

# The ECLIPSE

June  
2020

*The Newsletter of the Barnard-Seyfert Astronomical Society*

## Next Membership Meeting:

Stay tuned to the BSAS Google Group or Night Sky Network email for information about future meetings.

## From the President

It's been another long, strange month. Lots of things have been happening that aren't in the realm of astronomy and I have been distracted by it all. As you know, we haven't had a meeting in a couple of months, and I am really starting to miss the meetings. It is nice to get out of the house and socialize with people that share a common interest. Hopefully this month is the month that we can come together as a group and get back into a new normal routine. Watch for emails and Facebook updates regarding the monthly meeting.

Last month did have a big space event with the launch of the SpaceX Crew Dragon capsule to the ISS late in the month. It marks a return to U.S. spaceflight and NASA working with private corporations to get astronauts into space. I hope you had a chance to watch the launch on TV or the Internet, it was very exciting to see. I have not been around long enough to remember the Apollo launch days, but it did bring back memories of the shuttle launches for me. I hope this gets America excited about space travel again and brings back talk of getting people to the moon. Like I said earlier, I missed the Apollo days and having another set of moon launches would be spectacular.

Jupiter and Saturn are continuing their close dance getting ready for their conjunction at year end. Tiny Pluto is also near the two gas giants, just over one degree southwest of Jupiter. It is a challenging object to find and one that I have only confirmed by comparing images over multiple

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[BSASNashville.com](http://BSASNashville.com)

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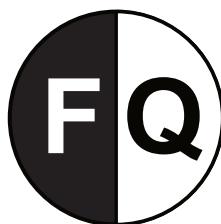
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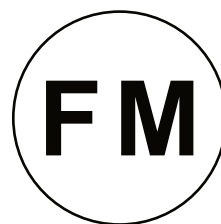
A SpaceX Falcon 9 rocket soars upward after lifting off from historic Launch Complex 39A at NASA's Kennedy Space Center in Florida on May 30, 2020, carrying NASA astronauts Robert Behnken and Douglas Hurley to the International Space Station in a SpaceX Crew Dragon capsule for the agency's SpaceX Demo-2 mission. Liftoff occurred at 3:22 p.m. EDT. Behnken and Hurley are the first astronauts to launch from U.S. soil to the space station since the end of the Space Shuttle Program in 2011. Part of NASA's Commercial Crew Program, this will be SpaceX's final flight test, paving the way for the agency to certify the crew transportation system for regular, crewed flights to the orbiting laboratory. Credit: [NASA/Tony Gray and Tim Powers](#)



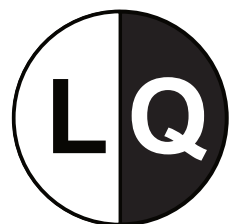
June 21  
July 20



June 28  
July 27



June 5  
July 4



June 13  
July 12

## Happy Birthday Pete Conrad by Robin Byrne

This month we honor the life of a man who made several contributions to the space program - all with a wicked sense of humor. Charles Peter "Pete" Conrad, Jr. was born June 2, 1930 in Philadelphia, Pennsylvania. His family was well-off, but had a reversal of fortune due to the Great Depression. They lost their house, and moved into a small cottage, paid for by his mother's brother. Pete's father was so devastated by his failure, he left his family.

As a schoolboy, Pete was considered to be smart, but he always struggled in his classes. It turns out that he suffered from dyslexia, a condition barely understood at the time. Pete attended a private school, which several generations of his family had attended. After his family lost their money, his uncle continued to pay for his tuition. Sadly, because of his struggles with dyslexia, Pete failed his Junior year of High School and was expelled. Pete's mother believed in him and found a school that was able to teach Pete techniques to cope with his disability. Armed with his new coping skills, Pete finished school with honors, and was awarded a full Navy ROTC scholarship to attend Princeton University.



When Pete was only 15 years old, he got a job at the Paoli Airfield, asking to be paid not with cash, but with time in their airplanes and flight lessons. He started doing odd jobs around the airfield, but soon was working on the planes, doing basic maintenance work. When he was 16, one of the flight instructors had to make an emergency landing 100 miles away. Pete drove out to him and was able to repair the plane. From that point on, the flight instructor gave Pete the flight lessons needed to earn his pilot's license.

