

# The ECLIPSE

November  
2016

*The Newsletter of the Barnard-Seyfert Astronomical Society*

**Next Membership Meeting:**  
November 16, 2016, 7:30 pm  
Glendale United Methodist  
Church - Fellowship Hall  
900 Glendale Lane

*Topic: "Astronomy Toys  
For Night and Day"  
Details on page 9.*

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## From the President:

Well, too much of a good thing. Yes, it's been clear, but also very dry. We don't usually say this, but we could use some rain! Save the drought for next August.

We still need one more board member for BSAS! The board meets once a month on the first Wednesday night. If you'd like to serve, please let me or any board member know! It's a great way to help us grow and prosper. Otherwise I'll have to twist arms.

Spencer Buckner and I will be going over what astronomy toys you might want to find under your tree. There is some awesome gear out there, including a telescope that can align itself using gps and a camera. That's fun, but I want to encourage all of you who are just starting out....learn the sky first. You'll use your eyes to do astronomy more than you will any telescope. Get a [planisphere](#) and start with finding a few bright patterns. The late fall features some of the easiest patterns to pick out: the Summer Triangle is still in the west, the Great Square of Pegasus overhead, and Orion the hunter rising in the east. Watch the movement of the evening planets against the stars. When you are in the habit of looking up whenever you are outside, you'll notice more: the occasional meteor, satellites faintly gliding across the sky, and of course clouds. Slowly you'll expand the number of star patterns you can pick out, and their pictures and stories become old friends that come back every year.

If you need to renew your membership, I'd like to give you a good reason to do so. The club has ordered solar viewing glasses... and every member will get a few. We don't want you or your family to have any trouble watching the Great American Total Solar Eclipse on August 21!



## Officers

Theo Wellington  
President

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Gary Eaton  
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Tom Guss  
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(no one)  
Ex-officio

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## Observing Highlights November and December

**Globular Clusters**  
M56, M71, M15, M2,  
M72, M75, M30

**Open Clusters**  
M73, M29, M39, M52,  
NGC457 (ET), M103,  
NGC654, NGC663,  
NGC884/869 (Double Cluster),  
M34, M45 (Pleiades)

**Nebulae**  
M57 (Ring),  
NGC 6543 (Cat's Eye),  
NGC6826 (Blinking),  
M27 (Dumbbell),  
NGC7000 (North America),  
IC5146 (Cocoon),  
NGC7293 (Helix),  
NGC1499 (California)

**Galaxies**  
M31 (Andromeda),  
M32, M110,  
M33 (Triangulum),  
M74

**Asterisms**  
Cr399 (Coat Hanger)

**Multiple Star Systems**  
Double-Double (Epsilon Lyrae)  
Albireo (Beta Cygni)  
Gamma Delphini

**Variable Stars**  
Mu Cephei  
(Herschel's Garnet Star),  
Beta Persei (Algol),  
Omicron Ceti (Mira)

## Upcoming Star Parties

Friday 11/18 6:30 pm to 9:00 pm	Public Star Party <a href="#">Bowie Nature Park (Fairview)</a>
Saturday 11/26	Private Star Party <a href="#">Natchez Trace Parkway mile marker 435.3</a>
Saturday 12/3 6:30 pm to 8:30 pm	Public Star Party <a href="#">Shelby Bottoms Nature Center</a>
Saturday 12/31	Private Star Party <a href="#">Natchez Trace Parkway mile marker 412 (Water Valley Overlook)</a>



Nov 29  
Dec 29



Nov 7  
Dec 7



Nov 14  
Dec 13



Nov 21  
Dec 20

## Happy Birthday Eileen Collins by Robin Byrne

This month we celebrate the life of a woman who blazed the trail. Eileen Marie Collins was born in Elmira, New York on November 19, 1956. Her parents, James and Rose, were immigrants from Ireland, who had a total of four children. Growing up in Elmira, it's no wonder Eileen became fascinated with flying at an early age. The city is known as the "soaring capital," and is home to the Harris Hill Soaring Center, where people can fly gliders off of the ridges found in the area. Growing up, Eileen loved both watching the gliders, as well as airplanes taking off from the local airport. Piloting became her dream. Despite her parents' divorce when Eileen was nine, and the economic hardships they faced during that difficult time, she never lost sight of her goal. Starting when she was in high school, Eileen worked nights at a pizza parlor, saving up for flying lessons. At the age of 19, she began her journey to the stars with her first flight.

