



# ECLIPSE



*The Newsletter of the Barnard-Seyfert Astronomical Society*

Organized in 1928

February 2007

**The Membership Meeting will be held on  
Thursday, February 15, 2007 at 7:30 pm at  
The Adventure Science Center**

Brown dwarfs are often called “failed stars” because their low masses are intermediate to those of planets and stars. Until recently, the fundamental physical properties of brown dwarfs were largely unknown. The discovery of a pair of brown dwarfs in an eclipsing binary system provides the first direct measurements of the masses, diameters, temperatures, and luminosities of these failed stars.

Keivan Guadalupe Stassun is Assistant Professor of Astronomy at Vanderbilt University. A native of California, he received his BA in Physics & Astronomy at the University of California at Berkeley. He then received his PhD in Astronomy in 2000 from the University of Wisconsin—Madison, and was then a NASA Hubble Postdoctoral Research Fellow for 3 years before joining the Vanderbilt faculty in 2003. His research seeks to address questions related to the formation of stars and planetary systems. These questions include: What are the physical processes involved in stellar birth, and which theory of star formation provides the most accurate description of a young star’s evolution? What are the physical processes involved in planet formation, and how long does this process take? How do young stars produce energetic X-ray radiation, and what is the impact of this radiation on the environment of young Earth-like planets? By what mechanism(s) do young stars slow down the very rapid rotation that should result from their gravitational collapse?

Please join us on Thursday, 15 February 2007, at 7:30pm in the Adventure Science Center for Dr. Stassun’s program “Magnificent Failures: Discovery of a rare brown-dwarf eclipsing binary.”

## President’s Message

When I started to think about what to write for this month’s message, I began to consider what each of the members of our Board of Directors is doing to help us grow and carry out the functions of our club.

The first name that comes to mind is Bob Rice, Secretary. Bob has the ability of taking all the talk, joking and just plain clutter and coming up with the minutes of the meeting that actually describe the legal happenings of the meeting. This is very important since these minutes become the official history of the BSAS.

Our Treasurer, Randy Smith keeps our financial records straight and helps to keep the list of active members current. His reports are short, to the point and accurate.

Terry Reeves, our Vice President has the job of backing me up in case I am unable to attend a meeting or any other event. Terry, by definition of the BSAS Bi-laws is the Chair of the Programs or Speaker committee.

Now this brings us to the working part of the Program committee, JanaRuth Ford. For the past several years, JanaRuth has through her contacts with the astronomy field has consistently provided us with wonderful speakers on a variety of subjects.

Mike Benson is continuing to provide the coordination with the Astronomical League and the BSAS.

Last year, Keith Burneson was the vice-president of the BSAS and the coordinator of the TNSP 06. Keith is now one of our Board of Directors with his main objective of setting up and supervising the TNSP 07. This is a major job and Keith will push it to a successful completion.

Tony Campbell assists in getting our newsletter, Eclipse emailed to our members. Tony is also our Web Master and is in the process of up-dating the events and happenings on our web site.

We have two more Directors and soon will be putting them to work. One of the jobs that need to be addressed is a coordinator of the star parties. More later on that subject.

Of interest, our member, Chuck Schlemm is the first to earn the Outreach Award from the Astronomical League. This is the first level award and Chuck is well on the way to completing the second level award. Congratulations Chuck!

by Bill Griswold,  
President

## Star Parties, 2007

**March**

Friday 3/2 MTSU 6:30 to 9:00 pm  
 Saturday 3/3 Warner Park 5:30 to 8:30 pm - Lunar Eclipse  
 Saturday 3/17 Spot Observatory Dark to Dawn - BSAS Messier Marathon

**April**

Friday 4/6 MTSU 6:30 to 9:00 pm  
 Saturday 4/14 Spot Observatory Dark to Dawn - BSAS Messier Marathon (alt. date)

**May**

Friday 5/4 MTSU 6:30 to 9:00 pm  
 Saturday 5/5 ASC 8:30 to 10:30 pm  
 Saturday 5/19 Natchez Trace 8:30 pm - BSAS private star party, mile marker 435

**June**

Saturday 6/16 Spot Observatory 4:00 pm - BSAS Annual Picnic, work shops and observing

**July**

Saturday 7/14 Natchez Trace 8:30 pm - BSAS Private Star Party, mile marker 435

**August**

Saturday 8/11 Warner Park 7:00 to 10:30 pm

**September**

Thu - Sun 9/13 TAG Noon on 9/13 - TNSP 07

**October**

Saturday 10/13 Natchez Trace 8:30 pm - BSAS Private Star Party, Mile Marker 435

**November**

Saturday 11/10 Natchez Trace 8:30 pm - BSAS Private Star Party, Mile Marker 435

**December**

Saturday 12/8 Natchez Trace 8:30 pm - BSAS Private Star Party, Mile Marker 435

**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 Lonnie Puterbaugh at 615-661-9540.

**MAGAZINE SUBSCRIPTIONS FOR  
BSAS MEMBERS**

We are always able to accept requests for new and renewal yearly subscriptions to **SKY AND TELESCOPE** and **ASTRONOMY** from our members in good standing.