While in college, majoring in Aeronautical Engineering, Conrad continued to fly. It was while at Princeton that Conrad met and began dating Jane DuBose, who was attending nearby Bryn Mawr. It was Jane's father who dubbed him "Pete" (his family had always called him Peter). In 1953, Conrad graduated with a B.S. degree and was immediately commissioned as an Ensign in the Navy. Also in that year, Pete and Jane got married. They would have four sons over the next seven years.

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**Pete Conrad, continued**

Conrad's first stop in the Navy was Pensacola, Florida for flight training. By 1954, Conrad was a Naval Aviator and became a fighter pilot. He served in many capacities, including as a flight instructor. Then Conrad was accepted to the Naval Test Pilot School in Maryland. Among his classmates were two other future astronauts: Wally Schirra and Jim Lovell. In 1958, Conrad graduated and was named as a Project Test Pilot. Over the course of his career, Conrad logged over 6500 hours of flight time, with over 5000 hours in jets.

Conrad was almost one of the original Mercury astronauts. In 1958, he was asked to participate in the selection process. Many of the tests the original astronauts had to endure were fairly outrageous, and Conrad's rebellious sense of humor took over. Part of the screening included looking at ink blots and describing what they saw. For one of the ink blots, Conrad described in great detail a lurid sex scene that he "saw." In another test, he was given a blank white sheet and asked to describe what image was on it. He turned it over and said, "It's upside down." To deliver a requested stool sample, Conrad put it in a box tied up with a ribbon. When he had reached his limit with the tests, Conrad made his statement in no unconditional terms - he dropped a full enema bag on the commanding officer's desk and then walked out. Not too surprisingly, Conrad's application was denied. Included with the rejection was a note saying "not suitable for long duration flight." That would ultimately be proven to be very wrong.

Four years later, after the success of the Mercury Program, and in response to Kennedy's goal of landing a man on the Moon before the end of the decade, Project Gemini was about to begin. That meant needing a new batch of astronauts. Conrad's friend Al Shepard, America's first man in space, suggested Conrad should apply again. The tests they were put through this time were much more reasonable, so Conrad was more cooperative. On September 17, 1962, Pete Conrad became a member of the "New Nine" astronauts. Among the training the new astronauts endured were: jungle survival, geology lessons, water egress from the spacecraft, physicals, and endless hours in flight simulators.

Conrad was considered one of the best pilots in his group, so it wasn't surprising that he would be given one of the first Gemini flights. His first mission was in 1965 aboard Gemini 5 as the Pilot, with one of the original Mercury astronauts, Gordon Cooper, as the Commander. During their flight, they set an endurance record of eight days, which beat the Russian record at the time of five days. Eight days was considered the minimum amount of time for a mission to the Moon, so they proved a Moon mission was possible, at least in terms of the health of the astronauts. This flight was the first to use fuel cells as the power source. They also tested the radar guidance system, as

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**Pete Conrad, continued**

well as taking photographs of the Earth. All in all, the mission was a complete success.

Conrad's next mission, in 1966, would be as the Commander of Gemini 11, with Dick Gordon as the Pilot. During the mission, they successfully docked with an Aegena Target Vehicle. Docking in space was a key milestone needed to be met before we could send people to the Moon. After the docking, they used the Aegena rocket to boost their orbit to a higher altitude from Earth. This mission still holds the record of being the highest of any orbital mission, at an apogee (farthest point from Earth) of 851 miles. While docked, Gordon performed two spacewalks, including connecting the Gemini spacecraft to the rocket with a tether. After returning to the capsule, the spacecraft undocked, but remained tethered. They then used thrusters to set the system into a slow rotation to be the first mission to generate artificial gravity in space.

