

# The ECLIPSE

February  
2019

*The Newsletter of the Barnard-Seyfert Astronomical Society*

**Next Membership Meeting:**  
February 20, 2019, 7:30 pm

Cumberland Valley  
Girl Scout Council Building  
4522 Granny White Pike

*Topic: What's Up?  
Messier Marathon Preview*

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**From the President**

Did everyone get to see the lunar eclipse? Our skies were partly to mostly cloudy which offered sporadic viewing of the moon. Thankfully, a lunar eclipse can be viewed sporadically and enjoyed just as much. Some of our members traveled to better skies, and some preferred to view the eclipse online the next day. However you viewed the eclipse, I hope you enjoyed it.

Coming up in March is the best time of year for a Messier marathon. March offers the best opportunity to see all 110 objects from Messier's famous list in one night from a dusk to dawn marathon. Our February 20th meeting will be all about the Messier marathon presented by our own Theo Wellington. This will be just in time to get prepared before the new moon in early March.

Also coming up a little sooner is the planet Mercury in the evening sky. Towards the end of the month of February, Mercury will swing around from behind the sun and offer some of the best viewing of the year for the small planet in the evening sky. Take a look to the West just after sunset and see if you can spot the messenger planet.

Finally, I am writing this letter on the anniversary of the Apollo 1 tragedy. Tomorrow is the anniversary of the Challenger tragedy. Friday is the anniversary of the Columbia tragedy. So many tragedies so close together on the calendar offer a somber reminder of the risk of human space exploration. Take a moment or two this month to remember these events and the astronauts that gave their lives to exploration.

Thank you and Clear Skies,

Keith Rainey



## Officers

Keith Rainey  
President

Keith.Rainey@gmail.com

Tom Beckermann  
Vice President

tmbeckermann@gmail.com

Bud Hamblen  
Secretary

wrhamblen@comcast.net

Theo Wellington  
Treasurer

tmwellington@comcast.net

Gary Eaton  
Ex-officio

gceaton@comcast.net

## Directors at Large

Chip Crossman

chipcrossman@gmail.com

Drew Gilmore

eclipse@bsasnashville.com

K.C. Katalbas

hazeykc@gmail.com

Johana Keohane

jokeohane@gmail.com

Todd Nannie

toddn\_us@yahoo.com

Andy Reeves

reevesaf@gmail.com



A giant, spiraling storm in Jupiter's southern hemisphere is captured in this animation from NASA's Juno spacecraft. The storm is approximately 5,000 miles (8,000 kilometers) across, or roughly the width of the United States. The counterclockwise motion of the storm, called Oval BA, is clearly on display.

Credit: [NASA/JPL-Caltech/SwRI/MSSS/Gerald Eichstadt/Sean Doran](https://photojournal.jpl.nasa.gov/archive/PIA22943.gif)

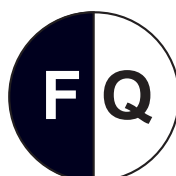
Animation at <https://photojournal.jpl.nasa.gov/archive/PIA22943.gif>

## Upcoming Star Parties

Saturday 2/2	Private Star Party Natchez Trace Parkway mile marker 412 (Water Valley Overlook)
Friday Feb 8 6:30 to 8:30 pm	BSAS Public Star Party Bowie Nature Park (Fairview)
Saturday Mar 16 8:00 to 10:00 pm	BSAS Public Star Party Shelby Bottoms Nature Center



Feb 4  
Mar 6



Feb 12  
Mar 14



Feb 19  
Mar 20



Feb 26  
Mar 27

## Happy Birthday Scott Kelly by Robin Byrne

This month we celebrate the achievements of a man who pushed the envelope of space exploration. Scott Joseph Kelly, and his identical twin brother, Mark, were born February 21, 1964 in Orange, New Jersey. His father, Richard, was a police officer in West Orange. Scott and Mark attended Mountain High School in West Orange. While in high school, Scott worked as an emergency medical technician. After his graduation in 1982, Scott attended the University of Maryland in Baltimore. During his freshman year, Scott read “The Right Stuff,” which inspired him to pursue career in naval aviation. First he tried to transfer to the United States Merchant Marine Academy, where his brother was in school, but his poor grades prevented that plan from coming true. So, instead, Scott transferred to the State University of New York Maritime College (SUNY Maritime) at the start of his sophomore year, where he received a NAVY ROTC scholarship. As part of the Navy ROTC, Scott sailed aboard different training ships each summer, visiting various places around the world. In 1987, Scott graduated with a Bachelor of Science degree in Electrical Engineering.



