Westminster Astronomical Society Inc, of Maryland

Volume 30, Issue 10
October 2013

# The Mason-Dixon Astronomer

## October Meeting:

- Wed., October 9th – 7:30pm
  Bear Branch Nature Center
- **Gadget Night…**
  Club members will present short topics on helpful astronomy tools.

## Pre-Meeting Dinner

- Wed., October 9th – 6pm.

  Harry's Main Street Grill -
  65 W Main Street
  Westminster, MD 21157

**INSIDE THIS ISSUE:**



## St*r Points

### Eclipse at Sunrise

October 2013 – Curt Roelle

In the next several weeks we will have two eclipses, one lunar and one solar. One of them is rather ho-hum, but the other is so unique you will want to read about it, paying attention at the end for important safety information.

But first I wanted to report that last month's night launch of NASA's LADEE mission to the moon from Wallops Island, Virginia was very spectacular. I observed it with some members from the Westminster Astronomical Society, Inc. (WASI). From our viewing location along the salt marshes we had a good view of the rocket only 2.1 miles away. It was quite a spectacle as it leaped into the night sky on a thundering column of pinkish-orange flames.

Less spectacular was the launch several days later of the Antares rocket from the same location. That is because it was a daytime launch and this time I observed it from the backyard, 144 miles from the launch pad. As this column is being written, its Cygnus payload has docked with the International Space Station providing precious supplies to the astronauts on board.

Continued on Page 3…

## President's Message

October 2013 - Vanessa Thomas

Hello WASIans,

I can't believe it's October already. Can you?

At the October WASI meeting, we will be having our postponed "gadget night" (originally planned for August, but delayed so that we could check out the newly renovated planetarium at Bear Branch during our August meeting. If you know about any good tools, either physical or digital tools, that your fellow amateur astronomers might be interested in learning about, I hope you'll share your secrets with the rest of us. We'll also have a couple short presentations from members containing some practical telescope tips and about some historical astronomy.

Continued on Page 4…

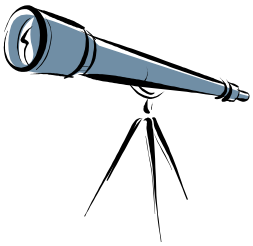
## October Meeting…

### *Gadget Night Returns!*

Join us this month as we bring back the
Westminster Astronomical Society's Gadget Night.

Club members will give short presentations about the gadgets and gizmos, software and hardware, and all those little things they just can't live without while observing. You never know what you might see or hear during these presentations that could make your observing experience even better.

## Upcoming Events From Our Calendars



- **Monthly Meeting** October 9th, 7:30 p.m., at Bear Branch Nature Center (BBNC)
- **Soldiers Delight Public Stargazing** October 12th, 8 p.m., at Soldiers Delight Natural Environment Area in Owings Mills
- **Boy Scout Belt Loop Day** October 13th, 1 p.m.- 5 p.m., at Landon Burns Park in Westminster, MD. Please contact Bob Clark if you can assist.
- **Planetarium Show** October 19th, 7:30 p.m., at Bear Branch Nature Center (BBNC)
- **Partial Solar Eclipse** November 3rd, Sunrise, Eastern U.S..
  - Please see the Solar Observing Warnings in the Star Points article in this newsletter.

## Join The Westminster Astronomical Society…

Joining WASI gives you a great opportunity to meet fellow astronomers and provides group memberships to the Astronomical League and the International Dark-Sky Association. Additionally, benefits include access to our Library (over 500 astronomy-related books), the ability the borrow club scopes, a subscription to the Astronomical League's *Reflector*, access to members-only observing sessions and sites, and club discounts on astronomical magazine subscriptions.

**Membership is still only $25 per year.**

http://www.westminsterastro.org

## St*r Points for October…

Continued from Page 1

Let us now talk about eclipses. A penumbral lunar eclipse occurs on Friday evening, October 18. But just what is a penumbral eclipse, and is it even visible?

A total lunar eclipse occurs when the moon passes completely into the earth's umbral shadow cast by the sun. What is an umbral shadow? The best way to explain it is to imagine an observer located inside of the earth's umbral shadow. From there a direct view of sun is completely blocked by the earth. The only sunlight reaching the observer is light that gets refracted by the atmosphere around the earth.

