

# The ECLIPSE

February  
2017

*The Newsletter of the Barnard-Seyfert Astronomical Society*

**Next Membership Meeting:**  
February 15, 2017, 7:30 pm  
Glendale United Methodist  
Church - Fellowship Hall  
900 Glendale Lane

*Topic: How to do a  
Messier Marathon*

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## From the President

Greetings,

A few minutes before sunset on the night of a BSAS star party, it is not unusual for telescopes to be ready to go and for BSAS members to huddle here and there for conversations about the weather, anticipated targets for the evening or perhaps for small talk about recently acquired equipment. On more than one of those occasions however, I can recall the conversation turning to the historic NASA missions with the often-asked question coming up, "where were you when Apollo 11 landed on the moon?" Obviously, July 20, 1969 is receding further into history, but those of us who are old enough can easily recall exactly where we were when we saw those grainy, black and white images of the moon being broadcast live on television. What a great memory!

It is not too much of a stretch to think that August 21, 2017 will become a similar date of historic note as well. Millions of people who rarely give any thought to astronomy, will stop long enough to look up and be awe-struck by the magnificent sight of a total solar eclipse. On this side of that historic moment, the question being asked now, is "where will you be during the total solar eclipse?" I have had several relatives call me recently and ask that very question and you probably have as well.

And, that same question is being asked of BSAS. We have had fellow amateur astronomers from nearby states and from as far away as Spain, England and Germany inquire to see if BSAS members will be holding an event at a specific site. We have also had several schools and organizations contact BSAS and ask if we have members willing to help support their events. Some of those groups expect nearly 1,000 people and one organization anticipates well over



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## Observing Highlights February and March

### Open Clusters

NGC457 (*ET*), M103,  
NGC654, NGC663,  
NGC884/869 (*Double Cluster*),  
M34, M45 (*Pleiades*),  
M36, M37, M38, M35, M41,  
M50, M47, M46, M93, M48,  
M44 (*Beehive*), M67,  
NGC2264 (*Christmas Tree*)

### Variable Stars

Beta Persei (*Algol*),  
Omicron Ceti (*Mira*),  
R Leporis (*Hind's Crimson Star*)

### Galaxies

M31 (*Andromeda*), M32, M110,  
M33 (*Triangulum*),  
M74, M77, M81, M82

### Globular Clusters

M79 Nebulae  
M76 (Little Dumbell), NGC1499  
(California),  
M1, M42 (*Orion*), M43, M78,  
NGC2392 (*Eskimo*)

### Multiple Star Systems

Eta Cassiopeiae,  
Gamma Arietis,  
Gamma Andromedae,  
Beta Orionis (*Rigel*),  
Alpha Geminorum (*Castor*)

## Upcoming Star Parties

Saturday 2/4 6:30 pm to 8:30 pm	Public Star Party <a href="#">Edwin Warner Park</a>
Saturday 2/25	Private Star Party <a href="#">Natchez Trace Parkway mile marker 412 (Water Valley Overlook)</a>
Saturday 3/4 7:00 pm to 9:00 pm	Public Star Party <a href="#">Shelby Bottoms Nature Center</a>
Saturday 3/25	Private Star Party <a href="#">Natchez Trace Parkway mile marker 435.3</a>
Friday 3/31 7:30 pm to 10:00 pm	Public Star Party <a href="#">Bowie Nature Park (Fairview)</a>



Feb 26  
Mar 27



Feb 3  
Mar 5



Feb 10  
Mar 12



Feb 18  
Mar 20

## Happy Birthday Klim Churyumov by Robin Byrne

This month we celebrate the life of a man who will forever be tied to a very special comet. Klim Churyumov was born February 19, 1937 in Mykolaiv (or Nikolaev), Ukraine. His father, Ivanovich, died in 1942 during World War II. The fourth child of a total of seven brothers and sisters, Klim fondly remembers his older brother, Ivan, telling him stories about philosophy and countries around the world. They would also lay on the roof of a shed at night, while Ivan told stories about the constellations. In 1949, his family moved to Kiev. Klim attended public school through 7th grade, then entered the Kiev Railway College. When he graduated with honors in 1955, he was recommended to attend university.

