

The newsletter of the Barnard Seyfert Astronomical Society, PO Box 150713, Nashville, TN 37215-0713

## Upcoming Events

### Board of Directors Meeting

August 6<sup>th</sup> at the Cumberland Valley Girl Scout Council Building  
– 7:30 pm

September 3<sup>rd</sup> at the Cumberland Valley Girl Scout Council Building  
– 7:30 pm

### Membership Meeting

August 20<sup>th</sup> at the Adventure Science Center – 7:30 pm

September 17<sup>th</sup> at the Adventure Science Center – 7:30 pm

## Upcoming Events

Public Star Party August 15<sup>th</sup> at Warner Park Special Events Field – 8:30 pm

Public Star Party August 21<sup>st</sup> at Bells Bend Nature Center – 8:30 pm

Private Star Party August 22<sup>nd</sup> at the Natchez Trace Water Valley Overlook site (mm 418) – 7:30 pm

## In this issue:

President's Message	1
Observing Highlights	2
Outreach Update	2
Happy Birthday Voyager 2 Neptune Flyby	3
Board Meeting Minutes	4
Activity Report	5
About Our Organization	6



## Monthly Membership Meeting

August 20<sup>th</sup>, 2009  
Adventure Science Center  
7:30 pm



BSAS member Randy Smith is will do a presentation on *Free Astronomy Software*. Don't miss this opportunity to enhance your observing experience by utilizing some of the free software readily available on the web. See you there!

## From The President



Well, it is now August, and for a change, the temperatures have been significantly cooler in middle Tennessee than the usual summer heat furnace. Of course, that means that the rain may have interfered with your observing, but you have to take the good with the bad. Also, the money you save on electricity can be used for other things, like astronomy toys.

Like last year, we will be holding an Astronomy Retreat this September for members of the BSAS. The dates are September 18th and 19th. The location, like last year, will be at Spot Observatory, the home of Mark and Anne Manner. This is to be a low key event dedicated to observing. We don't have any activities planned except for observing and the supper on Saturday night.

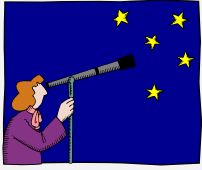
You will be responsible for your own food with the exception of Saturday evening. We are planning on a common meal. There will be a small charge to cover any expenses. There are some beds available at Mark's in his cabins, but we will need to know who will need bed space. Some of us will be using tents. We reserve the right to allocate the beds according to our perception of the need by requesting individuals. In other words, people with physical issues take priority over those of us who can handle a tent for a couple of nights. Unlike last year, we do not have a competing public star party.

If viewing conditions appear to be poor for any of the two nights, we will cancel that night. After all, the primary purpose of this event is viewing.

Send me an e-mail at [terry.w.reeves@att.net](mailto:terry.w.reeves@att.net) or leave me a message at (615)-833-6759 if you will commit to attending. Let me know if you desire a bed or want to participate in the Saturday evening meal. I will respond in like manner. So, if you do not hear back from me, assume that I missed the message and try again. We need the head counts by Friday, September 4. If the head counts are too small, we will cancel the event. It is not fair to Mark and Anne to ask them to block out a whole weekend for an event that is poorly attended by the club. It is also unfair to those of us who do the planning and work to make an event happen.

Once again, I would like to thank Steve Wheeler for helping out with the presentation at the July meeting. I enjoy getting someone else's perspective on objects in the night sky. For the August meeting, our own Randy Smith is scheduled to do a presentation on "Free Astronomy Software". "Free" is one of my favorite words, and there are some very good free software packages for Astronomy. Plan to attend.

Dr. Terry Reeves  
President



*"Astronomy captivates everybody. A kid in the ghetto, a kid on the farm, everybody at one time or another happens to glance up at the nighttime sky and they see these things we call stars and every once in a while a planet.*

*You'd just have to be a non-human being not to go 'what the heck is that?' It has a fascination for everybody."*

**Charles F. Bolden, Jr.**  
NASA Administrator  
(1946-)

### FREE TELESCOPES!

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, and a waiting list may be 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 Lonnie Puterbaugh at (615) 661-9540.

