The ECLIPSE

May 2015

The Newsletter of the Barnard-Seyfert Astronomical Society

Next Membership Meeting:
May 20, 2015, 7:30 pm
Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

Topic: *What's Up?*

In this Issue:

Barnard-Seyfert Astronomical Society

From the President:

Well, it is still raining. Or threatening to rain! But at least the weather is warmer, allowing us to run out and look up when it does clear up.

We've had some nice public events this past month! Met a lot of nice fans of Bells Bend park, celebrated Earth Day at Centennial, and then Astronomy Day at Warner Park. Anytime we have a public event and you have a chance, come and join us at our table or booth. You don't need a telescope, just visit and bring your enthusiasm and enjoyment of astronomy and the night sky.

BSAS encourages young enthusiasts as well. This year it was the club's pleasure to award a prize at the Middle Tennessee Science and Engineering Fair at APSU. Patricia Suzanne Eastwood and Mary Landis Gaston of Saint Cecilla Academy won $100 for their project "Orbital Calculation and Spectrographic Classification of Select Near Earth Asteroids". They will also get a membership in BSAS for the coming year, so I hope if you see them you will make them feel welcome. That's an amazing project for high school students to do. With luck we will get them to speak about their project at an upcoming general meeting.

LED lights are here… the number of businesses changing over to the new lights is growing, and it is only a matter of time until the streetlights change. Please take a moment to write your council member to suggest that LESS light is needed and to let them know that we can choose the "low color corrected temperature" lights. In general,

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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

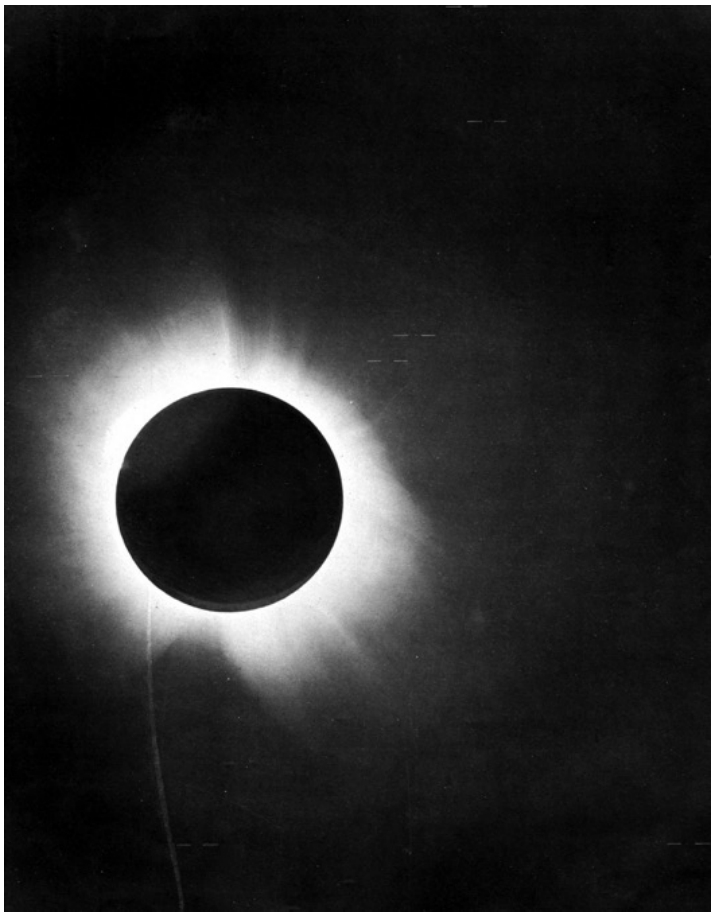
Multiple Star Systems
Alpha Geminorum *(Castor)*, Gamma Leonis *(Algieba)*, M40, Gamma Virginis *(Porrima)*, Alpha Canum Venaticorum *(CorCaroli)*, Zeta Ursae Majoris *(Mizar)*, Epsilon Bootis *(Izar or Pulcherrima)* Mu Bootis *(Alkalurops)*