After graduation, Kelly was commissioned in the U.S. Navy as an ensign. He had flight training at NAS Pensacola, and then jet training at the NAVAL Air Station Chase Field in Beeville, Texas. Kelly officially became a Naval Aviator in 1989. His first assignment was at the Naval Air Station Oceana, Virginia. Once all training was complete, Kelly was deployed in 1990 to the North Atlantic and Persian Gulf. While stationed in Virginia Beach, Kelley met Leslie Yandell. They married April 25, 1992, and would go on to have two children: Samantha and Charlotte. In 1993, Kelly was chosen to attend test pilot school, where his brother would be a fellow classmate. After completion of that program, in 1994, Kelly worked as a test pilot. He logged more than 8000 hours in over 40 different aircraft, with 250+ carrier landings.

In 1995, both Scott and Mark applied to NASA’s astronaut program. Both were selected as astronaut candidates in April, 1996. This was the first time that two relatives were selected for the program, and they would eventually become the only two siblings to have both travelled in space. After completion of training, Scott was assigned to the caution and warning system of the International Space Station (ISS). At the same time, Scott also completed a Master of Science degree in Aviation Systems from the University of Tennessee.

**Scott Kelley, continued**

In December of 1999, Scott flew his first Space Shuttle mission as the pilot of STS-103. The primary goal was a servicing mission to the Hubble Space Telescope. Following this successful flight, Scott was assigned to the role of NASA's Director of Operations in Star City, Russia.

In 2002, Scott served on the NEEMO 4 mission as the commander. This involved working in the Aquarius underwater laboratory near Key Largo, Florida. The underwater component of the mission lasted five days, cut short by a hurricane. The experience was meant to simulate working under the kinds of extreme conditions that would be encountered on extended space flights. Later, in 2005, Kelly served on another NEEMO mission for three days that worked on the difficulties of construction under those conditions.

After the Space Shuttle Columbia disaster in February of 2003, Kelly served as the coordinator of the searches for debris by airplanes and helicopters. In 2007, both Scott and Mark, at different times, were diagnosed and treated for prostate cancer. Both treatments were successful.

Due to delays as a result of the Columbia disaster, it wasn't until August 2007 that Scott would fly again, this time as the commander of his second spaceflight aboard Space Shuttle Endeavour on STS-118. This would be a 12-day mission to the International Space Station, delivering a truss system and other new components, along with supplies, to the growing space station. Another hurricane cut another of Scott's missions short, this time returning a day earlier than planned.

Two years later, Scott and his wife would get a divorce. The following year, Scott would get to spend a much longer time in space. In October of 2010, Scott would begin his 159-day stay aboard ISS as part of Expedition 26 in the role of commander. During his time there, they conducted 115 scientific experiments, including testing vegetable growth in a weightless environment and the dynamics of heat transfer in weightlessness. While in orbit, Scott's sister-in-law and wife of Mark, Congresswoman Gabrielle "Gabby" Giffords was shot. It wasn't until his return two months later that Scott could visit both Mark and Gabby.

In November of 2012, it was announced that Scott and cosmonaut Mikhail Korniyenko would fly aboard ISS for a one-year mission. From March 27, 2015 to March 1, 2016, Scott and Mikhail lived in space. The purpose was to study the effects of such an extended stay in space on the human body, in particular, with a journey to Mars in mind. Among the tests conducted were: analyzing how the shifting of fluid in the body affects vision, plus repeated chemical analysis of blood and urine samples. NASA wanted to see how the body reacted to weightlessness for such a long period of time and exposure to radiation, as well as the mental health issues of isolation and stress. More than once during their year-long stay, there were problems with resupply ship failures. Scott also performed three EVA's during his time there, either performing repairs or installations of equipment. Over the course of the year, Scott and Mikhail flew with a total of 13 other astronauts and cosmonauts from not only the United States and Russia, but also Italy, Japan, Denmark, and Kazakhstan. At the end of the flight, Scott had spent, over the course of his four flights, a total of 520 days in space. That was the record for the most days in space by an American until Jeff Williams reached 534 days, and, later, Peggy Whitson passed them both with 665 days.

Due to the unique opportunity of having identical twins in the space program, NASA studied both Scott and Mark before, during, and after his flight. This allowed them to see what differences appeared

**Scott Kelley, continued**

during Scott's time in space. One of the more publicized changes was in Scott's gene expression, erroneously reported as a change in his genetic code. Gene expression has to do with how the instructions from a gene are converted into a product. Changes in gene expression also occur after living at very high altitudes. In both cases, it is related to adapting to a different environment.

