The ECLIPSE

May 2017

The Newsletter of the Barnard-Seyfert Astronomical Society

Next Membership Meeting:
April 19, 2017, 7:30 pm
Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

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Barnard-Seyfert Astronomical Society
bsasnashville.com

From the President:

Greetings,

It seemed like an easy call at the time. We recently had a public star party scheduled for Bells Bend on Friday night. It had been very cloudy all afternoon. A 4:00 PM check of the weatherchannel.com and one other source confirmed what we expected. Their forecast called for "mostly cloudy" skies throughout the area. So, we decided to cancel the event. About 8:00 PM, I happened to walk outside our home in Franklin and was amazed at how clear the sky was. It may not have been as clear at Bells Bend, but chances are we would have had some opportunities to view Jupiter, the crescent moon and other targets. It was natural for me to second guess our "easy call".

It sure seems like we have had more than our share of clouds and rain. Our March Bowie Nature Park public star party was cancelled. Several recent private star parties on the Natchez Trace could not be held as planned. BSAS was scheduled to be represented at Nashville's Earth Day which was said to be a "rain or shine" event. Based on that, we sent out a reminder the morning of the event only to find out later, it was cancelled due to weather. I suppose most of us have not had our telescopes out more than a few times in the last couple of months.

According to the website, clearresults.com, Cold Bay, Alaska is the cloudiest U.S. city. On average, it has 354 days a year with heavy clouds. Nashville is more typical. On average, we have 102 days a year with clouds covering no more than 30% of the sky. That's about twice as many as Seattle, for which we can be thankful. But, less than half as many as Phoenix for which we can be jealous.

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Barnard-Seyfert Astronomical Society

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Observing Highlights May and June

Open Clusters
M35, NGC2264 *(Christmas Tree)*, M41, M50, M47, M46, M93, M48, M44 *(Beehive)*, M67, Mel111 *(Coma Star Cluster)*, NGC4755 *(Jewel Box Cluster)*

Galaxies
M81, M82, NGC3115 *(Spindle Galaxy)*, M95, M96, M105, M108, M65/M66/NGC3628 *(Leo Triplet)*, M109, M98, M99, M106, M61, M100, M84, M85, M86, M49, M87, M88, M91, M89, M90, M58, M104 *(Sombrero Galaxy)*, M59, M60, M94, M64 *(Black-Eye Galaxy)*, M63 *(Sunflower Galaxy)*, M51 *(Whirlpool Galaxy)*, M83, M101/M102

Nebulae
NGC2392 *(Eskimo)*, NGC3242 *(Ghost of Jupiter)*, M97 *(Owl)*

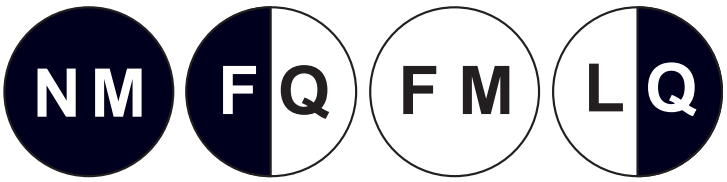
Variable Stars
L Puppis, R Leonis

Globular Clusters
M68, M53, M3, M5

Multiple Star Systems
Alpha Geminorum *(Castor)*, Gamma Leonis *(Algieba)*, M40, Gamma Virginis *(Porrima)*, Alpha Canum Venaticorum *(CorCaroli)*, Zeta Ursae Majoris *(Mizar)*, Epsilon Bootis *(Izar or Pulcherrima)* Mu Bootis *(Alkalurops)*

Upcoming Star Parties

Saturday 5/13 8:30 pm to 10:30 pm	Public Star Party Long Hunter State Park
Saturday 5/27	Private Star Party Natchez Trace Parkway mile marker 435.3
Saturday 6/3 9:00 pm to 11:00 pm	Public Star Party Cornelia Fort Airpark
Friday 6/16 8:30 pm to 10:30 pm	Public Star Party Bowie Nature Park (Fairview)
Saturday 6/17 8:30 pm to 10:00 pm	Public Star Party Montgomery Bell State Park