## Observing Highlights

all times listed are Central Standard Time

### LUNAR PHASES

#### August 2009

08/06 FULL Moon  
08/13 LAST Quarter  
08/20 NEW Moon  
08/27 FIRST Quarter

#### September 2009

07/04 FULL Moon  
07/12 LAST Quarter  
07/18 NEW Moon  
07/26 FIRST Quarter

### OBJECTS VISIBLE THIS MONTH

#### Messier Objects:

##### Globular Clusters:

M9, M10, M12, M19, M62, M107

##### Open Clusters:

M6, M7, M21, M23

##### Nebulae:

M8, M20

## Outreach Update *Dr. Terry Reeves, president*

On Friday, July 24<sup>th</sup>, Steve Wheeler participated in a second Stargazer Sleepover at Camp Idyllwild near Centerville, TN. This time, the skies did cooperate and approximately 11 campers and their parents were treated to a spectacular ISS flyover and views of nebulae, open and globular clusters, and double stars. Owners Suzanne and Eric Ward extended an invitation to area stargazers to contact them regarding observing opportunities at their camp. Contact information can be found at <http://www.campidyllwild.com>.

We had a public star at the Long Hunter State Park on Saturday, July 25. The weather was very "iffy" that night, but a small number of us persisted anyway. Despite the fact that the sky was completely clouded over when the first of us arrived, things cleared out enough so that we had something to show during the whole event. We had one of the largest crowds I remember at Long Hunter. If memory serves, Joe Boyd counted over 160 people that night. The lines at our three telescopes got a little long at times, but it was a great night anyway.

We have a public star party scheduled for Saturday night, August 15, from 8:30 PM until 10:30 PM at the Special Events Field in Warner Park. There is a private star party scheduled for Saturday night, August 22, at the Water Valley Overlook on the Natchez Trace (near mile marker 412).

Finally, there is another public star party that some of us are setting up on Friday night, August 21, from 8:30 PM until 10:30 PM at Bell's Bend Park. This is not an official BSAS event. Send me an e-mail at [terry.w.reeves@att.net](mailto:terry.w.reeves@att.net) if you want to come. That way, we can let you know if the event is canceled due to weather.

Dr. Terry Reeves  
President

# Happy Birthday Voyager 2 Neptune Flyby

by Robin Byrne

This month we celebrate the anniversary of the only spacecraft encounter with the planet Neptune. From 1846, when Neptune was discovered, until 1989, what we had known about this planet had been based purely on what could be observed from Earth. We knew it was a jovian planet - large, gaseous and composed primarily of hydrogen and helium - like Jupiter, Saturn and Uranus. Prior to the flyby, only two moons were known to orbit Neptune: Triton, which orbits Neptune backwards, possibly indicating that it was captured, and Nereid. Observations of Neptune passing in front of background stars hinted at the presence of rings, but they seemed to be composed of arcs, rather than complete rings. Our knowledge would soon expand.

In 1977, NASA launched Voyager 1 and Voyager 2. Originally, the plan was for both to fly past Jupiter and Saturn only. However, a once in 175 year arrangement of the planets provided the possibility of more. NASA engineers had kept as a plan, as a potential extension of the mission, the goal to fly Voyager 2 past both Uranus and Neptune. With the success of the Jupiter and Saturn flybys, and Voyager 2's health in good condition, NASA approved the mission extension. With some reprogramming from the ground, and the aid of gravitational assists from planetary flybys increasing its speed each time, Voyager 2 reached Neptune only 12 years after leaving Earth.

Beginning in June of 1989, Voyager 2 began to observe Neptune, and continued to observe continuously through October of the same year. On August 25, 1989, Voyager 2 flew within 3000 miles of Neptune's north pole, closer than it had flown to any other planet on its journey. Only 5 hours after the Neptune encounter, Voyager 2 flew past Triton. This would be the last solid object Voyager 2 would study.