Scott retired from NASA April 1, 2016. In November of that year, he was appointed the United Nations Champion for Space by the United Nations Office for Outer Space Affairs (UNOOSA). His role is to raise awareness for the outreach activities made by UNOOSA. In 2017, Scott published a book chronicling his year in space, titled, "Endurance: A Year in Space, a Lifetime of Discovery." This past July, Scott married Amiko Kauderer, who is a Public Affairs Officer for NASA.

From his exemplary military career, to his many accomplishments with NASA, to being a social media darling during his year in space, Scott Kelly has much to be remembered for. And at age 55, he has plenty of time to impress us with more. Happy Birthday, Scott! Go get 'em!

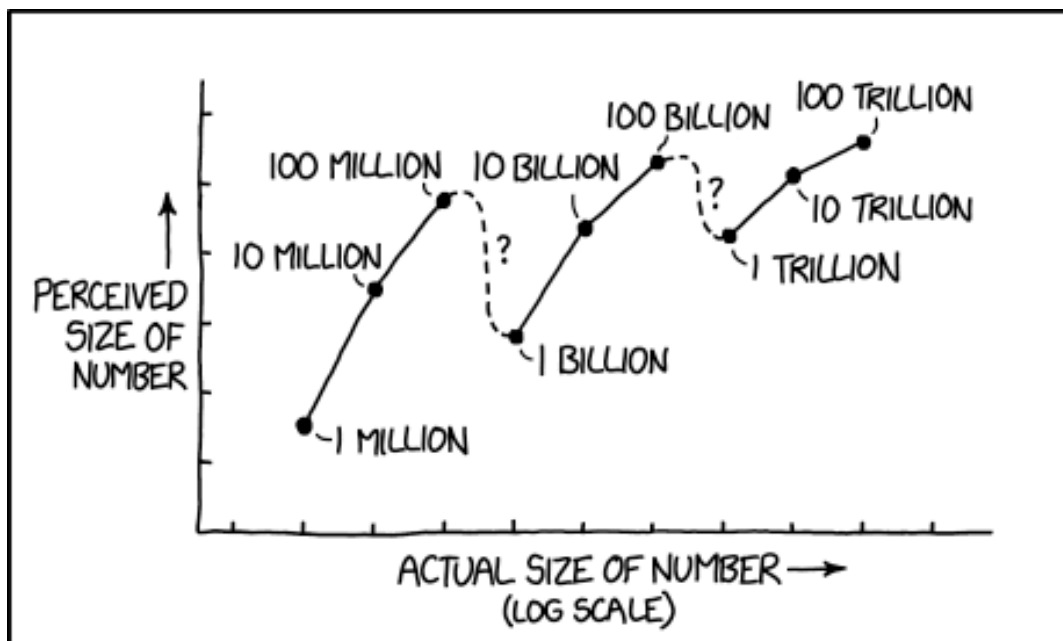
**References:**

[Wikipedia Scott Kelly \(astronaut\)](#)

[Biographical Data Scott J. Kelly](#)

[NASA Astronaut Scott Kelly Returns Safely to Earth after One-Year Mission, NASA Press Release, Mar. 2, 2016](#)