Upcoming Star Parties

Friday 5/8 8:30 - 10:30 pm	Public Star Party Bells Bend Outdoor Center
Saturday 5/16	Private Star Party Natchez Trace Parkway Mile Marker 412 (Water Valley Overlook)
Friday 5/22 8:30 - 10:30 pm	Public Star Party Bowie Nature Park (Fairview)
Saturday 6/13	Private Star Party Natchez Trace Parkway Mile Marker 433
Saturday 6/20 9:00 - 11:00 pm	Public Star Party Long Hunter State Park

Happy Birthday The First Test of General Relativity
by Robin Byrne

This month we celebrate the confirmation of an interesting idea. In 1916, Albert Einstein published his theory of geberal relativity. This theory has a number of bizarre effects associated with it, including the idea that mass warps space and time. One result of warped space is that an object that thinks it is moving in a straight line, will actually be following a curved path. This is true even for light.



Source: F. W. Dyson, A. S. Eddington, and C. Davidson, "A Determination of the Deflection of Light by the Sun's Gravitational Field, from Observations Made at the Total Eclipse of May 29, 1919" Philosophical Transactions of the Royal Society of London. Series A, Containing Papers of a Mathematical or Physical Character (1920): 291-333, on 332. Public Domain.

In 1919, an opportunity arose to test this crazy idea. Arthur Eddington realized that our Sun should be massive enough to cause a noticeable shift in the path of starlight passing near it. Unfortunately, since the Sun is so bright, it would impossible to see any other light source near the Sun's disk. However, during a solar eclipse, with the Sun's disk blocked, light from stars appearing in the same direction as the Sun would be visible. The solar eclipse on May 29, 1919 gave Eddington the opportunity to perform an historical experiment, with the Sun passing in front of the Hyades star cluster.

Eddington photographed the Sun during the eclipse with long enough exposures to reveal the background stars (2 to 20 seconds). By comparing this image to ones taken of the same region of the sky without the Sun in front, he could look to see if the apparent position of the stars had changed. The general theory of relativity predicted that the Sun's mass would warp the space near the Sun enough to bend the light from these stars to a new position in the sky. This would give the impression that some of the stars had moved when comparing the two images.

The predicted shift for stars appearing almost in line with the Sun was only about 2 seconds of arc. The farther the star is from being in line, the smaller the shift

continued on next page

General Relativity, continued

becomes. In November of 1919, Eddington announced that the eclipse observations confirmed the predictions with star images shifting by a very small amount.

Some modern critics believe that Eddington may have fudged his data by a small amount to give the results he expected. The small amount of shift observed would have been well within his range of error. However, subsequent observations have confirmed general relativity to be correct.

Whether Eddington published what he wanted to get or what he actually observed, his announcement of confirming general relativity was one of the main reasons why it became accepted by the scientific community. Up to this point, most people were very skeptical of the general theory (although the special theory of relativity was accepted). This one announcement made all the difference in people's perception of the theory and of Einstein. So, whether the experiment really worked or not, the eclipse of 1919 will always be remembered as the first experiment that brought the theory of general relativity into the world of accepted ideas.

Next BSAS meeting
May 20, 2015, 7:30 pm
Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

Topic: What's Up?

Send your cool astrophotos to
eclipse@bsasnashville.com!

Warner Park Nature Center's Astronomy Day Saturday April 25

BSAS members supported Warner Park Nature Center's Astronomy Day Saturday April 25 from 10 to 11:30am by presenting various astronomy related exhibits to ~50 children and adult guests.

President Theo Wellington presented a solar system distance scale drawing activity, info on light pollution and the 2017 solar eclipse along with BSAS activities. She demonstrated planetary gravity differences with a hands on activity having children pick up the "planetary gravity milk jugs".