This refraction is what gives the moon its reddish tinge during a total lunar eclipse. But this month's eclipse is *not* a total lunar eclipse.

A partial lunar eclipse occurs when only a portion of the moon enters into the umbral shadow. That region would be very dark in comparison to the rest of the visible moon that lies inside the penumbral shadow. An observer located inside of the earth's penumbral shadow would see the sun partially blocked by the earth. The deeper one goes into the penumbra, the closer one gets to the umbra itself, and the less one would see of the sun due to its increasing blockage from the earth.

This month's eclipse is *not* a partial lunar eclipse because no portion of the moon touches the umbra.

Due to the geometry, any lunar eclipse occurs only at full moon. When it reaches the full stage this month, the moon will be sliding rather deeply into the penumbral shadow, and the darkening should be noticeable.

How noticeable? On its eclipse web site NASA estimates that *"the beginning and end of a penumbral eclipse are not visible to the eye. In fact, no shading can be detected until about 2/3 of the Moon's disk is immersed in the penumbra."* For the observer this means that the nominal period of eclipse visibility on October 18th extends from about 7:30 p.m. to 8:10 p.m. EDT.

Optimal time aside, the eclipse begins actually at 5:51 p.m. Thus, when the moon rises at 6:18 p.m. the eclipse is already in progress. The penumbral eclipse ends at 9:50 p.m.

The next eclipse is the unique one. Please keep reading for important safety information at the end. On Sunday, November 3rd, a partially eclipsed sun will rise that morning for observers in Carroll County.

Maximum eclipse occurs at 7:10 a.m. EDT. But that's prior to sunrise and so will be blocked by earth's horizon. But when the sun does rise at 7:39 a.m. it will appear to have a big "bite" out of it amounting to 37% of its visible surface caused by the moon temporarily passing in front of the sun.

The partial eclipse will be visible from sunrise until it ceases at 8:10 a.m. In the intervening time the "bite" will continue shrinking as the moon ceases its occultation of the sun.

If you hope to see the November eclipse, you will need three things: 1) clear skies, 2) a location such as a hill with an unobstructed view of sunrise, and 3) a safe method for observing the eclipse.

### IMPORTANT SAFETY INFORMATION

***Great care must be taken when observing the sun. A rising sun will appear dimmed and reddened by the thick atmosphere near the horizon. The sun may not hurt to look at but is still a danger. Although its visible light is dim enough to cause no eye discomfort, harmful infrared radiation can still damage your vision.***

One option is using projection. Directions for building an eclipse projector can be found on StarPoints.org. Scroll down to the link for "Solar Eclipse Theater."

I would recommend getting a pair of black polymer eclipse glasses available at several October WASI activities. The first is a public star party at Soldiers Delight Nature Center in Baltimore County on Saturday, October 12 starting at 8 p.m. You can also pick up your eclipse glasses the following Saturday at the recently renovated Bear Branch Nature Center planetarium. The show starts at 7:30 p.m. on October 19.

For directions and registration information for these and other events, click on the calendar tab at the WestminsterAstro.org web site. Eclipse glasses will be available for a $2 donation or three pairs for a $5 donation.