Klim attended Kiev State University. In his third year, he was assigned to work with faculty in the optics department. He had hoped for theoretical physics, but there were no open spaces for more students. However, Klim continued to attend the theoretical physics lectures, against the wishes of the school's authorities. Then an opening appeared in the astronomy department, so he was transferred there. He began studying comets under Sergej K. Vsekhsvyatskij, who was well known for his comet work.

Churyumov graduated with a Bachelors Degree in 1960. He was then sent to Tiksi Bay in the Yakut Autonomous Soviet Socialist Republic (ASSR) to work at a polar geophysical station. Here, Klim studied aurorae and the ionosphere. Two years later, he transferred back to Kiev to work at the "Arsenal" plant, where he developed optics to be used by the Soviet space program and military.

Klim returned to Kiev State University to pursue a graduate degree. He continued studying comets, first using the university's observatory in a nearby village, Lisniki. Later, he went on expeditions to Central Asia, Siberia, the Caucasus, and other remote areas to study more comets. In 1969, Churyumov, along with Svetlana Gerasimenko and



[Klim Churyumov](#)

### Klim Churyumov, continued

a lab assistant, were sent to the Alma-Ata Astrophysical Observatory. Using a Maksutov telescope, they were to photograph various known periodic comets and hunt for new comets. They would take two images of the same part of the sky, separated by about half an hour, to look for something that moved against the backdrop of stars. They imaged comet 32P/Comas Sola on September 9. It turns out that on the edge of their first image was another comet, but they initially missed it. The next clear night was September 11. The next image showed a smudge in the center of the field (not where the known comet would have been), so they thought it was a defect due to improper development. Svetlana wanted to throw the photographic plate away, since it appeared to be useless. Their professor, Dmitri Rozhkovsky, explained the importance of keeping all the plates, because you never know what other useful information might be there. While the others returned to Kiev, Klim remained to take more photographs. Once they were all back in Kiev, Klim and Svetlana began making measurements of the comet positions on all of the images taken. They confirmed that the “smudge” was not the comet they were studying, and then they found it on four other images. At first, they were worried that it was a comet that had already been discovered, but, no, they were the first to see it. Officially named 67P/Churyumov-Gerasimenko, it was found to be a short period (6.5 year) comet from the Jupiter Family.

Klim went on to complete his degree in 1972 with a thesis titled “Studies of comets Ikeyya-Seki (N/1967n), Honda (C/1968), Tago-Sato-Kosaka (C/1969 T1) and new periodic comet Churyumova-Gerasimenko from photographic observations.” He then worked as a Fellow in the Astronomy Department at Kiev State University. His interest in comets never waned. In 1983, he made studies of the plasma tail of 67P. In 1986, he discovered another comet, C/1986 N1 (Churyumov-Solodovnikov), which is a long period comet that had never visited the inner solar system before.

In 1993, Churyumov completed his doctoral thesis, “Evolutionary physical processes in comets,” graduating with a PhD from the Institute of Space Research in Moscow. In 1998, he became a professor at Taras Shevchenko National University in Kiev.

Klim had other interests, though. An avid poet since the age of 16, in 1999, he began publishing books of poetry for children. The last of these books was printed in 2002. In 2004, Klim was named the Director of the Kiev Planetarium. From 2006 - 2009, he was the editor of a Ukrainian astronomical magazine, “Our Skies.” Klim was also the president of the Ukrainian Society of Amateur Astronomy. He frequently appeared on television and wrote popular articles to bring astronomy to the general public.

## Klim Churyumov, continued

On August 6, 2014, the Rosetta spacecraft entered orbit around comet 67P/Churyumov-Gerasimenko. Three months later, on November 12, the lander Philae, after bouncing three times, came to a rest on the surface of the comet. When Churyumov first saw images of the comet's unusual shape, he thought it looked like the traditional Ukrainian shoes used by farmers, that are made of straw - a "cosmic slipper." The images of the surface made him think of mountains like the Alps or Carpathians, though on a



smaller scale. He was hopeful that amino acids would be found on the comet, which they were - in particular glycine. Klim followed every aspect of the Rosetta mission as it studied "his" comet. He was passionate about studying comets, since they are pristine samples from the beginning of our solar system. He once said that he would have loved to be an astronaut walking on the surface of a comet.