In 1974, Eileen graduated from high school and entered Corning Community College to work toward an associate's degree in math and science, which she received in 1976. She then transferred to Syracuse University to finish off a bachelor's degree in math and economics. While at Syracuse, Eileen joined the ROTC, getting her first taste of military life.

Upon graduation in 1978, Eileen set her sights on the Air Force. It was only two years earlier that the Air Force even began accepting women. Eileen applied to the Undergraduate Pilot Training School at Vance Air Force Base in Oklahoma. A total of 120 women had applied that year, and only four were chosen, including Eileen. Meanwhile, there were 320 men in the same class. After completing the one year course of training, Eileen had earned the honor of being hired as the first female flight instructor for the U.S. Air Force. This would not be the last time Eileen was the first. She would work as a flight instructor at Vance for another three years.



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## Eileen Collins, continued

In 1983, Eileen was transferred to the Travis Air Force Base in California. While here, she flew cargo planes for both military and humanitarian missions. In 1986, she was assigned to the U.S. Air Force Academy in Colorado, where she was an assistant professor of mathematics and a flight instructor. In 1987, Eileen married fellow pilot, Pat Youngs, who went on to become an airline pilot. They would eventually have two children, Bridget and Luke. It was during this time that she decided to also continue her education. She started with Stanford University, where she received a master's degree in operations research in 1986. Later, she pursued a master's degree in space systems management from Webster University, graduating in 1989.



In 1989, with over 1500 hours of flight time, plus two advanced degrees, Eileen applied, and was accepted, to the Air Force Test Pilot School at Edwards Air Force Base. She was only the second woman to be accepted to the program. The following year, she graduated and was selected by NASA for the astronaut program.

For the next five years, Eileen trained and worked as ground support for other space shuttle missions. On February 3, 1995, Eileen Collins achieved another first, as the first woman to pilot a shuttle mission. The main goal of STS-63 was to rendezvous with the Mir space station, but not dock, so the mission was dubbed the "Near-Mir" mission. During the encounter with Mir, they tested how to maneuver near the space station, communications systems were tested, plus navigation aid sensors were evaluated. All of this was in anticipation of STS-71, which would be the first mission to dock with Mir. Despite some technical issues with the thrusters on the shuttle, they were able to fly around the space station, and approach as close as 11 meters. On board the shuttle

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### Eileen Collins, continued

was Mission Specialist Vladimir Titov, who was in charge of communicating with Mir, where he had lived for a record 365 days. Collins, remembering her first trip into space, said “The launch sounds like you’re standing in a room that’s on fire. The engines turn off at eight and a half minutes, and you’re immediately in zero gravity. I pulled out my pen and it floated. I thought, I’m here—I’m in space.” In recognition of being the first female Shuttle Pilot, Collins was awarded the Harmon Trophy, an annual award recognizing the highest achievement in space flight.

The following year, Eileen took some time off to give birth to her daughter, but the hiatus didn’t last long. In 1997, she would pilot her second shuttle mission, STS-84, which delivered 7000 pounds of equipment and supplies to Mir. At the end of this mission, Collins had amassed a total of 419 hours in space.

With that much space flight experience, it’s no wonder that for her next mission assignment, STS-93, Collins was given the position of mission commander. On July 23, 1999, Eileen Collins became the first woman to command a shuttle flight. The primary objective of the mission was to deliver the Chandra X-Ray Observatory into Earth orbit, but it had a rocky start. Due to faulty wiring, two of the three main engines blew out during launch. The backup engine kicked in to compensate, but then a leak developed in the fuel line. Despite all these problems, Collins remained calm and managed to successfully guide the shuttle into orbit (although at a slightly lower altitude than originally planned).