After the successful conclusion of the Gemini Program, it was time for Apollo. Despite the devastating setbacks of the Apollo 1 fire, the program ultimately progressed forward. The success of Apollo 11 meant it was up to the remaining crews to prove landing on the Moon could be repeated, and that more could be accomplished. On November 14, 1969, Pete Conrad flew as the Commander of Apollo 12, with Dick Gordon as his Command Module Pilot and Alan Bean as his Lunar Module Pilot. Their launch took place during a rain storm. The rocket flying through the clouds created enough static electricity to cause the spacecraft to be hit by lightning more than once. That resulted in the power and guidance systems being knocked out in the capsule. Fortunately, someone on the ground quickly knew how to fix the problem. After arriving at the Moon, Conrad and Bean separated from their command module, the Yankee Clipper, and flew the lunar module, Intrepid, to the surface of the Moon. Their landing was one of the most precise performed, landing only 600 feet from the Surveyor-3 spacecraft they were targeting. As Conrad, the third man to walk on the Moon, jumped down from the ladder to the surface, he said, "Whoopee! Man, that may have been a small one for Neil, but that's a long one for me." Conrad later confessed that he said that to win a \$500 bet with an Italian journalist who was convinced that NASA scripted what the astronauts said. Sadly, the journalist never paid up. Once on the Moon, Conrad and Bean collected rock samples, set up a radio antenna, a solar wind experiment, and placed an American flag near the landing site. They also set up equipment for measuring moon quakes, solar radiation, and detecting dust and gasses. Additionally, they collected some pieces from the Surveyor-3 spacecraft to bring back to Earth for study. At one point during their 31 hours 31 minutes on the Moon, Conrad became the first person, but not the last, to fall on the Moon. One of the pictures Conrad took during the mission was of his own

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**Pete Conrad, continued**

reflection in Alan Bean's visor. That image has been immortalized in Popular Science's list of best astronaut selfies.

In 1973, Conrad's last mission for NASA was as the Commander of Skylab 2, which was the first manned crew to inhabit America's first space station. His crew mates would be Joseph Kerwin and Paul Weisz. They almost couldn't complete their mission. After six unsuccessful attempts to dock with the space station, the crew put on their EVA suits and opened up the airlock to the docking mechanism. After opening it up, they saw the culprit, a loose screw, fly off into space. After that obstacle was removed, they were able to dock. The station had been launched unmanned 11 days earlier, and experienced some damage during its deployment. The micrometeoroid shield had been torn away, which pulled away one of the solar panels and jammed the other. So, the first job of the crew was to repair the damage. During the course of two spacewalks, Conrad used brute force to pull the stuck solar panel free. They also created a solar shield to replace the micrometeoroid shield, which helped shade the station, after becoming unbearably hot. During their 28 day stay on the station, the crew performed experiments related to medicine, and telescopic studies of the Sun and Earth. When they returned to Earth, the crew of Skylab 2 had set the record for the longest successful crewed mission in space. So much for someone once deemed "not suitable for long duration flight."

Pete Conrad retired from NASA in 1973, going to work in the private sector. He worked for a variety of companies, including: American Television and Communication Company ( a company in the "new" field of cable television), McDonnell Douglas Aircraft Company, and as a consultant for Delta Clipper, which was an experimental launch vehicle.

The demanding schedule of life as an astronaut took its toll on many marriages, and Pete's was no exception. In 1988, Pete and Jane divorced. Sadly, the following year, one of Pete's sons was diagnosed with a malignant lymphoma, and died one year later. That same year, Pete met Nancy Crane, and later married her.

In 1996, at the age of 66, Conrad was part of the crew for a jet flight that went around the world in 49 hours 26 minutes. They set a world record, and the Learjet that was flown is on permanent display at the Denver International Airport.

In June of 1999, Pete Conrad was interviewed on the ABC series Nightline. When asked about whether the Shuttle program was worth the cost, Conrad replied, "I think the Space Shuttle is worth one billion dollars a launch. I think that it is worth two billion dollars for what it does. I think the Shuttle is worth it for the work it does."

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### **Pete Conrad, continued**

Conrad was also interviewed around the same time for the PBS series Nova. Upon discussing the future of space exploration, Conrad was in support of missions to Mars or an asteroid, but thought that going back to the Moon was “a waste of taxpayer money.”

On July 8, 1999, Pete, his wife, and a group of friends were riding their motorcycles from Huntington Beach to Monterey, California. While going around a turn, Pete’s motorcycle crashed. Despite wearing a helmet and going the speed limit, Pete Conrad died later that day from internal injuries. He was buried with honors at Arlington National Cemetery. At the Johnson Space Center in Houston, they have the tradition of planting trees in honor of astronauts who have died. At the planting ceremony, Pete’s Apollo 12 crew mate Alan Bean, was one of the speakers. In a humorous tribute, Bean pretended to be channeling Conrad’s wishes. He said that, instead of the usual white lights NASA used to decorate the trees every Christmas, Conrad wanted colored lights, because they were more in keeping with his motto, “when you can’t be good, be colorful.” To this day, all the trees have white lights, except for Conrad’s, which has red lights.