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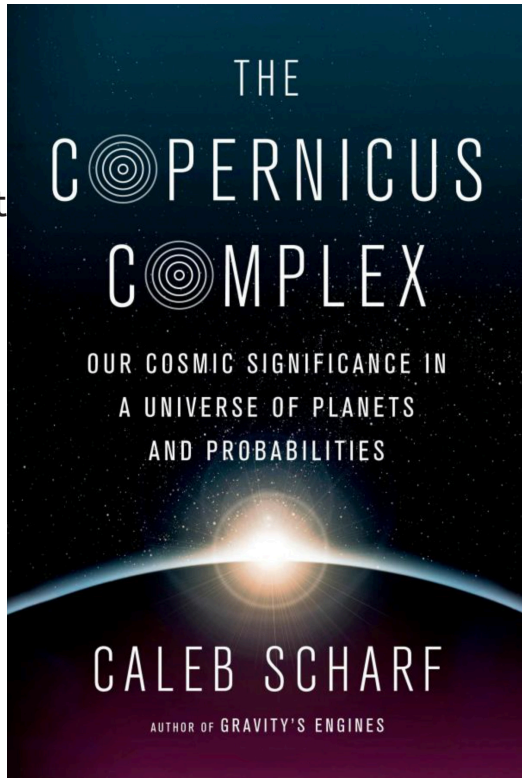
May 2
June 1, 30

May 10
June 9

May 18
June 17

Book Review: The Copernicus Complex
reviewed by Robin Byrne



One of my holiday gifts this past year was the book "The Copernicus Complex: Our Cosmic Significance in a Universe of Planets and Probabilities" by Caleb Scharf. Given our recent trip to Poland, seeing the name of Copernicus got me excited. Although the book turned out to have very little to do with Copernicus, it was still an enjoyable and thought-provoking read.

The premise of the book is to explore the question of whether we, humans on planet Earth, are "special" or not. Prior to Copernicus and the heliocentric model, people assumed we were special and that was evidenced by our location at the center of all creation. When planet Earth was delegated to just one of the planets orbiting the Sun, the pendulum shifted in the other direction, assuming that we are ordinary - a dime a dozen. Scharf explores a variety of avenues to see whether we are, indeed, special or ordinary.

He begins by exploring astronomical clues. We orbit a star that is often referred to as "average," when, in fact, far more stars are smaller than the Sun than larger. We reside in a solar system with terrestrial planets close to the star, and jovian planets located at larger distances. When looking at the systems of planets found so far, we do not resemble what we are finding. We are located at an ideal distance from our star for liquid water to be plentiful. We have sufficient atmosphere to maintain liquid water and life. We live in an era of the universe when enough high mass stars have died to provide, in sufficient quantities, the elements necessary for life as we know it to exist. We reside in a galaxy located in a sparsely populated cluster of galaxies, with infrequent galactic collisions. Our galaxy has enough gas and dust to sustain star formation. In many ways, it appears as though, astronomically speaking, we lucked out.

Having a background in astrobiology, Scharf next explores the conditions necessary for life to exist and evolve. I'll be honest, since biology is not my strong point, this section was tougher for me to go through. He looked at the initial chemistry needed to produce the building blocks for life, and found that the elements involved and the necessary reactions would be quite common. Exploring the kinds of conditions necessary for life

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The Copernicus Complex, continued

to exist, he looked not just at the more typical kinds of life found on Earth, but also the extremophiles that reside in some of the harshest environments our planet can dish out. So, while life is very abundant on Earth, there is definitely a sampling bias. We live on a planet inhabited by life forms, so, of course, there will be lots of life here. Is life on Earth even representative of life that could evolve on other planets in different circumstances? There are many unknowns when we enter this realm.

Finally, Scharf invokes probability theory to explore the likelihood of various conditions, both astronomical and biological, to see whether we are unique or not. Without giving too much away, the final answer is both yes and no. In some ways we appear to be quite unique, while in others we are not. That may not be the most satisfying answer, but it is the most reasonable. There are aspects to where and when we live in the universe that are quite common, while other parts are quite unusual. Having life may not be that unusual, but evolving to our level of intelligence and technology may end up being rare.