Dr. Spencer Buckner displayed meteorites, tectites and discussed their space origins, mineral content and finding locations.

Chuck Schlemm presented scale size models of solar system objects including the 8 planets, the Moon, asteroid Vesta and dwarf planets Pluto and Ceres. He told guests about many exploration spacecraft: Messenger at Mercury, Dawn to Vesta and Ceres, Galileo and Juno to Jupiter, Cassini and Huygens at Saturn and Titan, and New Horizon arriving at Pluto in July.

Chuck also had an exhibit of models of proposed Moon and Mars bases and Mars rovers Sojourner, Opportunity and Curiosity. He also displayed posters of constellations, asteroids, moons of the planets, lunar phases, deep sky objects, and space telescopes and satellites.

Gary Eaton used a 10" Dob with filter to show guests sunspots on the sun during the few times the clouds parted. Unfortunately the evening's star party had to be cancelled due to clouds and rain.

Our thanks to Heather Gallagher and the staff and volunteers at the WPNC for providing this opportunity to share astronomy and space sciences with their guests.

Chuck Schlemm

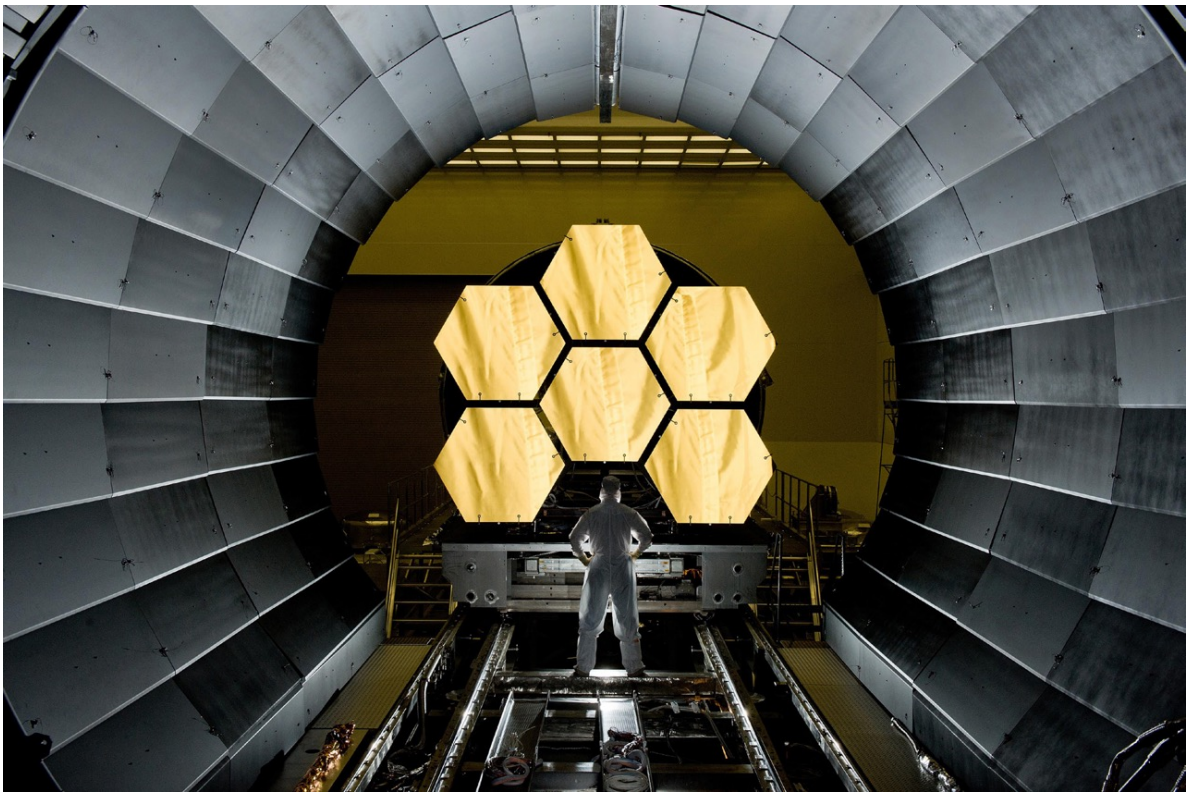
From the President, continued

LED lights look bluer and thus brighter than the sodium vapor lamps we have known and not really loved. You might notice this at home as you replace light bulbs, choose the "warm" white if you can. You might think that saving money would make the changes to full cutoff, lighting only the ground and not space, and perhaps saving energy would make dark sky friendly lighting an easy sell… but surprisingly, it is not. There are many who do not seem to understand that more light is not always better for seeing. Light pollution truly IS pollution, wasting energy, money, it's bad for you, bad for nocturnal animals, and it robs everyone of the spectacular view we enjoy of the entire rest of the universe. As we dedicate a Dark Sky Park here in Tennessee, we need to consider the challenge faced to find a sky dark enough to have a second one. Let it be night!

As always, BSAS is your group… so if there are programs you would like to see, please suggest! Keep up with us on the web page and on Facebook as well. I hope to see many of you at the next meeting on May 20th.

Clear dark skies,

Theo Wellington



NASA engineer Ernie Wright looks on as the first six flight ready James Webb Space Telescope's primary mirror segments are prepped to begin final cryogenic testing at NASA's Marshall Space Flight Center.