From overcoming dyslexia to being a pilot to becoming an astronaut, Pete Conrad was a man who accomplished so much. He flew in space four times, spending 32 hours on the Moon, and a total of 1200 hours in space. He was outrageously funny and irreverent, but always got the job done. Michael Collins, Command Module Pilot on the Apollo 11 mission probably said it best: “Funny, noisy, colorful, cool, competent; snazzy dresser, race-car driver. One of the few who lives up to the image. Should play Pete Conrad in a Pete Conrad movie.” Happy Birthday, Pete!

### **References:**

[Pete Conrad - Wikipedia](#)

[Conrad, Jr. Charles “Pete” - The National Aviation Hall of Fame](#)

[Pete Conrad: Apollo 12 Commander - space.com by Elizabeth Howell](#)

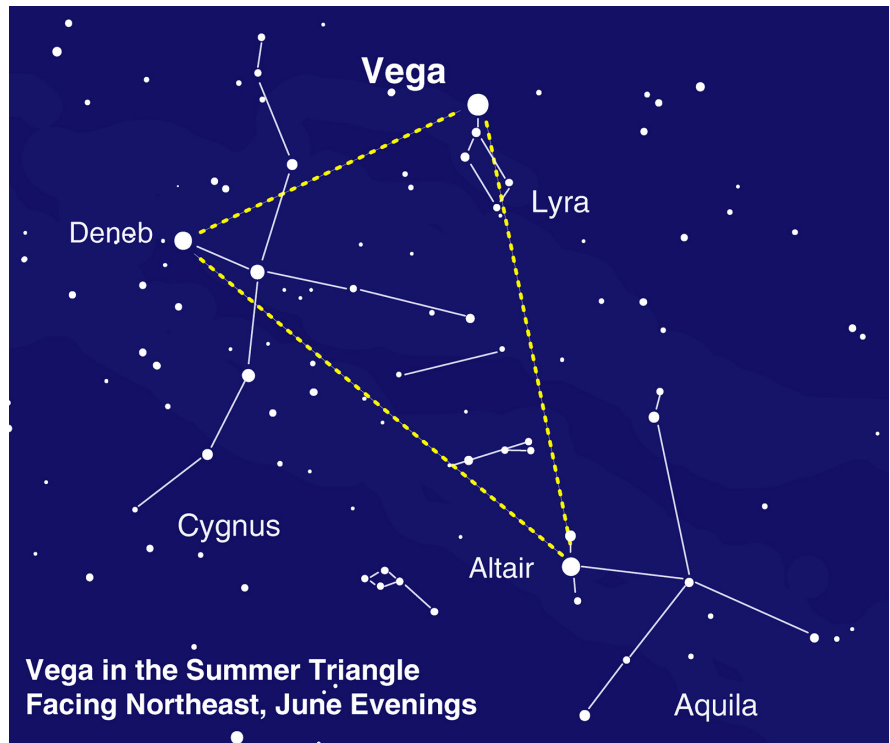
## Summer Triangle Corner: Vega by David Prosper and Vivian White

If you live in the Northern Hemisphere and look up during June evenings, you'll see the brilliant star Vega shining overhead. Did you know that Vega is one of the most studied stars in our skies? As one of the brightest summer stars, Vega has fascinated astronomers for thousands of years.

Vega is the brightest star in the small Greek constellation of Lyra, the harp. It's also one of the three points of the large "Summer Triangle" asterism, making Vega one of the easiest stars to find for novice stargazers. Ancient humans from 14,000 years ago likely knew Vega for another reason: it was the Earth's northern pole star! Compare Vega's current position with that of the current north star, Polaris, and you can see how much the Earth's tilt changes over thousands of years. This slow movement is called precession, and in 12,000 years Vega will return to the northern pole star position.

Bright Vega has been observed closely since the beginning of modern astronomy and even helped to set the standard for the current magnitude scale used to categorize the brightness of stars. Polaris and Vega have something else in common, besides being once and future pole stars: their brightness varies over time, making them variable stars. Variable stars' light can change for many different reasons. Dust, smaller stars, or even planets may block the light we see from the star. Or the star itself might be unstable with active sunspots, expansions, or eruptions changing its brightness. Most stars are so far away that we only record the change in light, and can't see their surface.