# xkcd



TALKING ABOUT LARGE NUMBERS IS HARD

## Hexagon at Night, Quartet in the Morning

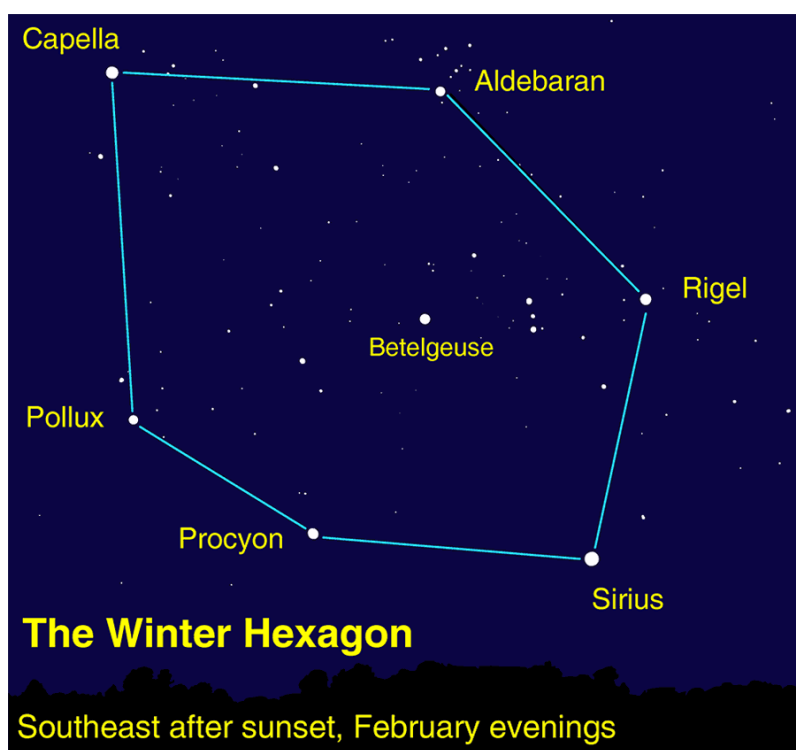
### By David Prosper

The stars that make up the Winter Hexagon asterism are some of the brightest in the night sky and February evenings are a great time to enjoy their sparkly splendor. The Winter Hexagon is so large in size that the six stars that make up its points are also the brightest members of six different constellations, making the Hexagon a great starting point for learning the winter sky. Find the Hexagon by looking southeast after sunset and finding the bright red star that forms the “left shoulder” of the constellation Orion: Betelgeuse. You can think of Betelgeuse as the center of a large irregular clock, with the Winter Hexagon stars as the clock’s hour numbers. Move diagonally across Orion to spot its “right foot,” the bright star Rigel. Now move clockwise from Rigel to the brightest star in the night sky: Sirius in Canis Major. Continue ticking along clockwise to Procyon in Canis Minor and then towards Pollux, the brighter of the Gemini twins. Keep moving around the circuit to find Capella in Auriga, and finish at orange Aldebaran, the “eye” of the V-shaped face of Taurus the Bull.

Two naked-eye planets are visible in the evening sky this month. As red Mars moves across Pisces, NASA’s InSight Mission is readying its suite of geological instruments designed to study the Martian interior. InSight and the rest of humanity’s robotic Martian emissaries will soon be joined by the Mars 2020 rover. The SUV-sized robot is slated to launch next year on a mission to study the possibility of past life on the red planet. A conjunction between Mars and Uranus on February 13 will be a treat for telescopic observers. Mars will pass a little over a degree away from Uranus and larger magnifications will allow comparisons between the small red disc of dusty Mars with the smaller and much more distant blue-green disc of ice giant Uranus.

Speedy Mercury has a good showing this month and makes its highest appearance in the evening on February 27; spot it above the western horizon at sunset. An unobstructed western view and binoculars will greatly help in catching Mercury against the glow of evening twilight.

The morning planets put on quite a show in February. Look for the bright planets Venus, Jupiter, and Saturn above the eastern horizon all month, at times forming a neat lineup. A crescent Moon makes a stunning addition on the mornings of February 1-2, and again on the 28th. Watch over the course of the month as Venus travels from its position above Jupiter to below dimmer Saturn. Venus and Saturn will be in close conjunction on the 18th; see if you can fit both planets into the same telescopic field of



The stars of the Winter Hexagon  
Image created with help from Stellarium

continued on next page

## Hexagon at Night, Quartet in the Morning, continued

view. A telescope reveals the brilliant thin crescent phase of Venus waxing into a wide gibbous phase as the planet passes around the other side of our Sun. The Night Sky Network has a simple activity that helps explain the nature of both Venus and Mercury's phases at [bit.ly/venusphases](http://bit.ly/venusphases).

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](http://nightsky.jpl.nasa.org) to find local clubs, events, and more!