The Rosetta Mission came to an end, September 30, 2016. Sadly, two weeks later, while traveling to Kharkiv, Ukraine, Klim Churyumov died suddenly on October 14. It's almost as though he were holding on long enough to witness all of the Rosetta Mission. Perhaps Klim is now out there, walking and exploring "his" comet.

**References:**

[Klim Churyumov - Wikipedia](#)

[Klim Churyumov - Co-Discoverer of Comet 67P - ESA](#)

[An Encounter with Klim Churyumov - Rosetta Blog](#)

Notes from "Discovery of Comet Churyumov-Gerasimenko" June 21, 2016 IPS Conference Warsaw, Poland Robin Byrne

## Comet Campaign: Amateurs Wanted

By Marcus Woo

In a cosmic coincidence, three comets will soon be approaching Earth—and astronomers want you to help study them. This global campaign, which will begin at the end of January when the first comet is bright enough, will enlist amateur astronomers to help researchers continuously monitor how the comets change over time and, ultimately, learn what these ancient ice chunks reveal about the origins of the solar system.

Over the last few years, spacecraft like NASA's Deep Impact/EPOXI or ESA's Rosetta (of which NASA played a part) discovered that comets are more dynamic than anyone realized. The missions found that dust and gas burst from a comet's nucleus every few days or weeks—fleeting phenomena that would have gone unnoticed if it weren't for the constant and nearby observations. But space missions are expensive, so for three upcoming cometary visits, researchers are instead recruiting the combined efforts of telescopes from around the world.

“This is a way that we hope can get the same sorts of observations: by harnessing the power of the masses from various amateurs,” says Matthew Knight, an astronomer at the University of Maryland.

By observing the gas and dust in the coma (the comet's atmosphere of gas and dust), and tracking outbursts, amateurs will help professional researchers measure the properties of the comet's nucleus, such as its composition, rotation speed, and how well it holds together.

The observations may also help NASA scout out future destinations. The three targets are so-called Jupiter family comets, with relatively short periods just over five years—and orbits that are accessible to spacecraft. “The better understood a comet is,” Knight says, “the better NASA can plan for a mission and figure out what the environment is going to be like, and what specifications the spacecraft will need to ensure that it will be successful.”

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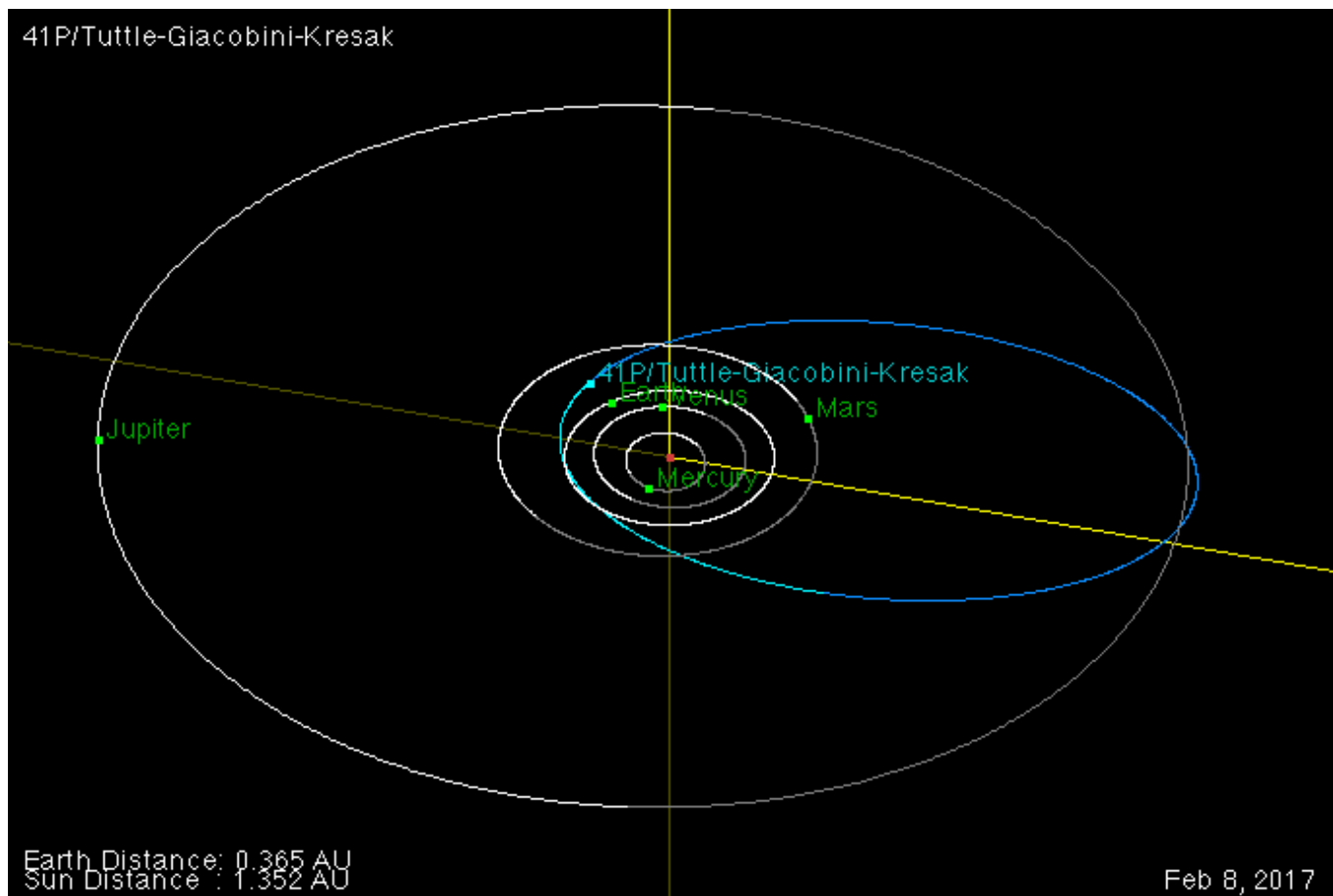