This represents the first six of 18 segments that will form NASA's James Webb Space Telescope's primary mirror for space observations. Engineers began final round-the-clock cryogenic testing to confirm that the mirrors will respond as expected to the extreme temperatures of space prior to integration into the telescope's permanent housing structure.

***Credit**: NASA/MSFC/David Higginbotham*

This NASA/ESA Hubble Space Telescope image of the cluster Westerlund 2 and its surroundings has been released to celebrate Hubble's 25th year in orbit and a quarter of a century of new discoveries, stunning images and outstanding science.

The image's central region, containing the star cluster, blends visible-light data taken by the Advanced Camera for Surveys and near-infrared exposures taken by the Wide Field Camera 3. The surrounding region is composed of visible-light observations taken by the Advanced Camera for Surveys.

Credit: NASA, ESA, the Hubble Heritage Team (STScI/AURA), A. Nota (ESA/STScI), and the Westerlund 2 Science Team

The original observations of Westerlund 2 were obtained by the science team: Antonella Nota (ESA/STScI), Elena Sabbi (STScI), Eva Grebel and Peter Zeidler (Astronomisches Rechen-Institut Heidelberg), Monica Tosi (INAF, Osservatorio Astronomico di Bologna), Alceste Bonanos (National Observatory of Athens, Astronomical Institute), Carol Christian (STScI/AURA) and Selma de Mink (University of Amsterdam). Follow-up observations were made by the Hubble Heritage team: Zoltan Levay (STScI), Max Mutchler, Jennifer Mack, Lisa Frattare, Shelly Meyett, Mario Livio, Carol Christian (STScI/AURA), and Keith Noll (NASA/GSFC).

Outreach Opportunities

Blue Moon Wedding: If you would be interested in taking a telescope to a wedding on the night of July 31st (yes,full Moon) we've been asked if anyone is interested in showing the Moon to guests at the reception out in the country east of Murfreesboro. Could be fun!

Tennessee Spring Star Party
From Allen Ball:
The Astronomy in the Parks Society, Cumberland Astronomical Society, Dyer Observatory and Fall Creek Falls State Park will be hosting the Tennessee Spring Star Party 2015 on May 15-17 at Fall Creek Falls State Park in Pikeville, Tennessee.
As in the past, TSSP 2015 is free to attend and registration is not required. All are welcome to attend and are responsible for their food and lodging. Fall Creek Falls is offering a star party package for those wishing to stay at the inn. Campsites are also available. Call 1-800-250-8610 for reservations. Ask for the star party package for rooms at the inn.