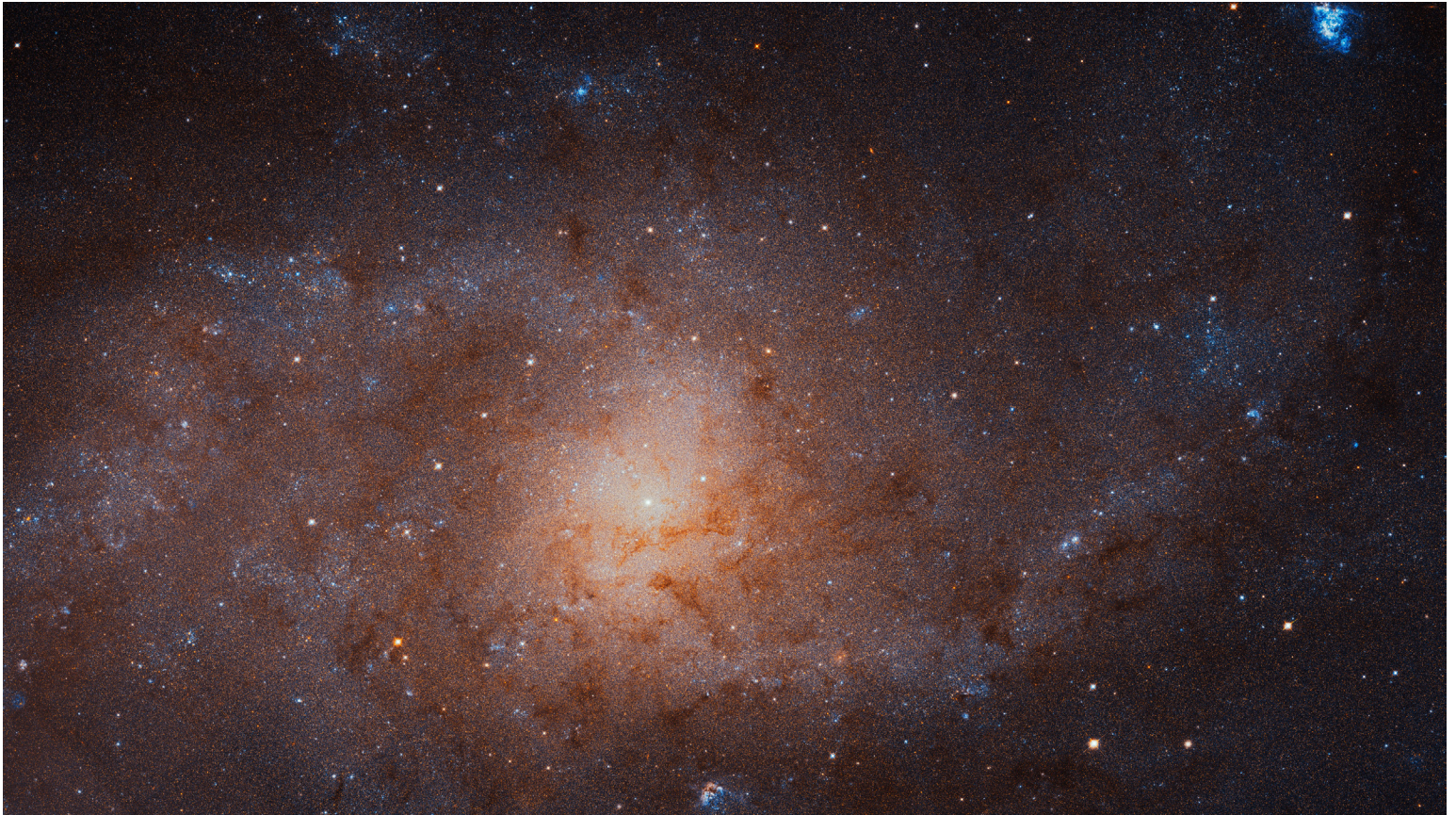
You can catch up on all of NASA's current and future missions at [nasa.gov](http://nasa.gov)

With articles, activities and games NASA Space Place encourages everyone to get excited about science and technology. Visit [spaceplace.nasa.gov](http://spaceplace.nasa.gov) to explore space and Earth science!



The spiral galaxy D100, on the far right of this Hubble Space Telescope image, is being stripped of its gas as it plunges toward the center of the giant Coma galaxy cluster.

The dark brown streaks near D100's central region are silhouettes of dust escaping from the galaxy. The dust is part of a long, thin tail, also composed of hydrogen gas, that stretches like taffy from the galaxy's core. Hubble, however, sees only the dust. The telescope's sharp vision also uncovered the blue glow of clumps of young stars in the tail. The brightest clump in the middle of the tail (the blue feature) contains at least 200,000 stars, fueled by the ongoing loss of hydrogen gas from D100. Credit: [NASA](#), [ESA](#), [M. Sun \(University of Alabama\)](#), and [W. Cramer and J. Kenney \(Yale University\)](#)



The NASA/ESA Hubble Space Telescope has captured the most detailed image yet of a close neighbour of the Milky Way — the Triangulum Galaxy, a spiral galaxy located at a distance of only three million light-years. This panoramic survey of the third-largest galaxy in our Local Group of galaxies provides a mesmerising view of the 40 billion stars that make up one of the most distant objects visible to the naked eye.