What we learned from the Voyager mission has helped to paint a fuller picture of Neptune. Photographs show Neptune to have a beautiful blue color. We now know that this is due to clouds composed of methane ice crystals. Within the clouds, storms of various sizes and characteristics were observed. The largest storm, dubbed the Great Dark Spot, was found to be about the size of Earth, and similar in nature to Jupiter's Great Red Spot. However, unlike Jupiter's storm, Neptune's Great Dark Spot turned out to be a shorter lived phenomenon, not appearing in Hubble Space Telescope images of Neptune taken about a decade later. Smaller storm systems, called "scooters", were observed to move quickly around Neptune, and cirrus-like clouds were seen to hover above the methane cloud tops. The winds in the atmosphere were measured to blow at speeds up to 1500 miles per hour, making Neptune the planet with the fastest winds in the solar system.

The temperatures in Neptune's clouds were measured. At such large distances from the Sun, most of Neptune's heat is generated internally, rather than being solar powered. At the equator and poles, atmospheric gases cool and sink. As they sink into Neptune's interior, they are compressed, which causes an increase in temperature. The gases then move to the mid-latitudes to rise and cool, and begin the cycle all over again.

Voyager determined that Neptune has a magnetic field, which is likely generated in a layer of liquid hydrogen deep in Neptune's interior. Having a magnetic field means that Neptune can also have aurora. Aurora form when charged particles in the Sun's solar wind get trapped in a magnetic field and spiral toward the top of the atmosphere. Because Neptune's magnetic field is more complicated than Earth's, the aurora are not confined to the magnetic poles, but are found all over the planet.

Flying past Triton, Voyager 2 discovered it to be a unique moon in its own right. Already unusual for its retrograde orbit, Triton was found to show signs of geologic activity. Some of the images revealed what could be the eruption of geysers, shooting nitrogen and methane gas, as well as dust, upward as high as 5 miles above the

surface of the moon. Because nitrogen can be in a gaseous form even at the low temperatures found on Triton, this moon has an extremely tenuous atmosphere of nitrogen gas, with an atmospheric pressure 1/70,000th Earth's atmospheric pressure. The composition of Triton was found to be more rocky and less icy than the other moons of the Jovian planets. The ice is mostly water ice, frozen to such a low temperature that it behaves like rock. This different composition was further evidence of Triton likely having formed elsewhere and subsequently being captured into Neptune's orbit. In addition to studying Triton, during the course of the flyby, Voyager 2 also discovered 6 more moons of Neptune, bringing the total up to 8.

The unusual nature of Neptune's rings was also explored. What were originally thought to be partial arcs of material, were found to be complete rings, but with varying densities in different regions. Had the rings been truly incomplete arcs, then the thought was that small moons were shepherding them into place. With the discovery of complete rings, a new solution needed to be found. Although not fully understood, one possibility is that the ring particles are the debris knocked off from a moon collision. If the collision occurred recently, then the particles would not have had time to spread out evenly around Neptune. The particles themselves are mostly fine particles, some of which are very dark, explaining why they are so hard to see from Earth.

After their final encounters with planets, both Voyager 1 and 2 took trajectories out of the plane of the solar system, with Voyager 1 traveling "up" above the ecliptic and Voyager 2 traveling "down." Because they were powered by radioisotope generators, even in the deep, dark reaches of our solar system, both spacecraft still have power. As such, they have remained in contact with Earth on the renamed Voyager Interstellar Mission. Using instruments designed to measure ultraviolet light from stars, magnetic fields and particle detectors, both Voyagers are in the process of measuring our Sun's heliopause, where the Sun's magnetic field ends and interstellar space begins. It is believed that Voyager 1 is very close to entering interstellar space. Estimates range from 10 to 30 more years of power remaining on both spacecraft. As long as their power holds up, they will continue to send back data and continue to perform amazing science.

By the time Voyager 2 encountered Neptune, it had experienced gravitational assists from the other three Jovian planets and had been accelerated to a very fast speed. When you consider that this fast moving object was attempting to photograph other moving objects in relatively dim lighting conditions, it's pretty amazing that there are any clear images at all! Think of trying to get a clear shot of a running deer from a car traveling at 70 miles per hour - oh, and it's nighttime, too. One of the people I attended graduate school with, Bill Owen, was responsible for programming the camera motions that allowed Voyager 2 to perform the seemingly impossible. Not too surprising, that bit of work earned him his doctorate.