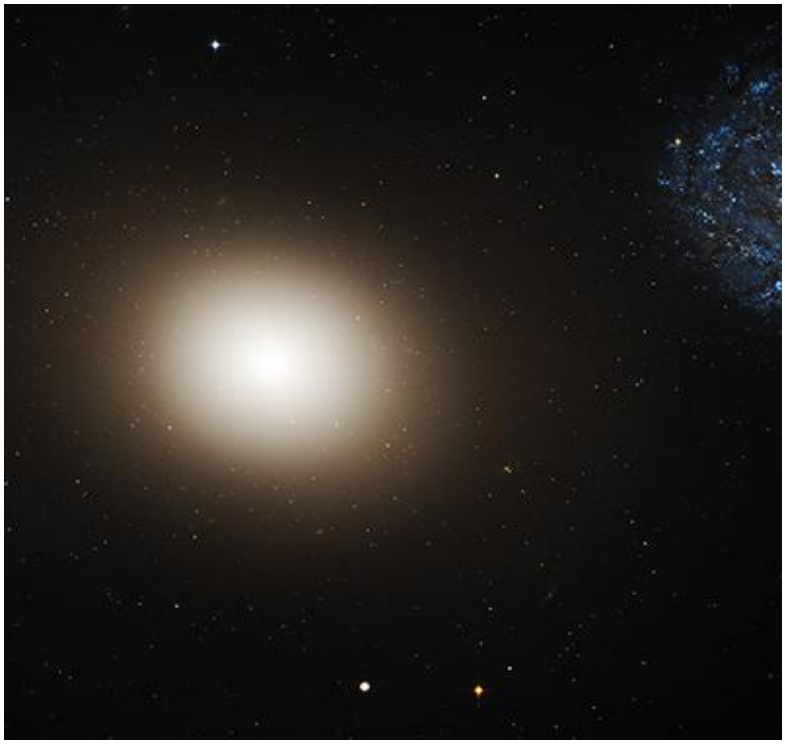
## President's Message

Continued from Page 1

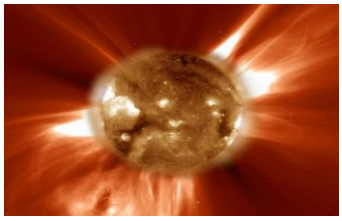
Speaking of astronomical history and valuable tools used by amateur astronomers, I recently attended a talk at the Johns Hopkins University about William Huggins. Ever heard of him? I hadn't. He was an amateur astronomer in London who, in the mid-1800s, became one of the first to use a spectroscope to study the composition and motion of stars and nebulae. It's a great story of an amateur astronomer helping to open up the new field of astrophysics. Additionally, his wife, Margaret, assisted much of his work and was a co-author on his later publications. Employing her photographic expertise, the couple helped advance the field of astrophotography as well. I was surprised that I had never learned of this pioneering husband-and-wife astronomical team before, especially since I've always been interested in the history of astronomy. If you're interested, too, the speaker, Barbara Becker, has written a book called "Unravelling Starlight: William and Margaret Huggins and the Rise of the New Astronomy." You can find summaries on the Web as well.

Here's another story I heard recently that I found interesting. The Hubble Space Telescope discovered a galaxy that, to me, looks pretty unremarkable in the Hubble image. But follow-up observations by the Chandra X-ray Observatory and ground-based telescopes suggest it's the densest galaxy in the local universe.

No, it's not that big elliptical galaxy near the middle. That's M60. The galaxy I'm talking about is the bright white dot below M60, near the bottom of the frame. *That* is M60-UCD1, an "ultra-compact dwarf galaxy" that astronomers estimate has a stellar density about 15,000 times greater than in our region of the Milky Way (meaning the stars are crammed about 25 times closer together). I just thought it was cool that that itty bitty thing could be so remarkable.



Yours, in wonder,
Vanessa

What is Solar Weather?

**solar weather** is the changing conditions in the space surrounding Earth that is affected by activity on the Sun.

## Ready to play?

Test your knowledge in the latest game from NASA's Space Place - Solar Tricktionary! Pick the correct definition to a term or concept about our Sun from a list of four. Hilariously incorrect answers allow players to learn heliophysics terms while still being entertained.
Visit http://spaceplace.nasa.gov/solar-tricktionary/ to play.

## Solar System Ambassadors Program Accepting Applications…

Deadline Extended Through October 15th, 2013

The NASA's Jet Propulsion Laboratory Solar System Ambassadors, or SSA, Program, a nationwide network of space enthusiast volunteers, will accept applications from **Sept. 1 through October 15, 2013**.

Highly motivated individuals will be given the opportunity to represent NASA's Jet Propulsion Laboratory as volunteer Solar System Ambassadors to the public for a one-year, renewable term beginning Jan. 1, 2014.

While applications are being sought nationwide, interested parties from the following states are especially encouraged to apply: Alaska, Delaware, Mississippi, Montana, Nebraska, Oklahoma, South Dakota, West Virginia, Wyoming and the District of Columbia. SSA hopes to add 100 new volunteers to the program in 2014.

