30th

Caloosahatchee Regional Park – Oct 26th, Nov 2nd, Dec 21st

We have scheduled some of the Seahawk Park nights to coincide with the moon being a crescent to 1st quarter stage to allow for lunar observing.

Ideas for Using Outreach Funds

SWFAS would like to hear from members for any suggestions for applying outreach funds.

Members' Recommended Reading & News Links

Members are encouraged to submit to the editor links to recommended articles and books that might be of interest to Club members.

Each Weekly Newsletter of S&T has a 60-second news section. The general link for S&T Astronomy News is <https://www.skyandtelescope.com/astronomy-news/>.

Sky and Telescope has a new free introductory E-book "Stargazing: Getting Started" if you sign up with your email. <https://skyandtelescope.com>

"Kepler's Discoveries", by Shannon Hall & Terri Dube, pages 16-17, Scientific American, September 2019, *News at a Glance*.

" August Will Have Two New Moons! What's the Big Deal", By Scott Levine, July 30, 2019, *Sky & Telescope Weekly, August 2, 2019. Abstract: First there were "blue Moons;" now there are "black Moons." What do these terms mean?*

For NASA-JPL News see <https://www.jpl.nasa.gov/> .

"Mars at Conjunction and Why Does It Matter?", July 23, 2019, JPL News Weekly , August 2, 2019. [Includes excellent animation & video:
<https://www.jpl.nasa.gov/news/news.php?feature=7485> .]

"Ancient Mars Tsunami Hints at Surprisingly Wet World", By Korey Haynes, Published: Friday, July 26, 2019, Astronomy Weekly, August , 2019. *Abstract: An asteroid hit Mars billions of years ago, forming Lomonosov Crater. It also may have a 1,000-foot-high tsunami that swept across the young Red Planet*

In the Sky this Month

Autumnal equinox occurs on the 23rd. See excellent diagrams of planetary paths & orbits in "Astronomy" magazine, pages 40-41, September 2019.

Moon:- 1st Quarter – September 5; Full – September 14; Apogee – September 13; Last Quarter – September 21 (EDT); Perigee & New– September 28

Mercury is in superior conjunction the night of the 3rd – 4th . It is 6° south of the Moon on the 29th. It is still difficult to view this month.

Venus (dusk) starts to be viewable at dusk in the second half of the month, but is at a shallow angle and sets about ½ hour after sunset. However, during its short appearance it is at magnitude -3.9.

Mars (dawn) is in conjunction with the Sun on the 2nd. Mars will not be visible again until the third week in October at dawn.

Jupiter (dusk, sets after 10 p.m., EDT, by month's end, South - Southeast) is 2° south of the Moon on the 6th. It is still close to Antares. It dims slightly in magnitude from -2.2 to -2.0, and its size changes from ~39" to 36". It is 90° east of the Sun on the 8th, enhancing views of the Galilean moons. See the detailed charts on page 51 in Sky & Telescope, or page 41 of Astronomy, September 2019, showing observation times for Jupiter's moons.

Saturn (South-Southeast) is .04° north of the Moon on the 8th. It is stationary on the 18th, ~2 a.m. EDT. It continues to dim, changing magnitude from +0.3 to +0.5, and its size decreases from 17.6" to <17". The rings are tilted at just over 25°.

Uranus, in Aires, reaches its highest point at about 3:30 a.m., EDT. Its midmonth magnitude is +5.7. See <https://is.gd/urnep> for a finder chart.

Neptune, in Aquarius, is at opposition on 10 September, after it transits the meridian after midnight EDT. It is 4° north of the Moon on the 13th. Its midmonth magnitude is +7.8, and its distance almost exactly 4 "light hours". See <https://is.gd/urnep> for a finder chart.

International Space Station: The ISS is visible twice daily during the middle of September: mid-late evening (8-10 p.m., and early morning (4-6 a.m). See this link for specific times and routes for the ISS: <http://www.heavens-above.com>

The **Hubble Space Telescope** will be visible early morning (4-6:30 a.m.) from September 8th to 25th , and 9-10:30 p.m. from the 26th to 30th . . See this link for specific times and routes for the HST: <http://www.heavens-above.com>

Minutes of the Southwest Florida Astronomical Society – August 1, 2019

The regular monthly business meeting of the Southwest Florida Astronomical Society was called to order at 7:31 pm by president Brian Risley in the Calusa Nature Center Planetarium. Twenty-six people were present, including five new members and visitors.

The program was a movie on Dark Matter and a Stellarium presentation.

At 8:24 pm the business meeting resumed.

The past events listed in the printed agenda were reviewed.

Upcoming events listed in the printed agenda were discussed.

Tim Barrier will not be able to continue as treasurer. After a discussion, Mike McCauley made a motion, seconded by Bill Francis, for John MacLean to take over as treasurer. The motion passed on a voice vote. Stephen Berni will provide assistance.

A second Babcock Ranch Sky Cruise event has been planned for November 29th. People and telescopes will be needed to help with the event.

Mike McCauley brought up possibilities for use of the Community Outreach Fund. Mike will research suggestions.

Tony Heiner made a motion, seconded by Stephen Berni, to approve the minutes of the June meeting as contained in the August newsletter. The motion passed on a voice vote.

Treasurer Tim Barrier presented the June treasurer's report, showing an ending balance of \$2426.39. Tim also presented the July treasurer's report, showing an ending balance of \$2167.18. Tony Heiner made a motion, seconded by John MacLean, to approve the reports. The motion passed on a voice vote.

Librarian Maria Berni reported that a number of books have not been returned after being checked out.

Equipment Coordinator Brian Risley reported that most of the scopes are available for checkout.

Astronomical League coordinator John MacLean reported that the membership list is being updated.

The business meeting was adjourned at 8:53 pm.