Meanwhile, I have my own Voyager 2 encounter. In May of 1989, I was at the Very Large Array (VLA) in Socorro, New Mexico, doing some research with one of my professors. The VLA is part of NASA's Deep Space Network, and is used to track distant spacecraft, including Voyager. The Neptune encounter was 3 months away, and the NASA personnel were already getting set up. After much pestering by my professor, we were allowed to hear the radio signal they used for tracking - Voyager's "heartbeat." Ever since then I have felt a connection with that spacecraft.

Voyager 2 was designed to last 5 years and to only study two planets. Instead, it has lasted for over 30 years, and provided us with our only up-close images of Uranus, Neptune, and their moons, as well as a chance to study the boundary of our Sun's sphere of influence. Because of Voyager 2, and its twin Voyager 1, we have a better understanding of our solar system than ever before. May her voyages continue on for years to come.

#### References

Voyager-Neptune: <http://voyager.jpl.nasa.gov/science/neptune.html>  
 Voyager-Planetary Voyage: <http://voyager.jpl.nasa.gov/science/planetary.html>  
 Science Summary by C. Hamilton: <http://www.solarviews.com/eng/vgnep.htm>

## July 2009 Board Meeting Minutes

*Bob Rice, Secretary*

The board of directors of the Barnard-Seyfert Astronomical Society met in regular session at the Cumberland Valley Girl Scout Council Building in Nashville, Tennessee on July 2, 2009. Board members Bill Griswold, Bob Norling, Curt Porter, Dr. Terry Reeves, Bob Rice, and Steve Wheeler were present. Board members Dr. Spencer Buckner, Tony Campbell, JanaRuth Ford, Dr. Donna Hummell, Kris McCall, and Theo Wellington were absent. BSAS member Mary Katherine Wheeler was also present. A quorum being present, President Dr. Terry Reeves called the meeting to order at 7:33 P.M.

Dr. Terry Reeves reported that the program for the July 16th membership meeting will be "What's Up (in the evening sky)" to be delivered by himself and Steve Wheeler. Dr. Reeves noted that the program would be divided between objects that can be seen in telescopes and those suitable for binoculars. Steve Wheeler reported that he provided a brief telescope observing session for youngsters at Camp Idyllwild on the evening of June 26th that was at least moderately successful despite the clouds moving in. Dr. Reeves reported that the Warner Parks had asked the BSAS to repeat the June 26th binocular based "Astronomy on the Cheap" public star party sometime in the fall.

Dr. Terry Reeves reported these upcoming events:

- Jul 25: Public star party at Long Hunter State Park; BSAS members should be able to stay late.
- Aug 15: Public star party at the Warner Parks,
- Aug 20: "Free Astronomy Software" membership-meeting program by Randy Smith
- Aug 22: Private star party at Water Valley Overlook on the Natchez Trace Parkway

Bob Rice stated that he would contact Vanderbilt astronomer Dr. Joshua Pepper about presenting the September 17 membership-meeting program.

Dr. Terry Reeves announced that he had talked to Mark Manner about holding the BSAS Astronomy Retreat at Spot Observatory on September 18-19. Dr. Reeves also suggested that the club should form a nominating committee to recommend candidates for 2010 officer and director positions by September. In addition, he related that Joe Boyd had talked to officials at Bells Bend Park about BSAS participation at that facility but, although they appeared to be interested, no details were available yet. Dr. Reeves noted that this might prove to be a convenient dark sky site.

Bob Norling suggested that we put Randy Smith's August "Free Astronomy Software" presentation on the BSAS website for members to reference. Bill Griswold commented that there appeared to be an undue delay between when the Eclipse newsletter was ready and when it was sent out. Steve Wheeler suggested that contributors try to have all copy turned in by the end of the month to get the newsletter out sooner.

There being no further business to discuss, Dr. Terry Reeves called for a motion to adjourn the meeting. Bill Griswold so moved, Steve Wheeler seconded his motion that passed by a unanimous voice vote, and the meeting was adjourned at 8:32 P.M.