If you are interested in a book that explores these kinds of philosophical questions, while reviewing some of what we know about astronomy, biology, and statistics, "The Copernicus Complex" may just be the book for you.

References:

The Copernicus Complex: Our Cosmic Significance in a Universe of Planets and Probabilities by Caleb Scharf; Scientific American; 2014

Next BSAS meeting
May 17, 2017, 7:30 pm

Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

***Topic**: Our May member program will feature two BSAS award recipients from the Middle Tennessee Science and Engineering Fair recently held at Belmont University. The MTSEF is the premier STEM competition for middle and high school students in Nashville-Davidson County and its surrounding counties. Each year, BSAS recognizes two students with outstanding astronomy related project entries. One student will talk about pulsars and the other student will speak on gravitational waves. Please plan to attend as we encourage these bright students and learn about their research as well as the MTSEF competition.*

From the President, continued

We send out reminders about public and private star parties through Night Sky Network. Please let us know if you are not receiving them. You can check out our website and Facebook for notices when public star parties are cancelled due to weather. We do not typically officially cancel private star parties.

Let's all hope the upcoming star parties are held under clear skies with great visibility. If you are not familiar with it, check out clear sky charts produced by the Canadian Meteorological Center. Their forecast model is specifically designed for amateur astronomers.

Gary Eaton

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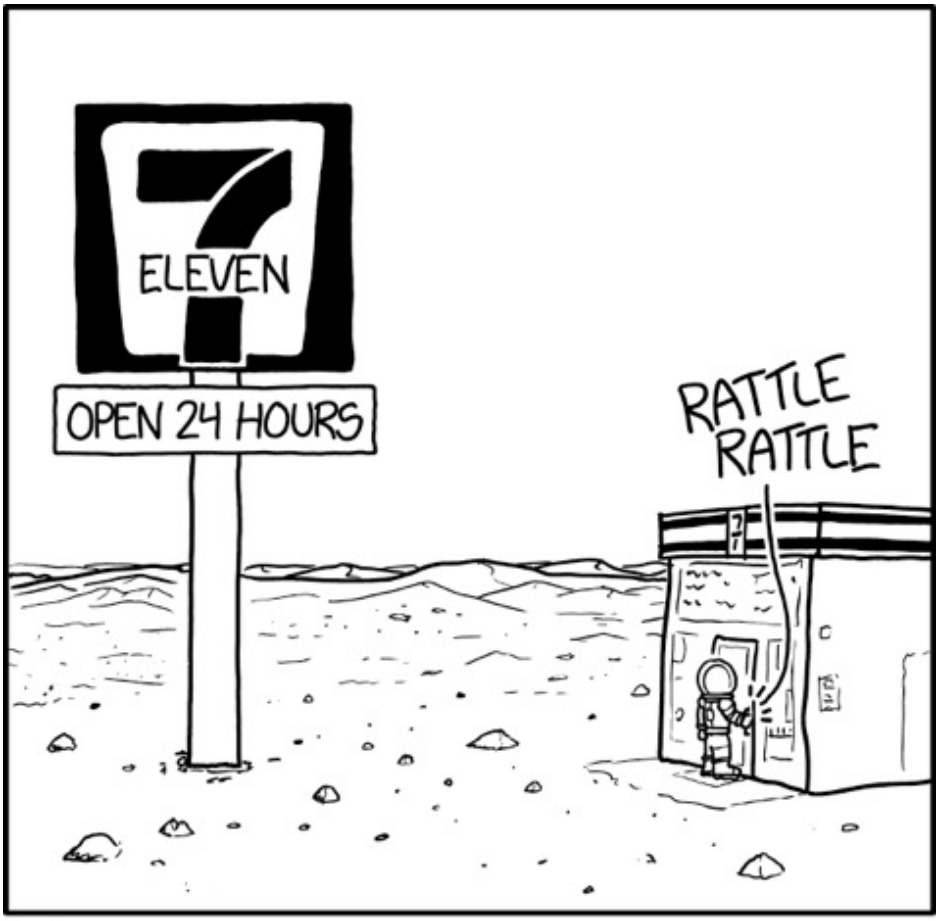

I'M GLAD THEY FINALLY OPENED A 7-ELEVEN HERE ON MARS, BUT IT'S ANNOYING HOW IT CLOSES FOR 37 MINUTES EVERY DAY.