There will be all night observing Friday and Saturday night on the observing field (observers are permitted to nap in their vehicles, but camping on the observing field is not permitted) We will have a hospitality/warming tent on the observing field with warm beverages and snacks provided.

There will be public viewing Friday and Saturday nights, 7:00-10:00pm
During the day on Saturday there will be free programs offered in the Cascade Room.

The speakers are being finalized at this time and I'll forward them soon. There will be vendors set up in the lobby at the inn as well as a swap table. We will also offer an introduction to astronomy on Saturday night on the observation field, showing those interested how to use a star wheel and telescope.

Come enjoy a weekend under the stars at one of Tennessee's premier parks. Fall Creek Falls has a family friendly atmosphere with activities offered for all ages.
tn.gov/environment/parks/FallCreekFalls

For more information contact:
Lloyd Watkins: watkinslk@comcast.net
Allen Ball tnscoper@gmail.com

Thanks and hope to see you in May!
Allen

Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held On Wednesday, April 15, 2015.

The Barnard-Seyfert Astronomical Society held its monthly membership meeting for January at the Girl Scouts of Middle Tennessee, 4522 Granny White Pike, Nashville, Tennessee, on Wednesday, April 15, 2015. 17 members and guests signed in. President Theo Wellington called the meeting to order at 7:40 PM. Theo Wellington asked for a motion to adopt the minutes of the March 18, 2015, membership meeting as published in the April 2015 issue of the Eclipse. Mike Benson so moved, Bob Norling seconded and the minutes were adopted, as published, by unanimous voice vote. Bob Norling reported that there was $1,510.31 in the regular account and $1,619.44 in the equipment account.

With the announcements of other scheduled events, Theo Wellington announced that there was an opportunity for outreach at a wedding in Murfreesboro in July on the 2nd full Moon of the month.

Gary Eaton presented a program on astronomy's often confusing nomenclature.

There being no further business the meeting was adjourned at 8:50 PM.

Respectfully submitted,

Bud Hamblen, Secretary

This image of Ceres is part of a sequence taken by NASA's Dawn spacecraft April 24 to 26, 2015, from a distance of 8,500 miles (13,500 kilometers).

Dawn's mission is managed by JPL for NASA's Science Mission Directorate in Washington. Dawn is a project of the directorate's Discovery Program, managed by NASA's Marshall Space Flight Center in Huntsville, Alabama. UCLA is responsible for overall Dawn mission science. Orbital ATK, Inc., in Dulles, Virginia, designed and built the spacecraft. The German Aerospace Center, the Max Planck Institute for Solar System Research, the Italian Space Agency and the Italian National Astrophysical Institute are international partners on the mission team. For a complete list of acknowledgements, visit: http://dawn.jpl.nasa.gov/mission.

Barnard-Seyfert Astronomical Society
Minutes of the Regular Meeting of the Board of Directors
Held On Wednesday, April 1, 2015.

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held April 1, 2015, at the Girl Scouts of Middle Tennessee, 4522 Granny White Pike, Nashville, TN 37204. Present were Joe Boyd, Gary Eaton, Bud Hamblen, Kris McCall, Bob Norling, and Theo Wellington, constituting a quorum. Theo Wellington called the meeting to order at 7:40 PM, and asked for a motion to approve the minutes of the February 4, 2015, board meeting. Kris McCall so moved, Bob Norling seconded, and the minutes were approved as printed in the March, 2015, issue of the Eclipse. Bob Norling reported that there was $1,422.31 in the regular account and $1,724.33 in the equipment account.