After the tragic destruction of the space shuttle Columbia in 2003, the shuttle program was grounded to rework the safety protocols. When the “return to flight” mission was announced for August 2005, Eileen Collins would again be in command. As one of the new safety procedures, the shuttle, with Collins at the wheel, performed the first 360° pitch maneuver next to the International Space Station, so that all sides of the shuttle, and especially the heat shields, could be inspected by the astronauts on ISS. They then docked with ISS, and spent most of the two-week mission unloading supplies to the space station. The success of the mission gave the green light to continue flying the shuttle.

Due to all of her accomplishments, it comes as no surprise that Eileen Collins has been honored in many ways, including the Distinguished Flying Cross, the NASA Outstanding Leadership Medal, induction into the National Women’s Hall of Fame, plus being named

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## Eileen Collins, continued

in Encyclopedia Britannica's list of 300 Women Who Changed the World. But the honor that may mean the most to Eileen is the construction of the Eileen Collins Observatory at her former community college in Elmira.

After spending a little over 38 total days in space, Eileen Collins had earned some time off. In 2005, she retired from the Air Force, and on May 1, 2006, she left NASA to spend more time with her family. While the shuttle missions continued, Collins could be seen on CNN, providing coverage of the missions. She also served on the board of the United Services Automobile Association, which provides insurance, investment and banking services to those who served in the U.S. military and their families.

Eileen Collins definitely lived her dream and blazed many trails. I was fortunate to have the chance to meet her several years ago when she spoke at ETSU. Despite all of her achievements and accolades, she was very approachable, and she truly enjoyed talking with each person who waited in line for an autograph or picture. In fact, we chatted for so long, I felt guilty about monopolizing so much of her time, but she seemed content to spend as long as possible with each person there. What an amazing woman, and what an amazing life she had the good fortune to live. As she said in an interview, "I gotta tell you, I came back from my last flight and I tried to read a novel, and it was boring. I couldn't get into it. My life was like, way above anything I could read in a book." May we all be as lucky as Eileen Collins, and live lives more interesting than anything you could read in a book.

### References:

[Eileen Collins - Wikipedia](#)

[STS 63 - Wikipedia](#)

[STS 93 - Wikipedia](#)

[Eileen Collins Biography - Biography.com](#)

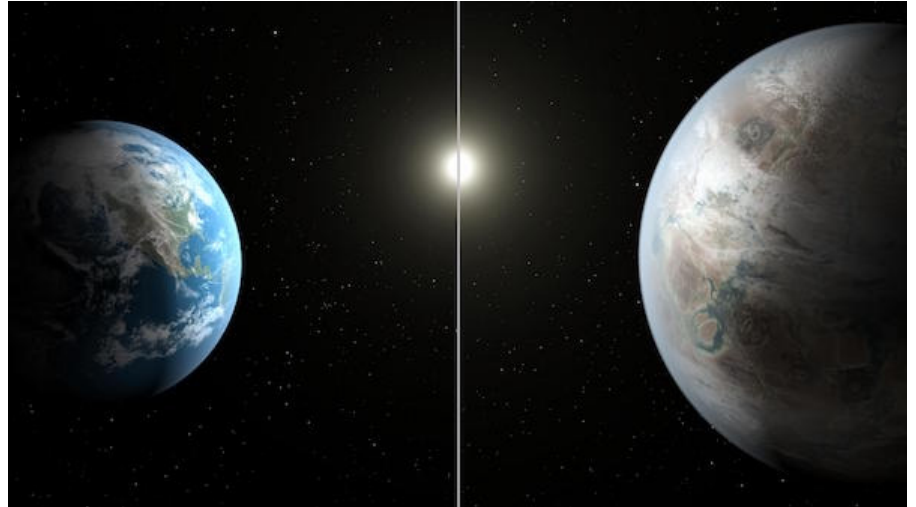
[Eileen Collins Biography - Encyclopedia of World Biography](#)

## Is Proxima Centauri's 'Earth-like' planet actually like Earth at all?

By Ethan Siegel

Just 25 years ago, scientists didn't know if any stars—other than our own sun, of course—had planets orbiting around them. Yet they knew with certainty that gravity from massive planets caused the sun to move around our solar system's center of mass. Therefore, they reasoned that other stars would have periodic changes to their motions if they, too, had planets.