The current yearly rates are as follows:

**SKY AND TELESCOPE: \$32.95**

**ASTRONOMY: \$34.00**

Checks or Money Orders should be made out to the **Barnard-Seyfert Astronomical Society (BSAS)** and sent to the following address:

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

**DUES INFORMATION**

On your Eclipse mailing label is the expiration date for your current membership in the BSAS. There will be a two month grace period before any member's name is removed from the current mailing list. You will be receiving a number of warnings informing you that your membership is expiring.

Dues per year are \$20.00 Regular (1 vote); \$30 Family (2 votes); \$15.00 Student (under 22 years of age)(1 vote); \$15 Seniors ( 65 years or older)(1 vote); \$25 Senior Family ( 65 years or older)(2 votes).

Contact [president@bsasnashville.com](mailto:president@bsasnashville.com) if you have questions. Dues can be sent to:

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**THE ECLIPSE NEWSLETTER**

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**BSAS Officers:**

Bill Griswold, President

Terry Reeves, Vice President

Bob Rice, Secretary

Randy Smith, Treasurer

Mark Manner, Immediate Past President

**Board of Directors**

Keith Burneson

Donna Hummell

Steve Wheeler

Mike Benson

Tony Campbell

JanaRuth Ford

Kris McCall, Ex Officio

BSAS website: [www.bsasnashville.com](http://www.bsasnashville.com)

BSAS Logo by Tony Campbell

## HAPPY BIRTHDAY SUPERNOVA 1987A

by Robin Byrne

This month we celebrate the anniversary of an explosive event. At the beginning of February, 1987, the star Sanduleak -69 202 in the Large Magellanic Cloud (LMC) was nearing the end. At the center of the blue supergiant star, silicon was being fused into iron, while other fusion layers surrounded the core in a series of shells. However, on February 23, the silicon in the core was gone, and the inert iron in the core collapsed in a fraction of a second. The collapse was intense enough to crush protons and electrons together to form neutrons, releasing neutrinos in the process.

Neutrinos are very small and very energetic particles, with no charge and an extremely small amount of mass. Because of their characteristics, they are also very difficult to detect, since they can pass easily through almost any material without leaving a trace. On the morning of February 23, in the Kamioka mine in Japan, 3,300 feet under ground, the neutrino detector there recorded the arrival of 9 neutrinos in 2 seconds, and 3 more neutrinos in the next 13 seconds. At the same time, a neutrino detector in Fairport, Ohio recorded 8 neutrinos in 6 seconds. And a Russian detector observed 5 neutrinos in a 5 second period of time.

The following predawn morning, Ian Shelton of the University of Toronto looked at a photographic plate he had taken at Las Campanas Observatory in Chile of the Large Magellanic Cloud. In the image was a bright spot that had not been there before. Suspecting a defect on the plate, he went outside to look at the LMC for himself, where he could easily see with his naked eye that the spot was not a defect.

Within hours, the word was out that a new supernova had been observed in the LMC and was dubbed SN1987A, for the first supernova of the year. This was the first supernova to occur relatively close to Earth since the invention of the telescope. For the first time, scientists could test their hypotheses about how massive stars die.

The neutrino observations were the first exciting news. Supernova models predict that out of the literally “billions and billions” of neutrinos expected to be produced by an exploding star, roughly 10 would be detected in a 10 second time frame. The neutrino observations were right in the ballpark of the predictions.

However, the progenitor star was a problem. Supernovae are supposed to be produced by RED supergiants, not BLUE supergiants. Older images of the LMC show that Sanduleak -69 202 had been a red supergiant in the past, but as it aged, it shrank and got hotter (and bluer) in the process. A little tweaking of the original hypothesis was needed, but not a major shakeup.

Although the Hubble Space Telescope was not launched until 3 years after the supernova, it has been used to study this object ever since. Some of the results of the Hubble observations include: a more accurate measurement of the distance to the LMC (168,000 light years), a measurement of the rate at which the gas is moving outward (70,000 - 100,000 mph), confirmation of the role supernovae play in the production of heavy elements, and future observations will show how the expelled gases will interact with nearby star-forming regions, providing more insight into the star formation process.