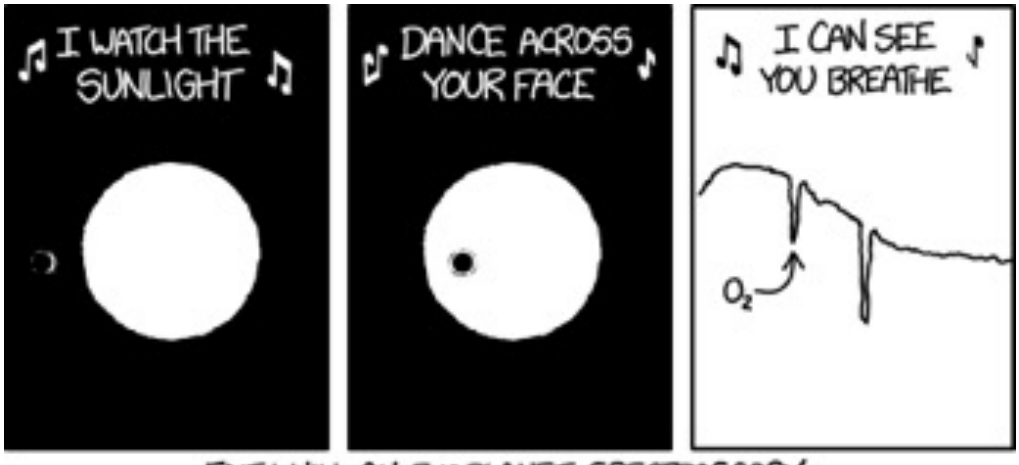
Bob Norling reported that when the balance in an account fell below $1,500 the bank charged a $5.00 monthly maintenance fee and brought up the question of whether to transfer $100.00 from the equipment account to the regular account to bring the balance in the regular account above $1,500.00. Kris McCall made the motion to authorize Bob Norling to transfer $100.00 from the equipment account to the regular account. Joe Boyd seconded and the resolution was adopted by a unanimous voice vote.

There was discussion of upcoming astronomy events and general meeting programs.

The meeting was adjourned at 9:00 PM.

Respectfully submitted,
Bud Hamblen, Secretary

xkcd



FAITH HILL ON EXOPLANET SPECTROSCOPY

http://xkcd.com/1517/

Barnard-Seyfert Astronomical Society

Become a Member of BSAS! Visit bsasnashville.com to download and print an application for membership.

All memberships have a vote in BSAS elections and other membership votes. Also included are subscriptions to the BSAS and Astronomical League newsletters.

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:

$20 Individual
$30 Family
$15 Senior (+65)
$25 Senior Family (+65)
$12 Student*

* To qualify as a student, you must be enrolled full time in an accredited institution or home schooled.

You can check the status of your membership at bsasnashville.com.

There will be a two month grace period before any member's name is removed from the current distribution list.

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 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.

FOR IMMEDIATE RELEASE

Tennessee State Park Designated Silver-Tier International Dark Sky Park

First state park in Tennessee to obtain this national designation

TUCSON, Ariz. & NASHVILLE, Tenn. (2 May 2015) – The International Dark Sky Association announced today that Pickett State Park and Pogue Creek Canyon State Natural Area have been named a Silver-tier International Dark Sky Park. The combined properties will be known as "Pickett-Pogue International Dark Sky Park."

A kickoff event is being held on Tuesday, 12 May, at 1 p.m. starting with a solar program for local schools in which participants can safely view the Sun through telescopes. A dedication ceremony will be held at 7 p.m. followed by an astronomy program at 8:30 p.m.

"We are pleased to welcome Tennessee into the Dark Sky program," said International Dark-Sky Association Executive Director J. Scott Feierabend. "We hope all Tennesseans will want to visit the park and take in its beautiful night skies."

Places experiencing natural darkness at night are rapidly vanishing in much of the United States especially east of the Mississippi River, an area that includes much of the country's population. This fact underscores the need to defend sites with dark night skies for the benefit of wildlife and humans alike. One location at the edge of the Cumberland Plateau in northern Tennessee has done just that, taking steps to preserve the nighttime environment for current and future visitors.