### OFFICERS

**Dr. Terry Reeves**  
*President*

**Dr. Spencer Buckner**  
*Vice-President*

**Bob Rice**  
*Secretary*

**Bob Norling**  
*Treasurer*

*Directors at Large*

**Tony Campbell**  
**Jana Ruth Ford**  
**Dr. Donna Hummel**  
**Curt Porter**  
**Theo Wellington**  
**Steve Wheeler**  
**Kris McCall** (*ex officio*)

**Steve Wheeler**  
*Newsletter Editor*  
[wsw261@hotmail.com](mailto:wsw261@hotmail.com)

**Monthly meetings  
are held at:**



**The Adventure  
Science Center**

**800 Fort Negley Blvd  
Nashville, TN 37203**

## July 2009 Monthly Meeting Minutes

*Bob Rice, Secretary*

President Dr. Terry Reeves called the meeting to order at 7:33 P.M. in the Adventure Science Center (ASC) and welcomed new members and guests. Treasurer Bob Norling reported that the BSAS' bank balance was in excess of \$2,000.00. Dr. Reeves reminded the audience about the public star parties scheduled at Long Hunter State Park on July 25 and at the Warner Parks on August 15.

Steve Wheeler and Dr. Terry Reeves then delivered the evening's program on "What's Up Tonight," a continuing series of presentations designed to provide seasonal guidance to observers about what can be seen in the night sky even from light-polluted backyards. The presentation was divided into two sessions: the first, delivered by Steve Wheeler, covered objects suitable for binoculars and the second, delivered by Dr. Terry Reeves, covered objects that were best seen through telescopes. Both sessions followed the same useful format of naming the object, showing how to find it, providing an image of what it looked like, and then explaining what the object actually was.

Some of the binocular objects included the globular star cluster M13 in the constellation Hercules, the open star cluster M11 (the Wild Duck Cluster) in the constellation Aquila, and the star-forming region M8 (the Lagoon Nebula) in the constellation Sagittarius. Several of the telescopic objects included the planetary nebula M57 (the Ring Nebula) in the constellation Lyra, the binary star Albireo in the constellation Cygnus, and the planets Jupiter and Neptune that are now only separated by approximately 40 minutes of arc in the sky. Both presenters kindly answered questions from the audience following the program.

Bill Griswold announced that he had membership applications available. Chuck Schlemm reminded the audience that the 40th anniversary of the Apollo 11 launch and moon landing would occur over the weekend. He also pointed out that the International Space Station could be seen in the sky this evening. Dr. Terry Reeves announced that BSAS member Randy Smith would present the August program on "Free Astronomy Software." There being no further business to discuss, President Reeves declared the meeting to be adjourned at 8:41 P.M.

### BSAS Affiliations

*The Astronomical League*  
<http://www.astroleague.org/>



*The Night Sky Network*  
<http://nightsky.jpl.nasa.gov/>



*International Dark Sky Association*  
<http://www.darksky.org/>



**Become a Member of the BSAS!**

Download and print the Application for membership from [www.bsasnashville.com](http://www.bsasnashville.com) (Adobe® Acrobat Reader® required).

Then fill it out and bring it to the next monthly meeting or mail it along with your first year's membership dues to:

BSAS  
P.O. Box 150713  
Nashville, TN 37215-0713

Annual dues, which include membership in the BSAS and Astronomical League, and subscriptions to their newsletters, are:

- \$20** Individual
- \$30** Family
- \$15** Senior (+65)
- \$25** Senior Family (+65)
- \$15** Student\*

\* To qualify, you must be 21 or younger & enrolled in an accredited institution.

All memberships have a vote in BSAS elections and other membership votes,

Also included are subscriptions to the BSAS and Astronomical League newsletters.

**IMPORTANT DUES INFORMATION**

On your Eclipse mailing label is the expiration date for your current membership. There will be a two month grace period before any member's name is removed from the current mailing list.



**We're on the Web!**  
See us at:  
[www.bsasnashville.com](http://www.bsasnashville.com)

# About Our Organization

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 Thursday of each month at the Adventure Science Center 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 [www.bsasnashville.com](http://www.bsasnashville.com). If you need more information, write to us at [info@bsasnashville.com](mailto:info@bsasnashville.com) or call Joe Boyd at (615) 386-3134.

**BARNARD-SEYFERT  
ASTRONOMICAL SOCIETY**  
PO BOX 150713  
NASHVILLE, TN 37215-0713