NOAA's Joint Polar Satellite System (JPSS) to monitor Earth as never before
By Ethan Siegel

Later this year, an ambitious new Earth-monitoring satellite will launch into a polar orbit around our planet. The new satellite—called JPSS-1—is a collaboration between NASA and NOAA. It is part of a mission called the Joint Polar Satellite System, or JPSS.

Ball and Raytheon technicians integrate the VIIRS Optical and Electrical Modules onto the JPSS-1 spacecraft in 2015. The spacecraft will be ready for launch later this year. Image Credit: Ball Aerospace & Technologies Corp.

At a destination altitude of only 824 km, it will complete an orbit around Earth in just 101 minutes, collecting extraordinarily high-resolution imagery of our surface, oceans and atmosphere. It will obtain full-planet coverage every 12 hours using five separate, independent instruments. This approach enables near-continuous monitoring of a huge variety of weather and climate phenomena.

JPSS-1 will improve the prediction of severe weather events and will help advance early warning systems. It will also be indispensable for long-term climate monitoring, as it will track global rainfall, drought conditions and ocean properties.

The five independent instruments on board are the main assets of this mission:

- The Cross-track Infrared Sounder (CrIS) will detail the atmosphere's 3D structure, measuring water vapor and temperature in over 1,000 infrared spectral channels. It will enable accurate weather forecasting up to seven days in advance of any major weather events.

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Joint Polar Satellite System, continued

• The Advanced Technology Microwave Sounder (ATMS) adds 22 microwave channels to CrIS's measurements, improving temperature and moisture readings.

• Taking visible and infrared images of Earth's surface at 750 meter resolution, the Visible Infrared Imaging Radiometer Suite (VIIRS) instrument will enable monitoring of weather patterns, fires, sea temperatures, light pollution, and ocean color observations at unprecedented resolutions.

• The Ozone Mapping and Profiler Suite (OMPS) will measure how ozone concentration varies with altitude and in time over every location on Earth's surface. This can help us understand how UV light penetrates the various layers of Earth's atmosphere.

• The Clouds and the Earth's Radiant System (CERES) instrument will quantify the effect of clouds on Earth's energy balance, measuring solar reflectance and Earth's radiance. It will greatly reduce one of the largest sources of uncertainty in climate modeling.

The information from this satellite will be important for emergency responders, airline pilots, cargo ships, farmers and coastal residents, and many others. Long and short term weather monitoring will be greatly enhanced by JPSS-1 and the rest of the upcoming satellites in the JPSS system.

Want to teach kids about polar and geostationary orbits? Go to the NASA Space Place: *https://spaceplace.nasa.gov/geo-orbits/*

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 to explore space and Earth science!

Contribute to *The Eclipse*!
eclipse@bsasnashville.com!

Barnard-Seyfert Astronomical Society
Minutes of a Regular Meeting of the Board of Directors
Held On Wednesday, April 5, 2017.

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held April 5, 2017, at Glendale United Methodist Church, 900 Glendale Lane, Nashville, TN 37204. Present were Spencer Buckner, Gary Eaton, Drew Gilmore, Tom Guss, Bud Hamblen, Todd Nannie, Keith Rainey and Theo Wellington. Gary called the meeting to order at about 7:30 PM. Gary then asked for a motion to approve the minutes for the March 1, 2017, board meeting as printed in the April, 2017, issue of the *Eclipse*. Spencer so moved, Keith seconded, and the minutes were approved by voice vote. Tom reported that there was $2,849.44 in the checking account and $1,820.15 in the savings account.

Keith reported that there were 105 members in March, 2017.