"As one of the few dark areas left in Tennessee, we believe in preserving the dark sky for future generations and are committed to educating the public about the importance of dark skies," said Brock Hill, Deputy Commissioner for Parks and Conservation, Tennessee Department of Environment and Conservation. "The park worked hard to preserve and protect its dark skies and we are excited about the potential for this designation."

With the support of a Clean Tennessee Energy Grant, lighting on the two properties was updated to meet IDA's rigorous standards. In partnership with the Barnard-Seyfert Astronomical Society and the Space Science Outreach at the University of Tennessee, the Park has developed a strong interpretive program. Activities include an annual New Year's Eve hike, a Junior Ranger Camp each July, an annual star party, and regular dark skies programming during peak visitor season in the summer.

- more -

Star trails appear over the natural bridge at Arch Lake in Pickett State Park (Credit and copyright: Mike Serkownek / TraceOfLight.com)
http://bit.ly/1EWckbZ

About the IDA Dark Sky Places Program
IDA established the International Dark Sky Places conservation program in 2001 to recognize excellent stewardship of the night sky. Designations are based on stringent outdoor lighting standards and innovative community outreach. Since the program began, 10 Communities, 23 Parks and nine Reserves have received International Dark Sky designations. For more information about the International Dark Sky Places Program, visit darksky.org/night-sky-conservation/dark-sky-places.

About Tennessee State Parks
Tennessee's 56 state parks offer diverse natural, recreational and cultural experiences for individuals, families, or business and professional groups. State park features range from pristine natural areas to 18-hole championship golf courses. There is a state park within an hour's drive of just about anywhere in the state, offering a variety of recreational, lodging and dining choices. For more information about Tennessee State Parks, visit tnstateparks.com or connect via Facebook, Twitter or Instagram.

Media Inquires

- **Tennessee Department of Environment and Conservation**: Ms. Kelly Brockman (Communications Director), Kelly.Brockman@tn.gov; +1 615 253 1916
- **International Dark-Sky Association**: Dr. John Barentine (Dark Sky Places Program Manager) john@darksky.org; +1 520 293 3198 / +1 512 983 1075 (mobile)

END

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MSRAL 2015

We are excited about the program we have lined up for the Mid-State's 2015 Regional Conference to be held at the University of Arkansas' Little Rock Campus, May 29th – 31st. http://msral2015.caasastro.org/index.php

The conference will begin Friday evening with the traditional CAAS Pisces fry. On Saturday a mix of knowledgeable an inspiring professional and amateur astronomers will present on a broad range of topics, from astrobiology to cataclysmic variables; from tips on organizing and recording your visual observing program at the scope using tablet applications, to tracking asteroids or doing photometry for science; from how to establish a robotic observatory, to a presentation on visual variable star observing, the future of astronomy clubs, and more, all along with a banquet key note on the frontiers of professional/amateur collaboration by Ron Dilulio.

Sunday morning will resume with a compact series on the frontiers of outreach: programs for the blind and disabled, conducting effective star parties in urban settings, launching a Library telescope lending program and planning for the 2017 eclipse.

This will be followed by three parallel workshops: Imaging, CCD Photometry, and a unique club leadership forum aimed at helping club leaders share ideas and problems with the goal of inspiring and empowering club leaders and would be leaders to make our clubs more vital and interesting. Check the website for more and the latest on our program and speakers.

The Arkansas Travelers are in town playing Corpus Christi each day with Sunday's game in the afternoon following the conference. Also of interest to spouses or attendees, the Clinton Presidential Library is an engaging attraction. These and other local attractions will be added to the venue page of the website soon.

Also see the website for on campus dorms, and off campus hotel accommodations. Contact us through the website if you have any questions or observations. Thanks, and hope to see you in May.