This new image of the Triangulum Galaxy — also known as Messier 33 or NGC 598 — has a staggering 665 million pixels and showcases the central region of the galaxy and its inner spiral arms. To stitch together this gigantic mosaic, Hubble's Advanced Camera for Surveys needed to create 54 separate images.

Under excellent dark-sky conditions, the Triangulum Galaxy can be seen with the naked eye as a faint, blurry object in the constellation of Triangulum (the Triangle), where its ethereal glow is an exciting target for amateur astronomers.

At only three million light-years from Earth, the Triangulum Galaxy is a notable member of the Local Group — it is the group's third-largest galaxy, but also the smallest spiral galaxy in the group. It measures only about 60 000 light-years across, compared to the 200 000 light-years of the Andromeda Galaxy; the Milky Way lies between these extremes at about 100 000 light-years in diameter.

The Triangulum Galaxy is not only surpassed in size by the other two spirals, but by the multitude of stars they contain. The Triangulum Galaxy has at least an order of magnitude less stars than the Milky Way and two orders of magnitude less than Andromeda. These numbers are hard to grasp when already in this image 10 to 15 million individual stars are visible.

Image credit: [NASA](#), [ESA](#)



**Barnard-Seyfert Astronomical Society  
Minutes of a Regular Meeting of the Board of Directors  
Held On Wednesday, January 2, 2019**

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held January 2, 2019, at the Girl Scouts Center, 4522 Granny White Pike, Nashville, TN 37204. Present were Tom Beckermann, Chip Crossman, Gary Eaton, Drew Gilmore, Bud Hamblen, Johanna Keohane, Todd Nannie, Andy Reeves and Keith Rainey. A quorum being present, Keith called the meeting to order at 7:30 PM. Keith asked for a motion to adopt the minutes of the December board meeting as printed in the January edition of the Eclipse. Johanna so moved and the minutes were adopted without further discussion by a unanimous voice vote. Tom Guss has agreed to close the club's saving account at Renascent Bank and receive a check for deposit into SunTrust Bank in order to consolidate the accounts at one financial institution in the interest of greater convenience. There were 142 members plus one pending as of January 2. The BSAS library is now at the home of Dr Terry Reeves. There was discussion of inventorying the material and how to make it available to members or otherwise deal with it.

Resolution 2019-01-02, to order 100 copies of a commemorative poster from Hatch Show Print, was moved by Todd, seconded by Keith, and passed by unanimous voice vote. Johanna will order the prints to be available by the date of the January general meeting. Prints will be available for purchase.

Teespring, as an alternative to Cafe Press for marketing materials, was discussed.

There being no further business, Drew moved for adjournment, Todd seconded, and the meeting was adjourned at 8:30 PM.

Respectfully submitted,

Bud Hamblen  
Secretary

**Next BSAS meeting  
February 20, 2019, 7:30 pm**

**Cumberland Valley  
Girl Scout Council Building  
4522 Granny White Pike**

*Theo Wellington: What's Up? Messier Marathon Preview*

**Barnard-Seyfert Astronomical Society  
Minutes of the Monthly Membership Meeting  
Held On Wednesday, January 16, 2019**

The Barnard-Seyfert Astronomical Society held its monthly meeting in the City Room of the Girl Scout Center, Nashville, Tennessee, on Wednesday, January 16, 2019. Nineteen members and guests signed in. Keith Rainey called the meeting to order at 7:30 PM and asked for a motion to approve the minutes of the December 19, 2018, meeting. Curt Porter so moved, David Reagan seconded, and the minutes were approved by a unanimous voice vote. Theo Wellington sent the treasurer's report, which showed there was \$3,075.14 in the checking account, \$4,157.81 in the savings account, and \$885.55 in the PayPal account. There were 142 members.

Keith noted that there were 10 to 11 persons attending the private star party on January 5, 2019. The public event at Bells Bend Outdoor Center was clouded out, but Gary Eaton did present a program to several families. The meeting room at Bells Bend can accommodate 20-30 people.

Upcoming events included total lunar eclipse viewing at the Edwin Warner Park Nature Center on January 20, a private star party at the Natchez Trace Water Valley Overlook on February 2, and a public star party on February 8 at Bowie Nature Park, Fairview.

The program for the evening was an unstructured telescope workshop.

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

Respectfully submitted,

Bud Hamblen  
Secretary



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).