Submitted by Don Palmer, secretary

Southwest Florida Astronomical Society, Inc.
Event Schedule for 2019/2020

Date	Event	Location	Time/Note
September 5 th	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
September 14 th	Solar Observing	Ponce De Leon Park Punta Gorda	9:00 am - Noon
September 27 th	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
September 28 th	Monthly Star Party	Seahawk Park	Dusk
October 3 rd	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
October 5 th	International Observe the Moon Night	TBD	Dusk – Lunar Observing
October 9 th	School Event – Mike McCauley Coord	Cape Coral Charter School	
October 12 th	Solar Observing	Bayshore Live Oak Park Port Charlotte	9:00 am - Noon
October 20 th	Ding Darling Days	Ding Darling National Wildlife Refuge Sanibel	10:00 am – 3:00 pm
October 25 th	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
October 26 th	Kiwanis KidsFest Cape Coral	SunSplash Cape Coral	9:00 am – 3:00 pm
October 26 th	Monthly Star Party	Caloosahatchee Regional Park	Dusk
November 2 nd	Monthly Star Party	Caloosahatchee Regional Park	Dusk
November 7 th	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
November 9 th	Solar Observing	Gilchrist Park Punta Gorda	9:00 am - Noon
November 9 th	Private Event	Forest Country Club – Mike McCauley Co-ord.	Dusk
November 11 th	Transit of Mercury	FSW Moore Observatory Punta Gorda Campus	8am-1pm
November 16 th	Girl Scout Event	Camp Calusa of SR31 NFM	6:00pm
November 22 nd	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
November 29 th	Sky Watch Cruise	Babcock Ranch – Fee for participation	Dusk Mike McCauley
November 30 th	Monthly Star Party	Seahawk Park	Dusk
December 5 th	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
December 14 th	Solar Observing	Ponce De Leon Park Punta Gorda	9:00 am - Noon

December 21 st	Monthly Star Party	Caloosahatchee Regional Park	Dusk
December 21 st	Big Cypress Observing	Big Cypress Preserve Ochopee	7:00 pm
Dec 27 th , 2019	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
January 2 nd , 2020	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
January 11 th , 2020	Solar Observing	Bayshore Live Oak Park Port Charlotte	9:00 am - Noon
January 24 th , 2020	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
January 25 th , 2020	Astronomy Swap Meet	El Joe Bean –Charlotte County	TBD
January 25 th , 2020	Big Cypress Observing	Big Cypress Preserve Ochopee	7:00 pm
February 6 th , 2020	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
February 8 th , 2020	Solar Observing	Gilchrist Park Punta Gorda	9:00 am - Noon
Feb 22 nd , 2020	Big Cypress Observing	Big Cypress Preserve Ochopee	7:00 pm
Feb 28 th , 2020	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
March 5 th , 2020	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
March 14 th , 2020	Solar Observing	Ponce De Leon Park Punta Gorda	9:00 am - Noon
March 21 st , 2020	Big Cypress Observing	Big Cypress Preserve Ochopee	7:00 pm
March 27 th , 2020	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
April 2 nd , 2020	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
April 11 th , 2020	Solar Observing	Bayshore Live Oak Park Port Charlotte	9:00 am - Noon
April 24 th , 2020	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
May 7 th , 2020	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
May 9 th , 2020	Solar Observing	Gilchrist Park Punta Gorda	9:00 am - Noon
May 22 nd , 2020	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk

***All observing events are Weather Permitting.
If it is cloudy or a chance of rain, we may not setup at all.
There may be no way to provide advance notice of cancellation.***

Events may be cancelled several hours before scheduled time based on observed conditions and forecasts at that time and weather may change.

Monthly Star Parties: These are held at either Seahawk Park in Cape Coral or at Caloosahatchee Regional Park (CRP) off SR78 7 miles east of SR31. Other than park fees noted, these are free and open to the public. Those wanting to learn how to use equipment can bring it to the monthly star parties or the monthly meetings. We are always glad to help people learn how to use their telescopes. It is also a great way to learn about different telescopes and try some out before making a purchase.

Seahawk Park is in North Cape Coral off Wilmington Blvd. (Nelson Rd or Chiquita Blvd are the nearest cross streets.) There is a brown sign in the center median at the entrance to the park. (GPS may not get you to the park, as some of the local roads have been closed.) You will make a big J hook before getting to the parking area. Seahawk Park is managed by the *Cape Coral R/Seahawks* Club for Radio Controlled Planes and they have priority. They are usually done by sunset but may be there before sunrise. Park in the lot and transport your equipment to the concrete staging area before the runway. This park is handicap capable as there is level concrete leading from parking to the staging area.

CRP has a gate that closes at dusk, you can check the county's website for current gate closing times and the status of the park's Northside entrance as that is where we observe from. (They may close the area if there are issues with the trails.) There is a parking fee of \$1/hr or \$5/day at CRP. Park in the main Northside parking lot. We sometimes setup down the dirt road that goes to the east. That area is grassy and may not be level, so one should walk on the dirt road as much as possible and watch their step.

Big Cypress: The Big Cypress Visitor Center is located off US41 5 miles east of SR29 about 25 miles east of Naples. Big Cypress has earned a Dark Sky Park designation. They hold observing events down the road that extends south of the Welcome Center during the winter months. This is a real dark sky site. Their observing events are free.

Solar Events: We have daytime solar events where one can safely look at the Sun. Things such as sunspots and prominences may be visible. These are free unless tied to another event that may have an entrance fee. There are seasonal monthly events held at different parks around Charlotte County as well as at other major public events in SW FLA.

Rotary Park Star Party: This is a free public star party held at Rotary Park at the south end of Pelican Blvd in South Cape Coral. Park to the west of the main building and walk to where we are setup to the east of the main building.

Moore Observatory, FSW Punta Gorda Campus: The campus is located off Airport Rd just east of I-75. Go to the right around the lake and park. The observatory is located down the path along the lake. Besides the telescope in the observatory, additional scopes may be setup around the observatory. This is a free event.

Star Party Etiquette: Bright white flashlights are not welcome. We use red flashlights to preserve our night vision. At the parks, please use just your parking lights if possible. As there may be cords and tripod legs that are hard to see in the dark, we ask that all children be well behaved and cautious around the telescopes. If you need help in moving around in the dark, just ask. Someone will be happy to guide you with a red light. If you have a telescope and need help with it, just ask. Someone will be glad to show you how to use it.

Golden Rules to Telescope Observing: Move your eye to the telescope, don't try to move the telescope to your eye! Ladders/chairs are there for your support, the telescopes do not provide support and should not be touched.