At 186,000 ly, SN1987A was hardly a “nearby” supernova, but close enough to provide astronomers with plenty of data to analyze and ponder for many years to come. The closest star to Earth that will eventually become a supernova, although not for a very long time, is Spica, at a distance of 260 ly. What a sight that will be! When Spica does finally give up the ghost, it will be bright enough to see in daylight, and you could easily read by its light at night. So, if you're out observing between midnight and dawn, take a moment to ponder Spica's fate and to remember the spectacular supernova of 20 years ago (or, more accurately, 168,020 years ago).

### References:

Supernova 1987A

<http://zebu.uoregon.edu/~soper/StarDeath/sn1987a.html>

The SN 1987A Story

<http://heritage.stsci.edu/1999/04/sn1987anino.html>

Voyages Through the Universe, Frauknoi Morrison & Wolff, 3rd edition

**Barnard-Seyfert Astronomical Society**  
**Minutes of a Regular Meeting of the Board of Directors**  
**Held On Thursday, January 4, 2007**

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 January 4, 2007. A sign-in sheet was circulated in lieu of a roll call. Board members Mike Benson, Tony Campbell, JanaRuth Ford, Bill Griswold, Donna Hummell, Mark Manner, Terry Reeves, Bob Rice, and Steve Wheeler were present. Board members Keith Burneson, Kris McCall, and Randy Smith were absent. Also attending were BSAS members Joe Boyd and Lonnie Puterbaugh. A quorum being present, President Bill Griswold called the meeting to order at 7:34 P.M.

Finance & Budget Committee Chair Bob Rice presented budget recommendations for 2007. Following a brief discussion Mark Manner moved that the budget be adopted as presented, Tony Campbell seconded this motion, and the budget passed by a unanimous voice vote. A copy of the adopted budget will be published in the *Eclipse* newsletter.

Bill Griswold asked JanaRuth Ford to continue as the Program Committee Chair which she agreed to do. Ms Ford announced these upcoming programs:

January – Dr. Scott Hawley of Belmont University on “Gravity and Black Holes”

February – Dr. Keivan Stassun of Vanderbilt University on “Failed Stars”

March – Combined presentations by Lonnie Puterbaugh on the Astronomical League’s new Outreach Award and the Messier Marathon to be followed by JanaRuth Ford on the NightSky Network.

Lonnie Puterbaugh agreed to serve as the Outreach Committee Chair and suggested that BSAS member Amy Batten, organizer of KOCHAB (Kids Observing the Celestial Heavens And Beyond), be invited to attend a future board meeting to discuss her goals. Mr. Puterbaugh said that he would contact her.

Bill Griswold handed out a proposed star party schedule noting that all appropriate events had been coordinated with Warner Park and that permits had been obtained to use the Natchez Trace sites. Mark Manner moved that the schedule be adopted as presented, JanaRuth Ford seconded this motion, and the star party schedule passed by a unanimous voice vote.

Bill Griswold asked Joe Boyd to continue as the Long Range Planning Committee Chair which he agreed to do. Mr. Griswold noted that Powell Hall had agreed to continue as the Dark Sky Committee Chair and reported that the meeting scheduled for next Tuesday (January 9, 2007) had been cancelled.

Lonnie Puterbaugh suggested that the BSAS consider holding its own Astronomy Day at a public library or a bookstore in addition to the event held at the Adventure Science Center (ASC). JanaRuth Ford commented that we might be able to advertise the event at these venues. Joe Boyd reported that Warner Park Naturalist Heather Gallagher had suggested that the park and the BSAS conduct a joint “Blue Moon” program. Bill Griswold said that he would contact her about this. Lonnie Puterbaugh suggested that the BSAS consider having a “Yuri Night” on April 12 for outreach activities. Mr. Puterbaugh explained that this day marked the first human space flight by Russian Cosmonaut Yuri Gagarin and also the United States’ first space shuttle launch.

Bill Griswold recommended that the Society purchase an external hard drive to back up its essential digital files and documents. Mr. Griswold additionally noted that the drive should be compatible with both Macintosh and PC systems. Tony Campbell and Terry Reeves offered to evaluate this acquisition and report back to the board.

There being no further business to discuss, President Griswold asked for a motion to adjourn the meeting. Mark Manner so moved, Tony Campbell seconded this motion, and the meeting adjourned at 8:52 P.M. by a unanimous voice vote.