NASA's TESS satellite has ultra-sensitive light sensors primed to look for the tiny dimming of starlight caused by transits of extrasolar planets. Their sensitivity also allowed TESS to observe much smaller pulsations in a certain type of variable star's light than previously observed. These observations of Delta Scuti variable stars will help astronomers model their complex interiors and make sense of their distinct,



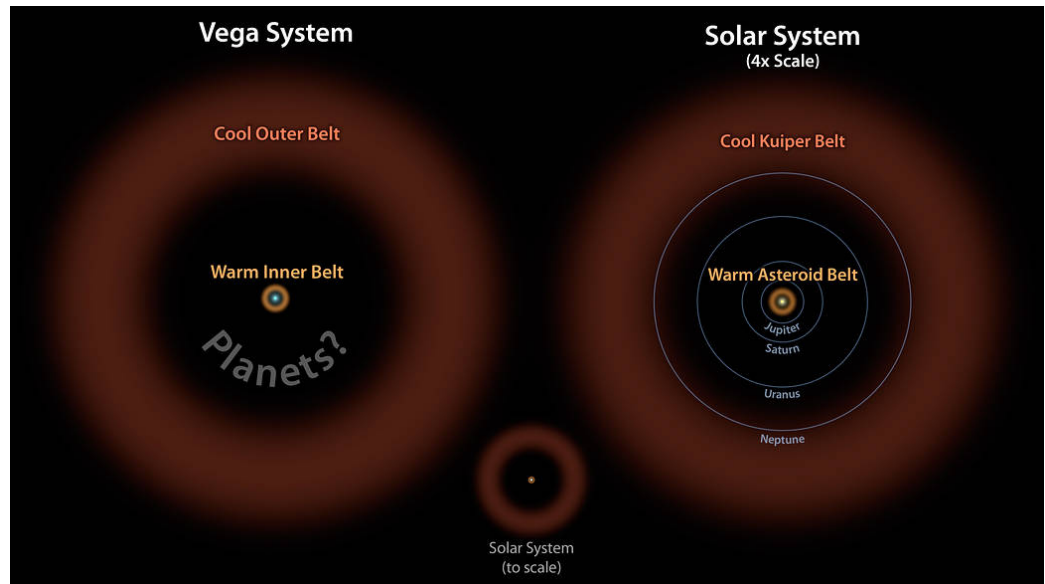
Can you spot Vega? You may need to look straight up to find it, especially if observing after midnight.

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## Vega, continued

seemingly chaotic, pulsations. This is a major contribution towards the field of astroseismology: the study of stellar interiors via observations of how sound waves “sing” as they travel through stars. The findings may help settle the debate over what kind of variable star Vega is. Find more details on this research, including a sonification demo that lets you “hear” the heartbeat of one of these stars, at [bit.ly/DeltaScutiTESS](https://bit.ly/DeltaScutiTESS)



Vega possesses two debris fields, similar to our own solar system’s asteroid and Kuiper belts. Astronomers continue to hunt for planets orbiting Vega, but as of May 2020 none have been confirmed. More info: [bit.ly/VegaSystem](https://bit.ly/VegaSystem)

Credit: NASA/JPL-Caltech

Interested in learning more about variable stars? Want to observe their changing brightness? Check out the website for the American Association of Variable Star Observers (AAVSO) at [aavso.org](https://aavso.org). You can also find the latest news about Vega and other fascinating stars at [nasa.gov](https://nasa.gov). June 2020

*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.gov](https://nightsky.jpl.nasa.gov) to find local clubs, events, and more! You can catch up on all of NASA’s current and future missions at [nasa.gov](https://nasa.gov). With articles, activities and games NASA Space Place encourages everyone to get excited about science and technology. Visit [spaceplace.nasa.gov](https://spaceplace.nasa.gov) to explore space and Earth science!*

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**There was no BSAS member meeting in May.**

**Barnard-Seyfert Astronomical Society**  
**Minutes of a Regular Meeting of the Board of Directors**  
**Held On Wednesday, May 6, 2020**

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held May 6, 2020, online by means of Zoom. Logged in were Tom Beckermann, Chip Crossman, Gary Eaton, Thomas Gaudin, Drew Gilmore, Bud Hamblen, KC Katalbas, Keith Rainey, Andy Reeves, Kathy Underwood, and Theo Wellington. A quorum being present, Keith called the meeting to order at 7:30 PM and asked for a motion to adopt the minutes as printed in the May issue of the Eclipse, and the motion was adopted by unanimous voice vote. Theo reported that there was \$11,519.97 in the bank account and \$568.64 in the PayPal account. Poster sales have reached 30. The Facebook page has 1,778 followers. Twitter has 219 followers.