Website: www.theeyepiece.org Check us out on Facebook too.

Space Samples Link NASA's Apollo 11 and Mars 2020

JPL-News Weekly, August 13, 2019

<https://www.jpl.nasa.gov/news>

On July 24, 1969, Apollo 11 command module Columbia splashed down in the Pacific, fulfilling President Kennedy's goal to land a man on the Moon and return him safely to Earth. Among the mission's many firsts was the acquisition and return of the first samples from another celestial body. Findings based on the 47 pounds (21.5 kilograms) of lunar rock and soil rewrote the textbooks on both the Moon and solar system, and the samples are still being studied today by researchers using new and more sensitive instruments.

With its launch window opening on July 17, 2020 - less than a year from today - NASA's Mars 2020 rover will mark another first: The rover will not only seek signs of ancient habitable conditions and past microbial life but will collect rock and soil samples, storing them on the planet's surface for a future mission to retrieve.

"Apollo 11 demonstrated the immense value of returning samples from other worlds for analysis here on Earth," said Thomas Zurbuchen, NASA's associate administrator for the Science Mission Directorate. "Today, we are standing on the shoulders of Apollo, preparing for the launch of the initial step in humanity's first roundtrip and sample return from another planet - Mars."

The 2020 rover will land at Jezero Crater on Feb. 18, 2021, equipped with a system to cache science samples in tubes that will be delivered to a safe drop-off site. Two subsequent missions, currently in the concept stage, would be needed to bring the Mars 2020 samples home.

One mission would land a rocket (the Mars Ascent Vehicle) and a spacecraft carrying a rover about the size of NASA's Opportunity Mars rover at Jezero Crater. The rover would gather the cached samples and carry them back to the ascent vehicle, which would then launch the samples into Mars orbit. The other mission (which would already be in orbit around Mars when the ascent vehicle launches) would rendezvous with and capture the orbiting samples, before returning them to Earth.

"NASA and the European Space Agency are solidifying these exciting mission concepts to retrieve the samples," said Zurbuchen. "Just as the first samples returned to Earth from the Moon's Sea of Tranquility made history, the first samples returned to Earth from another planet will make history and amaze us all over again. And those samples will come from Mars' Jezero Crater."

While the significance of being part of the first step in a sample return mission from another planet is not lost on anyone involved with Mars 2020, it has a special significance to John McNamee, Mars 2020 project manager at NASA's Jet Propulsion Laboratory in Pasadena, California.

"I was at the Cape and saw the launch of Apollo 11," said McNamee. "I remember the sense of awe and pride I felt watching that Saturn V majestically rise from the pad. I knew I was watching exploration history. To be a part of a team determined to do their part to bring back samples from another planet gives me that same feeling."

JPL is building and will manage operations of the Mars 2020 rover for the NASA Science Mission Directorate at the agency's headquarters in Washington. NASA will use Mars 2020 and other missions, including to the Moon, to prepare for human exploration of the Red Planet. The agency plans to establish a sustained human presence on and around the Moon through NASA's Artemis lunar exploration plans.

To submit your name to travel to Mars with NASA's 2020 mission and obtain a souvenir boarding pass to the Red Planet, go here by Sept. 30, 2019:

<https://go.nasa.gov/Mars2020Pass>

For more information about the mission, go to:

<https://mars.nasa.gov/mars2020/>

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From Lunar Flashes to Variable Stars: Pro-Am Astronomy Projects

The Editors of Sky & Telescope, August 6, 2019

Track satellites, spot flashes on the Moon, monitor violent stars — learn how amateur astronomers can become involved in professional science.

Astronomy is one of the most accessible sciences — all you really need to do is look up. Interested amateurs might expand their hobby by tackling the Messier, Caldwell, or even Herschel catalogs. And for those who want to take their observing a step further, there are several opportunities for collaboration with professional astronomers.



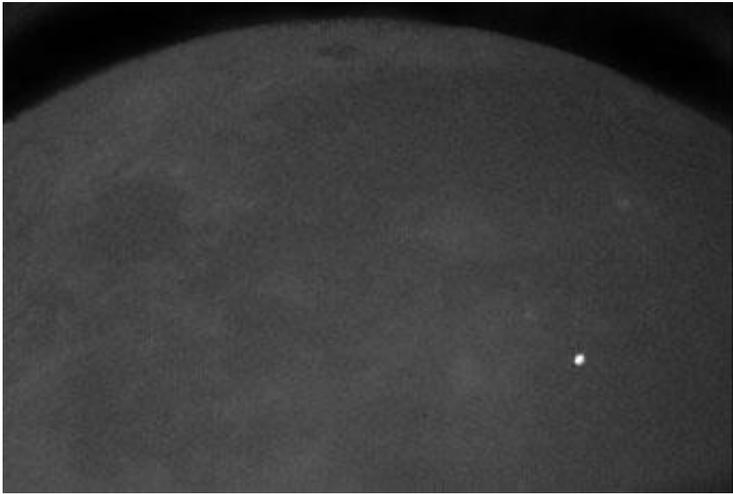
Speakers at the pro-am workshop included (from left to right): Callum Potter, Dr. Jeremy Shears, Dr. Tony Cook, Dr. Dirk Froebrich, Dr. Matt Darnley, and Robin Leadbeater

The pros may have 10-meter scopes or even observe from space. But one thing they lack is time. Several sky surveys coming online are discovery machines, but confirming and characterizing those discoveries is difficult. That's where amateurs can come in. With their ample observing time and wide geographical coverage, not to mention a history of contributing to and even leading astronomical research, amateurs have a lot to bring to the table.

At the National Astronomy Meeting at Lancaster University, UK, Callum Potter, president of the British Astronomical Association, and Dirk Froebrich (University of Kent, UK) organized and chaired a session on professional-amateur collaborations in astronomy. On July 4th, amateur astronomers and professionals alike presented several projects, some ongoing and looking for contributors, some wrapping up and serving as inspiration for the future.

Learn more about these projects — and see how you can get involved — with the descriptions and links below.