This change in motion first led to the detection of planets around pulsars in 1991, thanks to the change in pulsar timing it caused. Then, finally, in 1995 the first exoplanet around a normal star, 51 Pegasi b, was discovered via the “stellar wobble” of its parent star. Since that time, over 3000 exoplanets have been confirmed, most of which were first discovered by NASA's Kepler mission using the transit method. These transits only work if a solar system is fortuitously aligned to our perspective; nevertheless, we now know that planets—even rocky planets at the right distance for liquid water on their surface—are quite common in the Milky Way.



An artist's conception of the exoplanet Kepler-452b (R), a possible candidate for Earth 2.0, as compared with Earth (L). Image credit: NASA/Ames/JPL-Caltech/T. Pyle.

On August 24, 2016, scientists announced that the stellar wobble of Proxima Centauri, the closest star to our sun, indicated the existence of an exoplanet. At just 4.24 light years away, this planet orbits its red dwarf star in just 11 days, with a lower limit to its mass of just 1.3 Earths. If verified, this would bring the number of Earth-like planets found in their star's habitable zones up to 22, with 'Proxima b' being the closest one. Just based on what we've seen so far, if this planet is real and has 130 percent the mass of Earth, we can already infer the following:

- It receives 70 percent of the sunlight incident on Earth, giving it the right temperature for liquid water on its surface, assuming an Earth-like atmosphere.

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## Proxima Centari, continued

- It should have a radius approximately 10 percent larger than our own planet's, assuming it is made of similar elements.
- It is plausible that the planet would be tidally locked to its star, implying a permanent 'light side' and a permanent 'dark side'.
- And if so, then seasons on this world are determined by the orbit's ellipticity, not by axial tilt.

Yet the unknowns are tremendous. Proxima Centauri emits considerably less ultraviolet light than a star like the sun; can life begin without that? Solar flares and winds are much greater around this world; have they stripped away the atmosphere entirely? Is the far side permanently frozen, or do winds allow possible life there? Is the near side baked and barren, leaving only the 'ring' at the edge potentially habitable?

Proxima b is a vastly different world from Earth, and could range anywhere from actually inhabited to completely unsuitable for any form of life. As 30m-class telescopes and the next generation of space observatories come online, we just may find out!

Looking to teach kids about exoplanet discovery? NASA Space Place explains stellar wobble and how this phenomenon can help scientists find exoplanets.

<http://spaceplace.nasa.gov/barycenter/en/>

This article is provided by NASA Space Place.

With articles, activities, crafts, games, and lesson plans, 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!



Send your cool astrophotos to  
[eclipse@bsasnashville.com](mailto:eclipse@bsasnashville.com)!



## From the President, continued

While you are renewing, do you need a calendar and/or astronomy guide for next year? The club will make a bulk purchase of two items, Astronomy magazine's Deep Space Mysteries calendar and the RASC Observer's Handbook. The calendars are \$13, feature lovely images and have nice big blocks for writing in all the star party dates - these have been my kitchen calendar for years. The Royal Astronomical Society of Canada's Observer's Handbook is a guide to every phenomenon in the sky, lists of Messier and other deep sky objects, a monthly list of important events (double shadow transits on Jupiter, conjunctions, even eclipses). But wait, isn't all that on our phones? Sure... as long as your battery is charged. The book works in all weather, never runs out of power, and can be lit using my red flashlight instead of being a light beacon as many phone apps are. Toss it in your car, you'll always be ready. Please send me a note if you want one or both of these so we know how many to order... we'll have a sign up sheet as well at the November meeting. We'll order right after that to hopefully have them in for the December dinner.