Theo presented a table drape for use at outreach events, produced by UNIQ Signs. The drape is cloth, 8 ft. long and is imprinted with the BSAS logo.

Theo made a motion to buy the drape and Kathy seconded. The motion passed by unanimous voice vote.

Future star parties were discussed, including the possibility of virtual star parties. Virtual meetings were discussed but not yet finalized.

There being no further business the meeting was adjourned at about 8:30 PM.

Respectfully submitted,

Bud Hamblen  
Secretary

From the President, continued

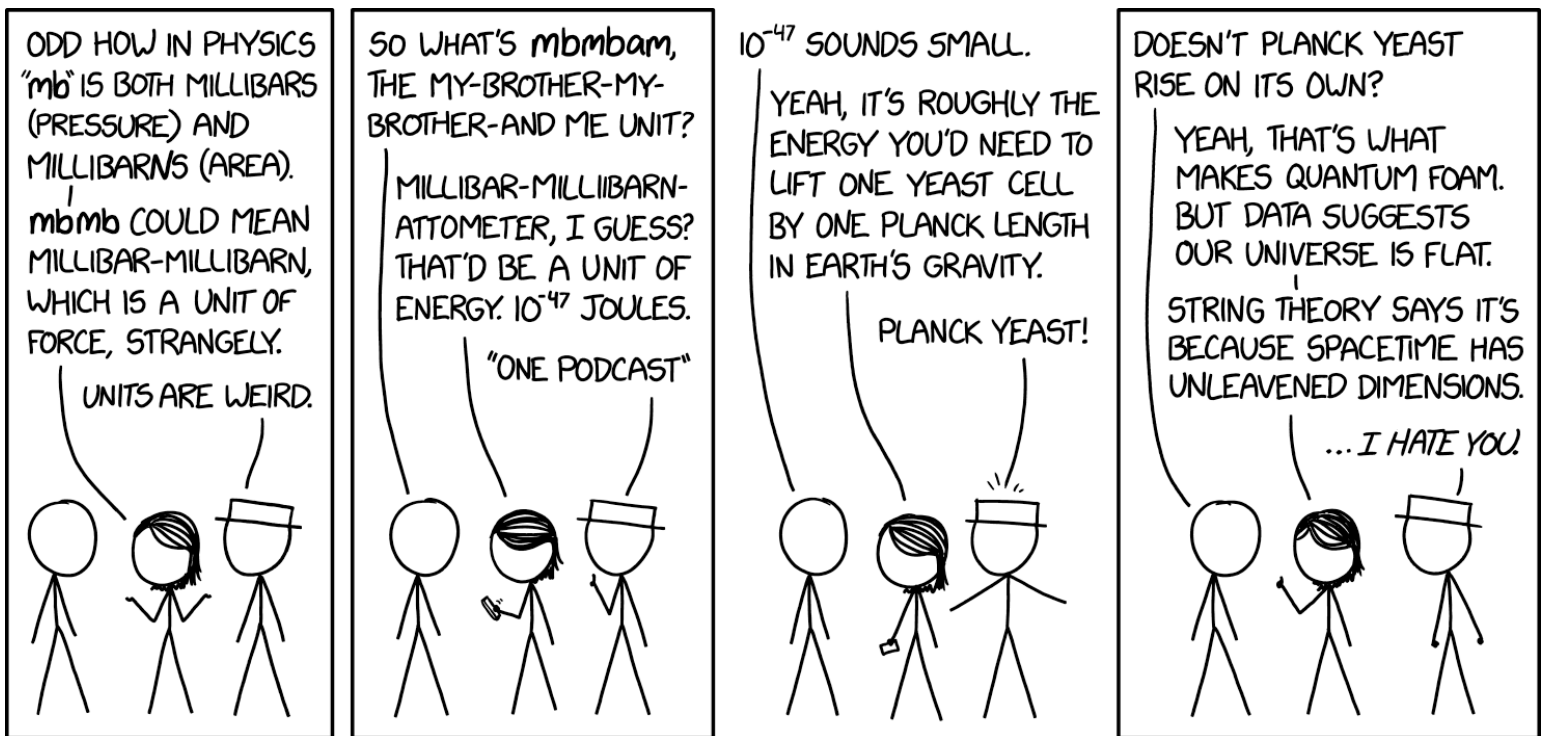
nights to see which star is moving. See if you are able to spot our most beloved dwarf planet and let us know how you did! Finally, the summer triangle is rising in the east at sunset beginning its trek across the summer sky. The triangle is rich with deep sky objects to find or my favorite double star, Albireo.