Lunar Impact Flashes



On March 17, 2013, a 4th-magnitude flash appeared along the southern margin of Mare Imbrium. NASA MEO

When a meteoroid strikes the Moon, astronomers on Earth may observe a lunar impact flash — a small bit of radiation that represents less than 1% of the meteoroid's total energy. Professional astronomers have been observing impact flashes by the hundreds since amateurs first confirmed their existence in 1999, but there's still plenty of room for amateurs to contribute. (Find a combined catalog of impact flashes here. [<https://www.impactflashdatabase.com/>])

Amateur lunar observations can be submitted to the following organizations:

Association of Lunar & Planetary Observers (in the U.S.) [<http://alpo-astronomy.org/lunarupload/lunimpacts.htm>]

British Astronomical Association (in the UK) [https://britastro.org/section_front/16]

Brazilian Meteor Observation Network [<http://www.bramonmeteor.org/bramon/en/>]

Unione Astrofili Italiani [http://luna.uai.it/index.php/Lunar_Impacts_Research_-_theory_for_observation] and the Geological Lunar Research [<https://digilander.libero.it/glrgroup/>] (both in Italy)

These amateur projects combine light curves from several observers in order to see more detail. Observations in different wavebands allow astronomers to measure the impact's blackbody temperature. Bright flashes on the lunar terminator or in shadow-filled craters are particularly valuable. Observers are encouraged to video lunar earthshine simultaneously to help rule out false detections from cosmic rays or satellite sun glint effects.

Observations so far have suggested that a small minority of impact flashes are slightly elongated, or at least not a single point of light. By having lots of observers videoing the Moon simultaneously, from different geographical locations on Earth, astronomers can rule out the blurring effect of our atmosphere.

If you enjoy catching lunar occultations, you can observe impact flashes at the same time. Then the star, prior to occultation, can be used to calibrate the brightness of any observed flashes.

Lastly, some amateur astronomers have video archives of lunar observations spanning at least 30 years. Combing through these with impact flash detection software could turn up evidence of impact flashes prior to 1999.

— *Anthony Cook (British Astronomical Association)*

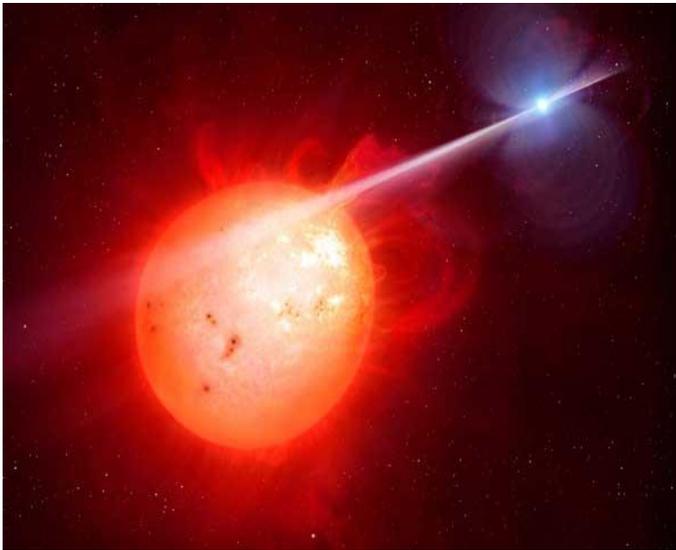
Further resources:

- Predictions on when to observe earthshine for impact flashes [http://users.aber.ac.uk/atc/lunar_schedule.htm]

Impact flash detection software:

- Automatic Lunar Flash Investigation: [<http://users.aber.ac.uk/atc/alfi.htm>]
- LunarScanL [see article to download zip file]

Cataclysmic variables



An artist's impression shows the exotic binary system, AR Scorpii. M. Garlick / University of Warwick / ESO

Accretion is a fundamental process and much research on cataclysmic variables (CVs) during the last half century has been on understanding the physics of accretion. Accretion discs are found in a wide variety of systems from forming young stars to accreting black holes. CVs, because of their short timescales, provide a useful laboratory to study accretion disc physics.

Sky surveys that are already coming online will provide near-continuous and exquisitely precise photometry of these systems. But rather than replace amateur observations, these surveys actually provide new opportunities, as long as the amateur community adapts to focus its efforts on stars of interest to the professional community.

Amateurs equipped for CCD photometry can make scientifically useful observations of these unpredictable stars. Coordinated observing campaigns could take advantage of observers located at different longitudes around the world to provide near-continuous coverage

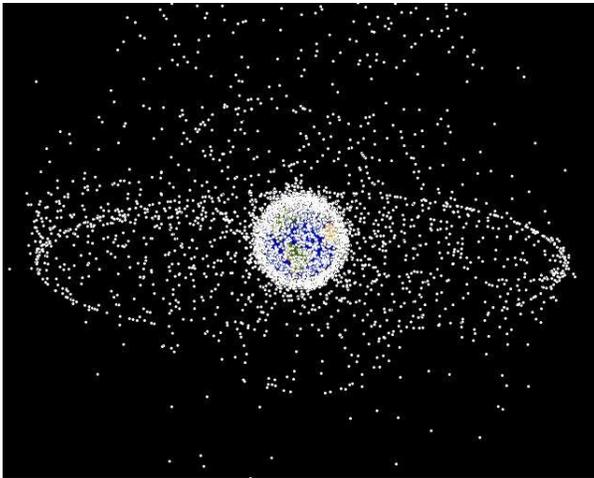
— *Jeremy Shears (British Astronomical Association)*

Further Resources:

- [BAA Variable Star Section](http://www.britastro.org/vss/) [<http://www.britastro.org/vss/>]
- [AAVSO](https://www.aavso.org/) [<https://www.aavso.org/>]
- Jeremy also wrote a paper which is an introduction to how amateurs can contribute to CV science: "[Amateur astronomers and the new golden age of cataclysmic variable star astronomy](#)." Shears, J., J. Br. Astron. Assoc., 128, 75-90 (2018).

Argus: A Citizen Science Project to Track Satellites

Space debris and retired satellites are increasingly endangering satellites in low-Earth orbit. Determining accurate orbits for the high number of objects is challenging, and traditional techniques such as radar are expensive on a large scale.