Spencer, Theo and Bud said they planned to be at Bells Bend on April 8 for the Outdoor estival. Gary, Spencer and Bud planned to be at Centennial Park on April 22 for the Earth Day Festival.

Keith reported that he had received the new spider and diagonal mirror for the club's 13.1" Coulter dob.

Theo reported that there were two astronomy-related projects of note at the 2017 Middle Tennessee Science and Engineering Fair. First prize will be awarded for a project to detect pulsars in available data and second prize will be awarded for a project modeling gravity waves.

Heather at Warner Parks is interested in help for solar observing at the Nature Center on June 21. There will to be help for a similar program at the Parthenon on July 21.

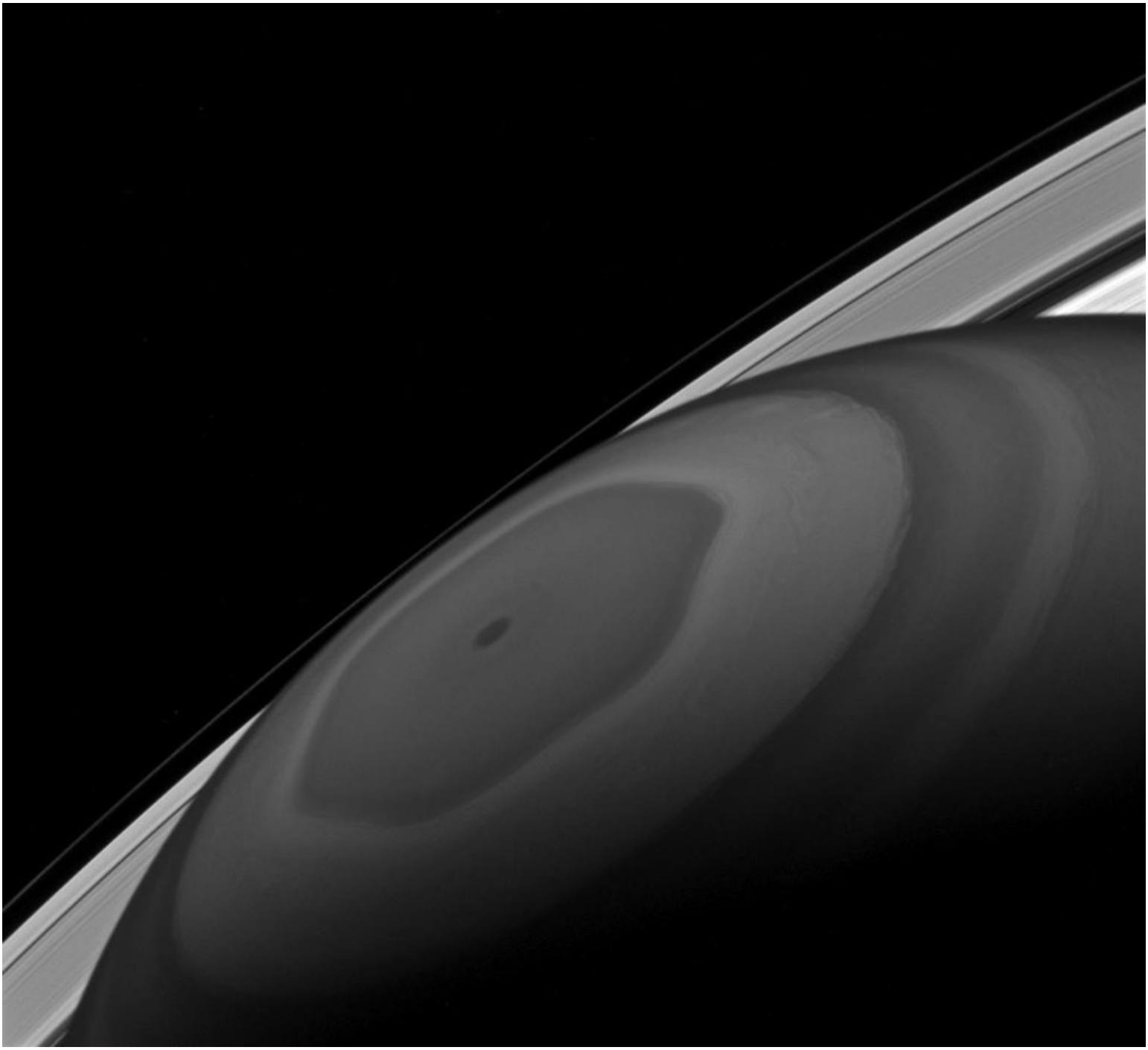
Todd reported that K. C. has the club's Celestar 114GT, Chuck Schlemm has the PST, Curt Porter has two star party signs, and Terry Reeves has red LED ropes.