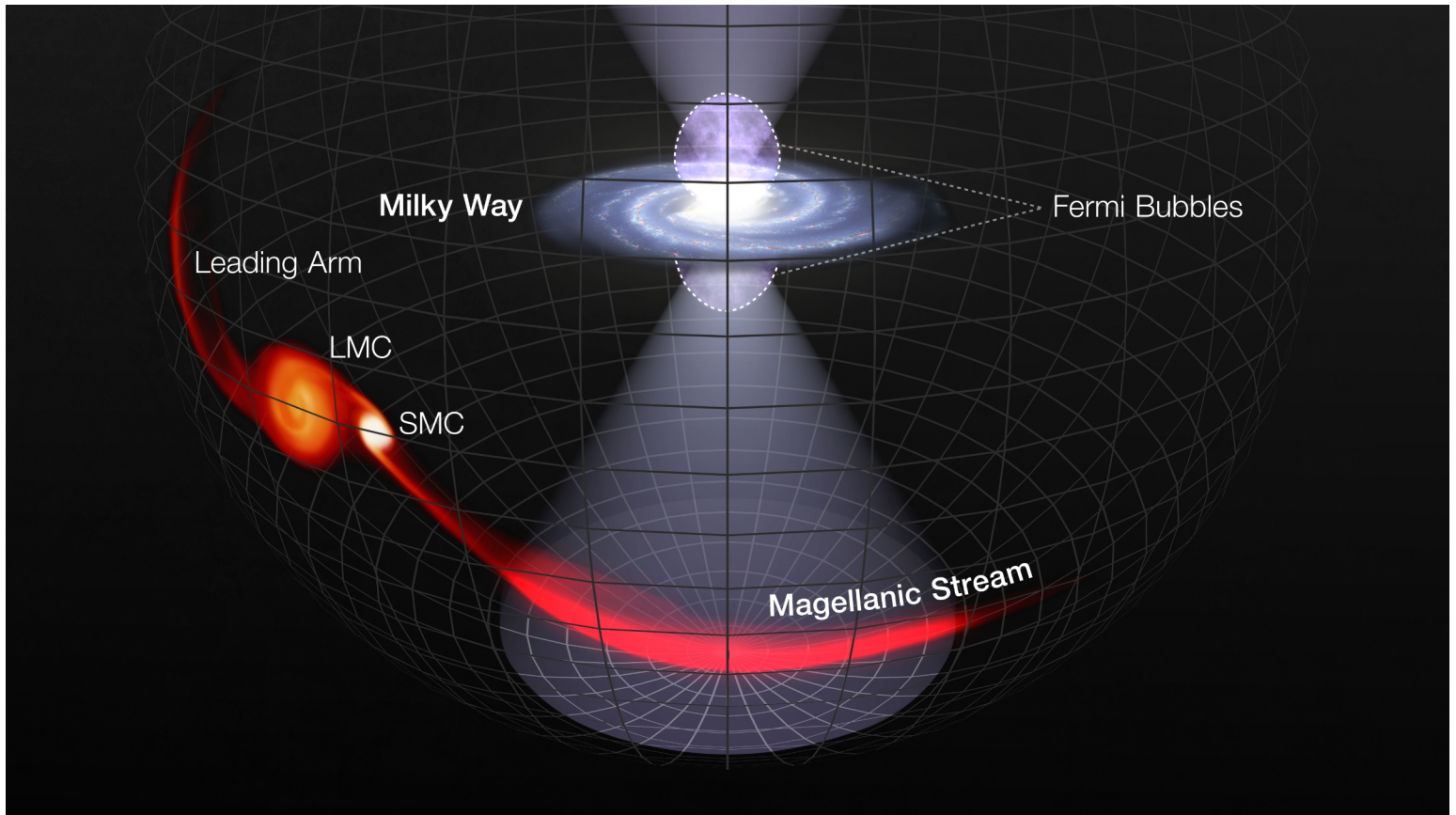
Keep staying safe.