***This view of space junk shows objects in the geosynchronous region (around 35,785 km altitude).
NASA Orbital Debris Program Office***

In an unusual partnership, the UK's Defence Science and Technology Laboratory teamed up with amateur astronomers of the Basingstoke Astronomical Society (BAS) to undertake a proof-of-concept study. Observers participating in the project used inexpensive DSLR cameras or astronomical CCD cameras, along with standard camera lenses, to take short-exposure images of satellite trails. Professional astronomers then analyzed images from BAS members to provide the apparent satellite positions at precise times. By combining observations from several BAS members, astronomers could determine satellite orbits to within 20 meters (65 feet).

Although not yet confirmed, there might be a follow-up project involving more amateur astronomers to enable wider geographical coverage.

— *Grant Privett (Defence Science and Technology Laboratory) & Trevor Gainey (Basingstoke Astronomical Society)*

Supernova Spectroscopy

Known for introducing thousands of amateur astronomers to spectroscopy through his Star Analyser spectrograph, Robin Leadbeater described his work confirming and classifying supernovae spectroscopically.



**Artist's impression of a superluminous supernova. A new study has found radio emission from one of these stellar explosions, possibly providing the key to understanding the origin of fast radio bursts.
NASA / CXC / M. Weiss**

Amateur supernova hunters have faced difficulties getting time on professional telescopes to confirm their discoveries using spectroscopy; no amateur instruments with sufficient sensitivity were available. The solution was to modify a commercial ALPY600 spectrograph, reducing its resolution somewhat to increase sensitivity while still providing enough information to identify the [key features specific to supernovae](#) [http://www.threehillsobservatory.co.uk/astro/spectroscopy_20.htm].

The spectrograph, mounted on an 11-inch aperture telescope, has been used to officially confirm 24 supernovae to date via the [IAU Transient Name Server](#) [<https://wis-tns.weizmann.ac.il/>], 11 of which were also discovered by amateurs. The supernova named SN2016bme was the first to be confirmed spectroscopically by an amateur.

The professional [All Sky Automated Survey for Supernovae](#) (ASAS-SN) [<http://www.astronomy.ohio-state.edu/asassn/index.shtml>] discovered several more; Robin has collaborated with the ASAS-SN team to provide follow-up spectra. For example, he confirmed [ASAS-SN18bt/SN2018oh](#) [<https://iopscience.iop.org/article/10.3847/1538-4357/aaec79>] [<https://www.skyandtelescope.com/astronomy-news/60-second-astro-news-helium-exoplanets-and-a-supernova-surprise/>] as a Type Ia supernova. The properties of its lightcurve add to the debate over what mechanism(s) causes white dwarfs to explode — accretion from a companion star or the merger of two white dwarfs.

Leadbeater also provided spectra to classify supernova SN2018hna, discovered by amateur Koichi Itagaki. A type II supernova with an [unusually slow rise to maximum brightness](#) [<https://lasair.roe.ac.uk/object/ZTF18acbwxk/>], this explosion is suspected to be caused by the core collapse of a blue supergiant star. (Most supernovae result from the core collapse of the more common red supergiants.)

Robin has also followed the evolution of supernovae for up to a year as they fade to as faint as 18th magnitude, the current limit of amateur spectroscopic capability. The ALPY spectra, along with over 4,000 spectra from other amateurs, covering a wide range of objects, can be found in the [spectroscopic database run by the British Astronomical Association](#).

— Robin Leadbeater (*British Astronomical Association*)

The HOYS-CAPS Citizen Science Project

The Hunting for Outbursting Young Stars with the Centre for Astrophysics and Planetary Science Citizen Science project aims to bring together amateur astronomers from around the world to monitor the brightness of around 20 young and nearby clusters and star-forming regions in the northern sky using various optical filters (U, B, V, R, Ha, I). The ultimate goal is to have a sufficient number of participants so that we can obtain an image of every region in every filter about once or twice per day.

Most of our targets are well-known, photogenic objects (e.g. Orion, Rosette, Cocoon, Pelican, Elephant Trunk, and Cone Nebula) that amateurs already observe and photograph. We are collecting and analysing new as well as historic images of all of these regions; all of our data is publically accessible from the HOYS-CAPS server.

We are actively recruiting new participants since 2018. So far, almost 70 observers from 10 different countries are delivering data. There are now more than 11,000 images with more than 80 million accurate brightness measurements. All the data together corresponds to 700 hours integration time on a 1-meter-diameter telescope.

The project does not require a large amount of time; either (filtered) CCD or DSLR images are acceptable. Our internal self-calibration in the photometry database automatically corrects possible color terms in the data.

The scientific goals of the project are plentiful: First, by identifying and characterizing the material that's accreting onto and occulting the young star, we can study the properties and structure of disk material, at a resolution more than 100 times better than what can be achieved with direct observations. The light curves may even reveal periodic signals hinting at the presence of accreting proto-planets crossing in front of their host star. Observations also provide the stars' rotation periods. Finally, observations will help identify and characterize the brightness of these young stars' outbursts.

— *Dirk Froebrich (University of Kent)*

Further resources:

- [HOYS-CAPS website](http://astro.kent.ac.uk/~df/hoyscaps/index.html) [<http://astro.kent.ac.uk/~df/hoyscaps/index.html>]
- [HOY-CAPS Facebook group](#) [

August Will Have Two New Moons! What's the Big Deal?

By Scott Levine, July 30, 2019, *Sky & Telescope Weekly*, August 2, 2019

First there were "blue Moons;" now there are "black Moons." What do these terms mean?



Sky & Telescope diagram

If you've been keeping your eyes on astronomy news lately, you might have started noticing hype-filled stories telling you to make sure you keep your eyes open in August: "There'll be two new Moons!" The next new Moon is at 3:12 UT on August 1st, which corresponds to 11:12 p.m. EDT; the second new Moon falls at 10:37 UT on August 30th.