Clear skies,

Theo Wellington



*Astronomers using data from the NASA/ESA Hubble Space Telescopes and other telescopes have performed an accurate census of the number of galaxies in the Universe. The group came to the surprising conclusion that there are at least 10 times as many galaxies in the observable Universe as previously thought. The results have clear implications for our understanding of galaxy formation, and also help solve an ancient astronomical paradox – why is the sky dark at night?*

Image credit: NASA, ESA

[Article and full resolution image](#)

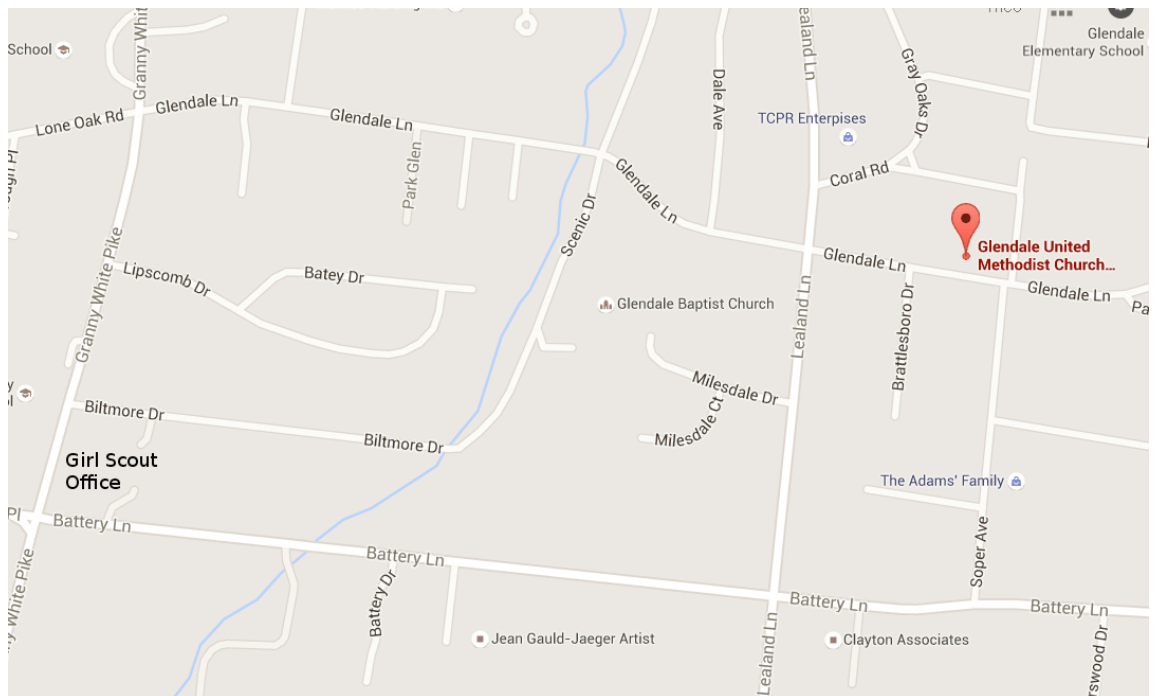
Next BSAS meeting  
 November 19, 2016, 7:30 pm  
 Glendale United Methodist Church - Fellowship Hall  
 900 Glendale Lane

*Topic: "Astronomy Toys For Night and Day" Spencer Buckner and Theo Wellington  
 With the upcoming eclipse, this year's pre-Thanksgiving meeting will cover astronomy toys for both  
 daytime solar and eclipse observing as well as nighttime stargazing.*

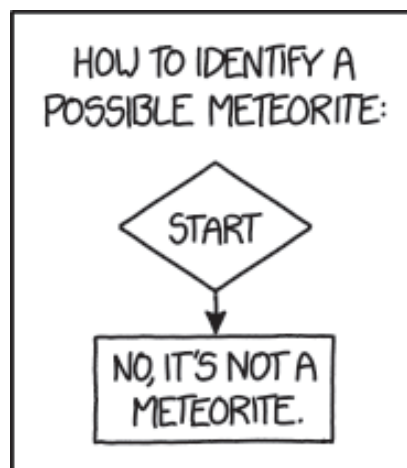
**NOTICE:** the location for  
 our board and member  
 meetings has changed!

The Girl Scouts are  
 renovating, so we will be  
 at the [Glendale United  
 Methodist Church, 900  
 Glendale Lane, Nashville  
 37204](#).

It's just around the block  
 from the Girl Scout  
 office.