Respectfully submitted,  
Bob Rice  
Secretary

**Barnard-Seyfert Astronomical Society**  
**Minutes of the Monthly Membership Meeting**  
**Held on Thursday, January 18, 2007**

President Bill Griswold called the meeting to order at 7:34 P.M. in the Adventure Science Center (ASC) and introduced the newly elected officers and board members. Mr. Griswold then recognized Joe Boyd as the Society's legal advisor and Lonnie Puterbaugh as the astronomy advisor. He next welcomed new members and visitors, asking them to stand and introduce themselves. Mr. Griswold announced that approximately twenty star parties were planned for 2007 and noted that Keith Burneson would again serve as the coordinator for the annual Tennessee Star Party (TNSP). He mentioned these upcoming star party dates and locations: January 20 at Warner Park from 8:00 to 10:00 P.M.; February 2 at Middle Tennessee State University from 6:30 to 9:00 P.M.; and at Long Hunter State Park on February 17 from 7:00 to 10:00 P.M.

Bill Griswold announced that the BSAS would pay for stone markers designating the relative distances of the sun and planets at Warner Park along the entrance way to the nature center. He also thanked immediate past President Mark Manner for generously offering to personally defray half of this cost. Mr. Griswold asked Chuck Schlemm to comment on the Astronomical League's new outreach award program. Mr. Schlemm stated that, in addition to other categories, the League offered a master's level award for up to 160 hours of club public outreach activity and that more details would be provided as part of the March meeting presentation.

Dark Sky Committee Chair Powell Hall announced that this committee met on the first Tuesday of each month with the next meeting scheduled for February 6 on studies of the effect of lighting on wildlife. Mr. Hall invited everyone to attend. Treasurer Randy Smith reported that the Society's bank balance was \$3,767.75. Mr. Smith announced that had one copy of the Celestial Mysteries calendar left for sale and a member of the audience offered to purchase it almost immediately.

JanaRuth Ford introduced Dr. Scott Hawley, Assistant Professor of Physics at Belmont University, who gave the evening's presentation on Black Holes and Gravitational Waves. Noting that this topic was a mix of theoretical physics and computer simulation, Dr. Hawley introduced the basic concepts of modeling in general and then went on to the elements of mathematical modeling. Citing examples from Aristotle, Isaac Newton, and Albert Einstein, he explained how our models of gravity had become more refined over time. Dr. Hawley described how Einstein's theory of general relativity predicted the existence of black holes and identified several that examples that were subsequently found. He also noted that gravitational waves, described as ripples in spacetime, were also predicted by general relativity, but that none had yet been detected. Following his presentation, Dr. Hawley graciously answered questions from the audience.

Since there was no further business to discuss, President Griswold declared the meeting adjourned at 8:49 P.M.

Respectfully submitted,  
Bob Rice, Secretary

## Activities and Events

## February 1 — 28, 2007

- 2/1 BSAS Board of Directors mtg., 7:30 p.m. at Girl Scout Office
- 2/2 FULL MOON, conj. Moon & Saturn  
Star Party MTSU 6:30 p.m. to 9:00 p.m.
- 2/4 Zodiacal light visible in W after evening twilight for next 2 weeks
- 2/7 Venus 0.7° S of Uranus
- 2/8 Conj. Sun & Neptune
- 2/10 LAST QUARTER, Saturn at opposition
- 2/12 Jupiter 6° N of moon
- 2/15 BSAS monthly meeting at ASC: 7:30 p.m.  
Mars 4° N of moon
- 2/17 NEW MOON  
Public Star Party Long Hunter State Park 7:00 p.m.
- 2/19 Venus 2° S of Moon
- 2/23 Moon 1° N of Pleiades (M45)
- 2/24 FIRST QUARTER

## March 1 — 31, 2007

- 3/1 BSAS Board of Directors mtg., 7:30 p.m. at Girl Scout Office
- 3/2 Star Party MTSU 6:30 p.m. to 9:00 p.m.  
Conj. Moon & Saturn
- 3/3 FULL MOON, total eclipse  
Star Party Warner Park 5:30 to 8:30 p.m.
- 3/5 Conj. Sun & Uranus, Mars 4° N of Moon
- 3/11 Daylight Savings Time begins
- 3/12 LAST QUARTER, Jupiter 6° N of Moon
- 3/17 BSAS Messier Marathon, Spot Observatory  
Dark to Dawn, Conj. Mercury & Moon
- 3/19 NEW MOON
- 3/21 Equinox, Venus 4° S of Moon
- 3/25 FIRST QUARTER  
Mars 1° S of Neptune
- 3/29 Conj. Moon & Saturn

\*All times listed are Central Time

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