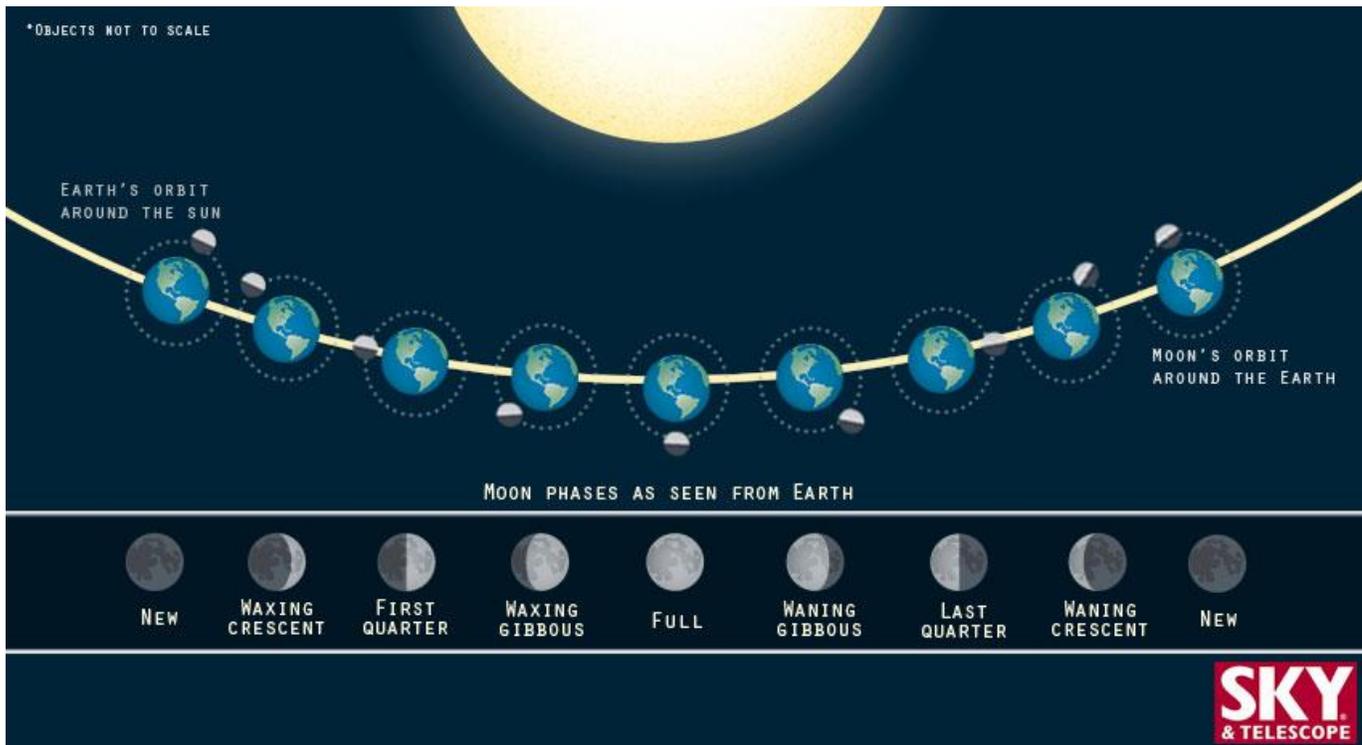
Some of these stories lend the phenomenon a nickname, like "Black Moon." There's a better-known term, "[Blue Moon](#)," that has been around for decades. While its exact definition is debated, these days it usually means the second full Moon in a month. A more old-fashioned definition defines it as the third of four full Moons, like the Blue Moon of May 2019.

Two new Moons in a month, though — that's the opposite of a Blue Moon. So what's the big deal about a Black Moon? Or is it a big deal at all?

Defining a Month by the Moon

Astronomers measure months in several ways. For instance, a *sidereal month* is the time the Moon takes to make one orbit around Earth, relative to the background stars. Meanwhile, an *anomalistic month* is the time between lunar perigees, the Moon's closest point to Earth. These are about 27.5 earth days. But the *lunation*, or *synodic month*, is what most of us talk about when we talk about months: That's the amount of time it takes to go back to a phase, usually from new to new.

Having two full — or new — Moons in a month is uncommon but not rare. A lunation is about 29.5 days, and there are 365.25 days in a year. So, on average, there are slightly more than 12 full lunar cycles a year. This means about every two and half years (2 years, 8 months, roughly speaking) there'll be two full or two new Moons in a given month.



We see the Moon go through a changing cycle of phases each month due to its orbital motion around Earth and the changing geometry with which we view it.
Ana Aceves / Sky & Telescope

Let's take a bigger view, though. Since a 29.5-day lunar cycle is shorter than every month except February, in every year every month except February is likely to have a repeated phase.

Put differently, [phases correspond to places in the Moon's orbit](#). So when the Moon finishes a lap and returns to the same spot in its orbit around the Earth every 29.5 days, it's also at the same phase. So at the end of most months, the Moon is likely to come back to the spot it was in at the beginning of a month. Just like that, there's a repeated phase in every month!

For example, let's take a look at the upcoming year (dates are listed in UTC time zone):

August: New Moon on the 1st and 30th.

September: Thin, waxing crescents on the 1st and 30th.

October: Waxing crescents on the 1st and 31st.

November: Waxing crescent on the 1st & 30th.

December: Waxing crescent on the 1st & 31st.

January 2020: Waxing crescent on the 1st & 31st.

February 2020: Not enough days for a full cycle, even though it's a leap year. No repeating phases.

March 2020: Nearly first-quarter crescents on the 1st and 31st.

April 2020: First quarter on the 1st and 30th.

May 2020: Waxing gibbous on the 1st and 31st.

June 2020: Waxing gibbous on the 1st and 30th.

July 2020: Waxing gibbous on the 1st and 30th.

August 2020: Just-about-full-waxing gibbous on the 1st & 31st.

So, what happens if there's a second new Moon? Not much. A second new Moon in a month can help with skygazing, because there's no moonlight to wash out the stars. But it's hard to get excited otherwise. After all, the new Moon lies between the Sun and Earth, and since all of the Sun's light is hitting the lunar far side, there's nothing to see!

You might see news stories that try to acknowledge this. But they'll fumble and say that the Moon will be invisible to us at nighttime: "Second New Moon in Tonight's Sky!" Nope. New Moons rise and set with the Sun, so they're up in the daytime, not at night.