Clear skies,

Keith Rainey

xkcd





## Seyfert Flare

An enormous outburst from the vicinity of the Milky Way's central black hole sent cones of blistering ultraviolet radiation above and below the plane of the galaxy and deep into space. The radiation cone that blasted out of the Milky Way's south pole lit up a massive ribbon-like gas structure called the Magellanic Stream. This vast train of gas trails the Milky Way's two prominent satellite galaxies: the Large Magellanic Cloud (LMC), and its companion, the Small Magellanic Cloud (SMC). The astronomers studied sightlines to quasars far behind the Magellanic Stream and behind another feature called the Leading Arm, a tattered and shredded gaseous "arm" that precedes the LMC and SMC in their orbit around the Milky Way. Unlike the Magellanic Stream, the Leading Arm did not show evidence of being lit up by the flare.

The same event that caused the radiation flare also "burped" hot plasma that is now towering in ballooning lobes about 30,000 light-years above and below the plane of our galaxy. These bubbles, visible only in gamma rays and weighing the equivalent of millions of Suns, are called the Fermi Bubbles. The Fermi Bubbles and the Magellanic Stream were thought to be separate and unrelated to each other, but now it appears that the same powerful flash from our galaxy's central black hole has played a major role in both.

Credit: [NASA](#), [ESA](#), and [L. Hustak \(STSci\)](#)





In honor of the club's 90th anniversary we partnered with Hatch Show Print to create a unique poster that would honor the achievement of the club. For those who don't know Hatch Show has been making posters for a variety of events and concerts for 140 years. In all that time we are their first astronomy club.

On the poster at the center is the moon. This was made from a wood grained stencil that the shop has used for over 50 years. To contrast that the telescope that the people are using is a brand new stencil made for our poster. The poster has three colors. First the pale yellow color of the moon was applied. Next the small stars, circles, and figures at the bottom were colored in metallic gold. The third color is

a blue for the night sky. Where it overlaps with the metallic gold it creates a darker blue leaving the figures at the bottom looking like silhouettes. This was a one time printing so the 100 that we have are all that will be printed.

The prints are approximately 13 3/4" x 22 1/4" and are available for \$20 at our membership meetings, or \$25 with shipping by ordering through [bsasnashville.com](https://bsasnashville.com). Frame not included.



Become a Member of BSAS!  
Visit [bsasnashville.com](http://bsasnashville.com) to join online.

All memberships have a vote in BSAS elections and other membership votes. Also included are subscriptions to the BSAS and Astronomical League newsletters.

Annual dues:

Regular: \$25  
Family: \$35  
Senior/Senior family: \$20  
Student\*: \$15

\* To qualify as a student, you must be enrolled full time in an accredited institution or home schooled.

## About BSAS

Organized in 1928, the Barnard-Seyfert Astronomical Society is an association of amateur and professional astronomers who have joined to share our knowledge and our love of the sky.

The BSAS meets on the third Wednesday of each month at the Cumberland Valley Girl Scout Building at the intersection of Granny White Pike and Harding Place in Nashville. Experienced members or guest speakers talk about some aspect of astronomy or observing. Subjects range from how the universe first formed to how to build your own telescope. The meetings are informal and time is allotted for fellowship. You do not have to be a member to attend the meetings.

Membership entitles you to subscriptions to *Astronomy and Sky & Telescope* at reduced rates; the club's newsletter, the *Eclipse*, is sent to members monthly. BSAS members also receive membership in the Astronomical League, receiving their quarterly newsletter, the *Reflector*, discounts on all astronomical books, and many other benefits.

In addition to the meetings, BSAS also sponsors many public events, such as star parties and Astronomy Day; we go into the schools on occasion to hold star parties for the children and their parents. Often the public star parties are centered on a special astronomical event, such as a lunar eclipse or a planetary opposition.

Most information about BSAS and our activities may be found at [bsasnashville.com](http://bsasnashville.com). If you need more information, write to us at [info@bsasnashville.com](mailto:info@bsasnashville.com).

## Free Telescope Offer

Did someone say free telescope? Yes, you did read that correctly. The BSAS Equipment & Facilities Committee has free telescopes ranging in size from 2.6" to 8" that current members can actually have to use for up to 60 days at a time. We also have some other items in the loaner program such as a photometer, H-alpha solar telescope, educational CDs, tapes, DVDs, and books. Some restrictions apply. A waiting list is applicable in some cases. The BSAS Equipment Committee will not be held responsible for lost sleep or other problems arising from use of this excellent astronomy gear. For information on what equipment is currently available, contact [info@bsasnashville.com](mailto:info@bsasnashville.com).