Franklin Frasier wants to donate a 4" Meade telescope, exact model not known.

There being no further business, the meeting was adjourned about 9:00 PM.

Respectfully submitted,

Bud Hamblen
Secretary



North Pole of Saturn This view looks toward the sunlit side of the rings from about 26 degrees above the ring plane. The image was taken with the Cassini spacecraft wide-angle camera on Dec. 2, 2016 using a spectral filter which preferentially admits wavelengths of near-infrared light centered at 890 nanometers.

The view was acquired at a distance of approximately 619,000 miles (996,000 kilometers) from Saturn. Image scale is 37 miles (60 kilometers) per pixel.

Image Credit: NASA/JPL-Caltech/Space Science Institute

Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held On Wednesday, April 19, 2017.

The Barnard-Seyfert Astronomical Society held its monthly meeting in the City Room at the Girls Scout office, 4522 Granny White Pike, Nashville, Tennessee, on Wednesday, April, 2017. About 30 members were present.

Gary Eaton called the meeting to order at 7:30pm. The minutes of the March 15 meeting as printed in the April issue of the Eclipse were adopted, without discussion, by voice vote.

Keith Rainey reported that there were 106-107 members.

Lonnie Puterbaugh, John Walker and Gary Eaton were at Brentwood Baptist Church on April 1, 2017. Gary reported that there were about 150 attendees.

Upcoming events include the Earth Day Festival at Centennial Park on April 22, a public star party at Bells Bend Outdoor Center on April 28, and a public star party at Long Hunter State Park on May 13. Pickett State Park will hold an International Dark-Sky Association celebration on April 22. The club meeting on August 16 will be oriented toward solar eclipse preparation. Public solar viewing events are scheduled at the Parthenon on June 21 from 9:45 to 11:15, and at the Warner Park Nature Center (not the Special Events Field) on July 21 from 10 to 12. Solar telescopes will be needed.

Todd Nannie asked that members let him know what club owned equipment they currently have.

Dr JanaRuth Ford made a presentation on meteorite impact sites in Tennessee and Alabama, and discussed the material available for outreach at the Night Sky Network. One incentive for using NSN material is that when the club is credited for using NSN material, it becomes eligible to receive more goodies from NASA.

There being no further business the meeting was adjourned at 9:00pm.

Respectfully submitted,

Bud Hamblen

Secretary

This NASA/ESA Hubble Space Telescope image captures a galaxy named NGC 7250. Despite being remarkable in its own right — it has bright bursts of star formation and recorded supernova explosions— it blends into the background somewhat thanks to the gloriously bright star hogging the limelight next to it.

This bright object is a single and little-studied star named TYC 3203-450-1, located in the constellation of Lacerta (The Lizard), much closer than the much more distant galaxy. Only this way a normal star can outshine an entire galaxy, consisting of billions of stars. Astronomers studying distant objects call these stars “foreground stars” and they are often not very happy about them, as their bright light is contaminating the faint light from the more distant and interesting objects they actually want to study.

In this case TYC 3203-450-1 million times closer than NGC 7250 which lies over 45 million light-years away from us. Would the star be the same distance as NGC 7250, it would hardly be visible in this image.

Image Credit: ESA/Hubble & NASA

Barnard-Seyfert Astronomical Society

Become a Member of BSAS! Visit 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. If you need more information, write to us at 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.