Besides, since the new Moon is up during the day when clear skies are blue, wouldn't it be ironic if we called new Moons Blue Moons?

Better yet, let's stay clear of the hype, enjoy the night sky, and watch another lunation unfold before our eyes.

The Astronomical League

As a member of the Southwest Florida Astronomical Society you are automatically also a member of the Astronomical League, a nationwide affiliation of astronomy clubs. Membership in the AL provides a number of benefits for you including receipt of The Reflector, the AL's quarterly newsletter, use of the Book Service, through which you can buy astronomy related books at a 10% discount. You can also participate in the Astronomical League's Observing Clubs. The Observing Clubs offer encouragement and certificates of accomplishment for demonstrating observing skills with a variety of instruments and objects. These include the Messier Club, Binocular Messier Club, the Herschel 400 Club, the Deep Sky Binocular Club, and many others. To learn more about the Astronomical League and its benefits for you, visit <http://www.astroleague.org>

Introduction to the Astronomical League Observing Programs

There are some 50 formal Observing Programs available to choose from covering the whole gamut of object types accessible to the amateur astronomer. In addition there are from time to time additional programs set up for special targets including comets, eclipses, transits and so forth. Certificates and pins are awarded for successful completion and submission of the required observations for a particular program. There is no time limit for completing observations. The programs are categorized by level of difficulty (Novice, Intermediate, and Advanced) and each program is also categorized by recommended equipment ranging from the naked eye through binoculars and telescope aperture. There are programs for Imagers and also for solar observers using H-alpha scopes. Visit <http://www.astroleague.org/observing> to obtain full details. Starting in February 2019, we will highlight one or two programs each month in the Newsletter.

Reflector Magazine

... due to a staff retirement they [The Astronomical League] have not been sending out the quarterly Reflector magazine download email links to members in 2019.

However the Reflector copies for June & March 2019 can be downloaded by going to the Astronomical League homepage <https://www.astroleague.org/> and scrolling down the left hand side and clicking on the Reflector link. The direct link is: <https://www.astroleague.org/reflector>

The next quarterly Reflector issues will be available in early September and December and will be accessible in the same way. They are working to resolve the mass email notification issue as quickly as possible.

The Astronomical League Globular Cluster Observing Program

Globular clusters are frequent targets during our public star parties. The Messier List includes 29 of them and the Herschel 400 has a total of 62.

The goal of the Globular Cluster Observing Program is to provide an in-depth introduction to this class of objects, allowing the observer to observe or image and compare the structures of globular clusters. The use of any kind of computer aided Go-To technology is allowed, as is of course manual star-hopping using a finder scope. Remote telescopes are also allowed. A minimum of 8 inches aperture is recommended but larger scopes will definitely provide more detail. A 12.5 inch scope was used for validating the entire list of 190 potential targets.

The League strongly advises the purchase of their publication "A Guide to the Globular Cluster Observing Program" available on the League webstore which contains the listing of 190 objects which extend into the southern hemisphere. The Guide contains background information on globular clusters along with specific information about each of the 190 targets.

To obtain an award, observers must select a minimum of any 50 globular clusters from the entire list of 190 objects cataloged in the Guide. This allows for customization of an observing list suitable to the observer's interests, skies, and equipment.

The program goes beyond just observing the selected globulars, however, and requires both visual and imaging observers to identify the Shapley-Sawyer concentration class of each cluster observed. The Guide explains the mechanics of how to do this.

The Guide designates certain members of the entire 190 object list as challenge objects. Some of these are globulars within the M31 and M33 galaxies which appear as stellar type point objects in amateur scopes. Visual observers are required to include 1 challenge object in their selection of 50 objects. Imaging observers must select 3 challenge objects.



This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

Spot the Stars of the Summer Triangle

By David Prosper

September skies are a showcase for the Summer Triangle, its three stars gleaming directly overhead after sunset. The equinox ushers in the official change of seasons on September 23. Jupiter and Saturn maintain their vigil over the southern horizon, but set earlier each evening, while the terrestrial planets remain hidden.

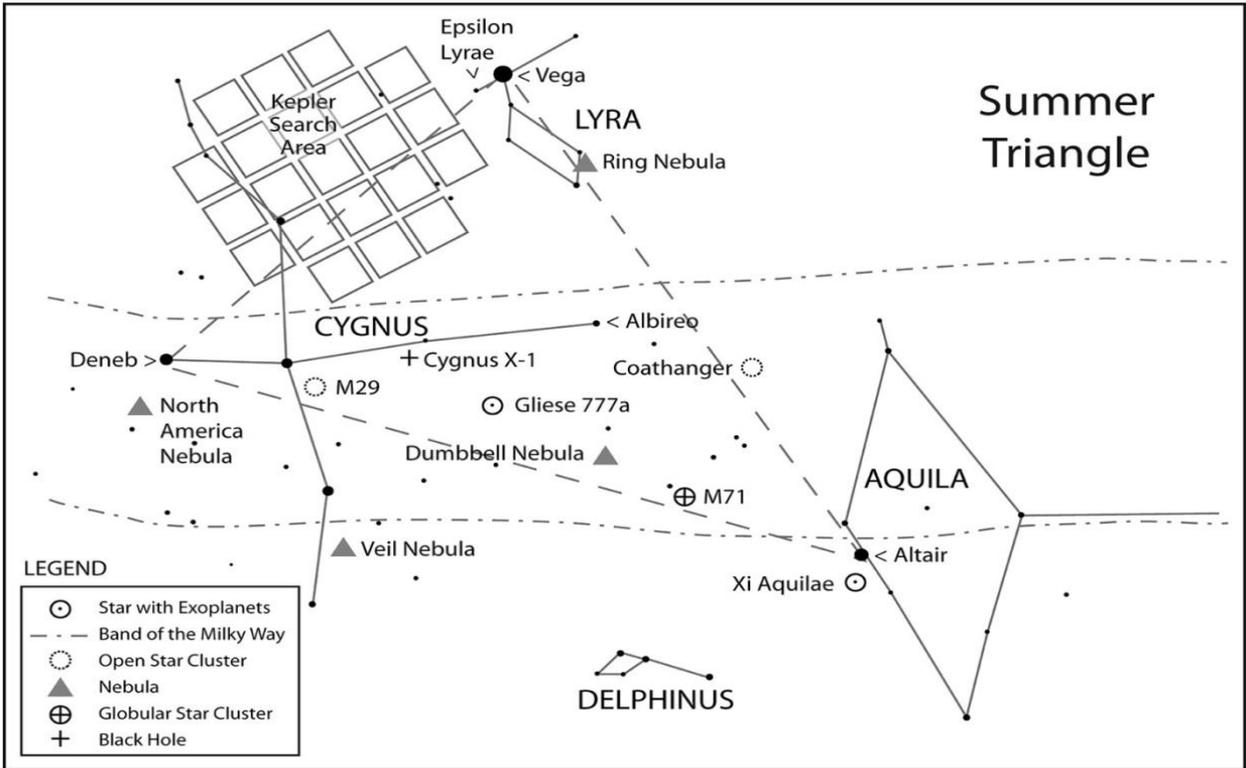
The bright three points of the Summer Triangle are among the first stars you can see after sunset: Deneb, Vega, and Altair. The Summer Triangle is called an asterism, as it's not an official constellation, but still a striking group of stars. However, the Triangle is the key to spotting multiple constellations! Its three stars are themselves the brightest in their respective constellations: Deneb, in Cygnus the Swan; Vega, in Lyra the Harp; and Altair, in Aquila the Eagle. That alone would be impressive, but the Summer Triangle also contains two small constellations inside its lines, Vulpecula the Fox and Sagitta the Arrow. There is even another small constellation just outside its borders: diminutive Delphinus the Dolphin. The Summer Triangle is huge!