## Comet Campaign, continued

The first comet to arrive is 41P/Tuttle-Giacobini-Kresak, whose prime window runs from the end of January to the end of July. Comet 45P/Honda-Mrkos-Pajdusakova will be most visible between mid-February and mid-March. The third target, comet 46P/Wirtanen won't arrive until 2018.

Still, the opportunity to observe three relatively bright comets within roughly 18 months is rare. "We're talking 20 or more years since we've had anything remotely resembling this," Knight says. "Telescope technology and our knowledge of comets are just totally different now than the last time any of these were good for observing."

For more information about how to participate in the campaign, visit <http://www.psi.edu/41P45P46P>.



An orbit diagram of comet 41P/Tuttle-Giacobini-Kresak on February 8, 2017—a day that falls during the comet's prime visibility window. The planets orbits are white curves and the comet's orbit is a blue curve. The brighter lines indicate the portion of the orbit that is above the ecliptic plane defined by Earth's orbital plane and the darker portions are below the ecliptic plane. This [image](#) was created with the Orbit Viewer applet, provided by the Osamu Ajiki (AstroArts) and modified by Ron Baalke (Solar System Dynamics group, JPL).

## From the President, continued

10,000 participants.

Some astronomy clubs on the path of totality are planning official events, but others are simply encouraging members to enjoy the eclipse with friends and family from wherever they want to be. Having flexibility to change their viewing site is important to some, in case weather becomes a factor.

At our February 15<sup>th</sup> member meeting, in addition to our program, please come prepared to discuss the possibility of having a sponsored BSAS event for viewing the total eclipse and how we should respond to inquiries from groups looking for support.

Gary Eaton

**Next BSAS meeting**  
**February 15, 2016, 7:30 pm**  
**Glendale United Methodist Church - Fellowship Hall**  
**900 Glendale Lane**

*Topic: How to do a Messier Marathon*

**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.





**Barnard-Seyfert Astronomical Society**  
**Minutes of a Regular Meeting of the Board of Directors**  
**Held On Wednesday, January 4, 2017.**

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held January 4, 2017, at Glendale United Methodist Church, 900 Glendale Lane, Nashville, TN 37204. Present were Mike Benson, Gary Eaton, Drew Gilmore, Tom Guss, Bud Hamblen, Todd Nannie, Keith Rainey and Theo Wellington. Gary called the meeting to order at about 7:40 PM. Gary then asked for a motion to approve the minutes for the December 7, 2016, board meeting as printed in the January, 2017, issue of the Eclipse. Mike so moved, Todd seconded, and the minutes were approved by voice vote. Tom reported that there was \$3,630.13 in the checking account and \$1,619.95 in the savings account.