[xkcd](#)



**Barnard-Seyfert Astronomical Society  
Minutes of a Regular Meeting of the Board of Directors  
Held On Wednesday, October 5, 2016.**

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held October 5, 2016, at Glendale United Methodist Church, 900 Glendale Lane, Nashville, TN 37204. Present were Mike Benson, Spencer Buckner, Gary Eaton, Tom Guss, Bud Hamblen and Theo Wellington. Theo called the meeting to order at about 7:45 PM. Theo asked for a motion to approve the minutes for the August 3, 2016, board meeting as printed in the September 2016 issue of the Eclipse. Spencer so moved, Mike seconded, and the minutes were approved by unanimous voice vote. Tom Guss reported that there was \$2,758.21 in the checking account and \$1,619.84 in the savings account.

The planned public star parties for October 8 at Edwin Warner Park and November 18 at Bowie Nature Park are still on the schedule, weather permitting. A private star party is planned on October 29 at the Natchez Trace Water Valley Overlook.

The club has heartfelt thanks for Mark Manner's hospitality in August.

Billy Teets from Dyer Observatory is scheduled to speak at the October 19 meeting. Spencer Buckner is scheduled to speak at the November 16 meeting. Paul Lewis has been asked to speak at the December 21 meeting.

Monique Hodge, Pickett State Park, said that Paul Lewis is writing a grant application to build an observatory at Pickett State Park. The 16" Meade telescope donated to the club by Loren Ball would be located at that observatory.

Drew Gilmore and Keith Rainey have volunteered to be at-large members of the board.

Eclipse glasses will be ordered soon. Keith Rainey has added \$100 to the order for his friends and business (many thanks).

Denise Weyer, Shelby Bottoms Nature Center, has asked for assistance with staff training for the 2017 solar eclipse.

Theo reported that she is working part time with Richard Gelderman, WKU, helping with eclipse events.

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## Minutes of a Regular Meeting of the Board of Directors, continued

Possible private star party dates for 2017:

1/28  
2/25  
3/25  
4/29  
5/27  
6/24  
7/22  
8/19  
9/16  
10/21  
11/18  
12/16

Possible public star party dates:

1/7  
2/4  
3/4  
4/1  
5/6 or 5/27  
6/3  
7/1  
8/26  
9/30 (Astronomy Day)  
10/28  
11/25 is the Saturday after Thanksgiving and an alternative date may be decided on.

12/9 or 12/23? 12/23 would be close to Christmas.

There being no further business, Spencer moved for adjournment, Gary seconded, and the meeting was adjourned at about 8:45 PM.

Respectfully submitted,

Bud Hamblen  
Secretary

**Barnard-Seyfert Astronomical Society  
Minutes of the Monthly Membership Meeting  
Held On Wednesday, October 19, 2016.**

The Barnard–Seyfert Astronomical Society held its monthly membership meeting at the Glendale United Methodist Church, 900 Glendale Lane, Nashville, Tennessee, on Wednesday, October 19, 2016. Fifteen members and two guests signed in. Theo Wellington called the meeting to order at 7:45pm. Theo asked for a motion to approve the minutes of the September meeting as printed in the October Eclipse. Bill Griswold so moved, Mike Benson seconded, and the minutes were approved by unanimous voice vote. Tom Guss reported that there was \$1,619.84 in the savings account and \$3,144.69 in the checking account.

Theo reported that the Japanese Moon Viewing Celebration at Cheekwood Botanical Garden and Art Museum on October 16 was successful.

Chuck Schlemm and John Walker will be at Montgomery Bell State Park on November 4 from 7 to 9 PM.

A private star party is scheduled at the Water Valley Overlook, Natchez Trace mile marker 412, for October 29.

A public star party is scheduled at Bowie Nature Park, Fairview, for Friday, November 18, from 6:30 to 9 PM.

Theo asked for a volunteer to fill a seat on the board of the society.

Dr Billy Teets, Vanderbilt University Dyer Observatory, made a presentation on the European Space Agency Gaia (Global Astrometric Interferometer for Astrophysics) satellite. [[sci.esa.int/gaia/](http://sci.esa.int/gaia/)]

There being no further business, the meeting was adjourned at 9:00 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) or call Theo Wellington at (615) 300-3044.

## 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).