The equinox occurs on September 23, officially ushering in autumn for folks in the Northern Hemisphere and bringing with it longer nights and shorter days, a change many stargazers appreciate. Right before sunrise on the 23rd, look for Deneb - the Summer Triangle's last visible point - flickering right above the western horizon, almost as if saying goodbye to summer.

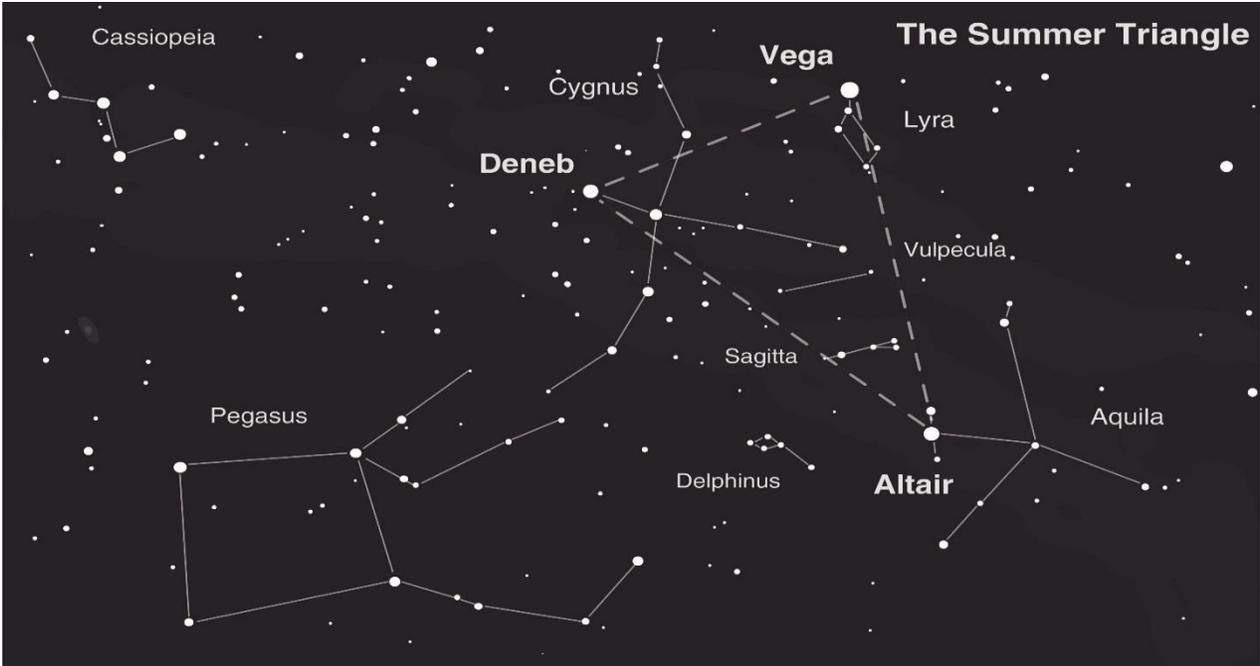
The Summer Triangle region is home to many important astronomical discoveries. Cygnus X-1, the first confirmed black hole, was initially detected here by x-ray equipment on board a sounding rocket launched in 1964. NASA's Kepler Mission, which revolutionized our understanding of exoplanets, discovered thousands of planet candidates within its initial field of view in Cygnus. The Dumbbell Nebula (M27), the first planetary nebula discovered, was spotted by Charles Messier in the diminutive constellation Vulpecula way back in 1764!

Planet watchers can easily find Jupiter and Saturn shining in the south after sunset, with Jupiter to the right and brighter than Saturn. At the beginning of September, Jupiter sets shortly after midnight, with Saturn following a couple of hours later, around 2:00am. By month's end the gas giant duo are setting noticeably earlier: Jupiter sets right before 10:30pm, with Saturn following just after midnight. Thankfully for planet watchers, earlier fall sunsets help these giant worlds remain in view for a bit longer. The terrestrial planets, Mars, Venus, and Mercury, remain hidden in the Sun's glare for the entire month.

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Caption: Once you spot the Summer Triangle, you can explore the cosmic treasures found in this busy region of the Milky Way. Make sure to "Take a Trip Around the Triangle" before it sets this fall! Find the full handout at bit.ly/TriangleTrip



Caption: This wider view of the area around the Summer Triangle includes another nearby asterism: the Great Square of Pegasus.

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