The Bells Bend Outdoor Expo is scheduled for April 8 during the day. This is an opportunity for solar observing.

Long Hunter State Park star party is not yet on the park staff calendar.

Pickett State Park has scheduled the dark sky celebration weekend for March 24-26. Gary and Keith are planning an astronomy app presentation. The park wants our help to hold a sidewalk astronomy event at the Jamestown courthouse to promote good outdoor lighting to preserve dark skies at night.

Todd said he would bring an SCT to the telescope clinic on January 18. Gary or Chuck Schlemm will bring a dob. Theo will bring a newtonian.

We will ask Derrick Rohl to do a presentation at the March general meeting.

Gary will bring adhesive name tags to the January meeting. Keith will move the magazine subscriptions to the Night Sky Network system.

Mammoth Cave National Park is investigating dark sky park status.

There being no further business, Theo moved for adjournment, Todd seconded, and the meeting was adjourned at about 9:00 PM.

Respectfully submitted,

Bud Hamblen

Secretary

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

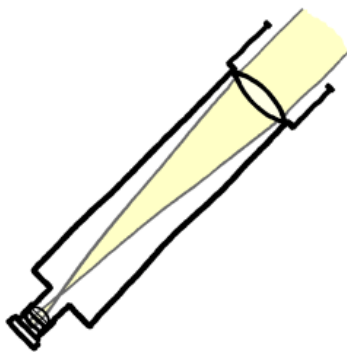


This beautiful image obtained with the Ralph/Multispectral Visible Imaging Camera aboard NASA's New Horizons spacecraft shows the night side of Pluto's large, Texas-sized moon Charon, against a star field, lit by faint, reflected light from Pluto itself. The bright crescent on Charon's right side is a sliver of sunlit terrain; it is overexposed. New Horizons was already about 100,000 miles (150,000 kilometers) beyond Pluto when the image was taken on July 15, 2015.

Credit: [NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research](#)

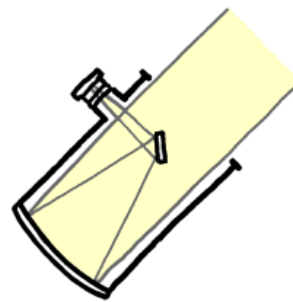
[xkcd](#)

## REFRACTOR



- MORE EXPENSIVE
- LESS COMPACT
- CHROMATIC ABERRATION
- REDUCED LIGHT-GATHERING

## REFLECTOR



- CAN'T SEE SPACE VAMPIRES

**Barnard-Seyfert Astronomical Society  
Minutes of the Monthly Membership Meeting  
Held On Wednesday, January 18, 2017.**

The Barnard–Seyfert Astronomical Society held its monthly meeting at the Glendale United Methodist Church, 900 Glendale Lane, Nashville, Tennessee, on Wednesday, January 18, 2017. Eleven visitors and new members were present and about 25 members were present.

Gary Eaton called the meeting to order at 7:36pm. Gary asked for a motion to approve the minutes of the December meeting as printed in the January Eclipse. Kat Underwood so moved, Chuck Schlemm seconded, and the minutes were approved by unanimous voice vote. Tom Guss reported that there was \$4,005.88 in the checking account and \$1,870.15 in the savings account.

Gary asked for volunteers for help with committees, especially to develop programs.

Gary announced scheduled events: Saturday, January 28 – private star party at Natchez Trace mile marker 435.3.

Saturday, February 4 – public star party at Edwin Warner Park Special Events Field from 6:30 to 8:30pm.

Saturday, February 25 – private star party at Natchez Trace Water Valley Overlook.

Monday, August 21 – the total solar eclipse.

Theo Wellington mentioned that RASC Handbooks were available at the Sky and Telescope on-line store for those who missed ordering a copy through the club.

Tims Ford State Park had asked for help with programs relating to the solar eclipse. The eclipse will only be partial at that site.

The program was the annual telescope workshop. Several visitors brought telescopes for help and several members brought demonstration telescopes.

There being no further business, the meeting was adjourned at 8:48pm.

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).