To learn more about the Solar System Ambassador Program and to apply online, visit http://www2.jpl.nasa.gov/ambassador/. The Announcement of Opportunity and application form will be available beginning Sept. 1, 2013.

If you have questions about this opportunity, contact Kay Ferrari, SSA Coordinator, by email at ambassad@jpl.nasa.gov.

# Cherry Springs State Park

Pennsylvania's Dark Sky Gem…
Information courtesy of the PA DCNR Website:
http://www.dcnr.state.pa.us/stateparks/findapark/cherrysprings/

Due to its exceptionally dark skies, Cherry Springs State Park is one of the best places on the eastern seaboard for stargazing and the science of astronomy.

A dark night sky is a natural resource, just like plants, waterways and wildlife. Recognizing that this unique resource needed to be managed and protected, in 2000, the Pennsylvania Department of Conservation and Natural Resources declared Cherry Springs State Park the first Dark Sky Park.

## The Second International Dark Sky Park in the World

In 2008, Cherry Springs State Park attained a Gold Level International Dark Sky Park certification from the International Dark Sky Association in 2008. Cherry Springs was, in fact, the second International Dark Sky Park in the world. The International Dark-Skies Association and its partners certify locations with exceptional nightscapes as International Dark Sky Parks (IDSP). These locations serve as reminders that with quality outdoor lighting, the extraordinary wonders of the nighttime sky and night environment are just as much a part of our lifestyle and history as are the daylight hours. In fact, without the inspiration and wonders of the nighttime environment much of the world's history, art, culture, music, and literature might not have been created. www.darksky.org

## Short Term Stargazing

If you would like to come out and enjoy the magnificent night sky at Cherry Springs and only wish to gaze for a few hours, you may do so at the Night Sky Viewing area located north of Rt. 44 (opposite the gated Astronomy Observation Field). Public parking lots are located here along with several information kiosks and waysides. You may follow the walkway out to the public program area where benches are located and you will be shielded from passing vehicle lights. There is also a backlit summer sky map wayside located on this pathway. Press the button at the lower side of the display to activate the red light.

Although white light is permitted, a red filter or cover for your flashlight is recommended to preserve your night vision. Please remember to always direct your light downward.

Cherry Springs State Park is located on top of a mountain and the weather generally tends to be on the cool side. It can also be damp. It is recommended that you wear proper clothing and foot gear. Feel free to bring out your own blankets, lawn chairs, binoculars and telescopes when you visit the park.

Check the Calendar of Events for astronomy programs being presented at the park.

Pets are prohibited on the Astronomy Observation Field while astronomers are present.

## Serious Stargazing at Cherry Springs State Park

A combination of attributes makes Cherry Springs ideal for stargazing and astronomy.

- The field is at the top of a 2,300-foot high mountain. The surrounding state forest is relatively undeveloped and nearby communities are in valleys, shielding any light that might affect the park.
- The location of the park, 41.6501 degrees north, 77.8164 degrees west, offers a great view of the nucleus of the Milky Way Galaxy.
- The Astronomy Field offers an excellent 360 degree view of the night sky.
- All lighting in the park is shielded and all white light has been converted to red.

NASA's Space Place

# How to hunt for your very own supernova!

By Dr. Ethan Siegel

In our day-to-day lives, stars seem like the most fixed and unchanging of all the night sky objects. Shining relentlessly and constantly for billions of years, it's only the long-term motion of these individual nuclear furnaces and our own motion through the cosmos that results in the most minute, barely-perceptible changes.

Unless, that is, you're talking about a star reaching the end of its life. A star like our Sun will burn through all the hydrogen in its core after approximately 10 billion years, after which the core contracts and heats up, and the heavier element helium begins to fuse. About a quarter of all stars are massive enough that they'll reach this giant stage, but the *most* massive ones -- only about 0.1% of all stars -- will continue to fuse leaner elements past carbon, oxygen, neon, magnesium, silicon, sulphur and all the way up to iron, cobalt, and, nickel in their core. For the rare ultra-massive stars that make it this far, their cores become so massive that they're unstable against gravitational collapse. When they run out of fuel, the core implodes.

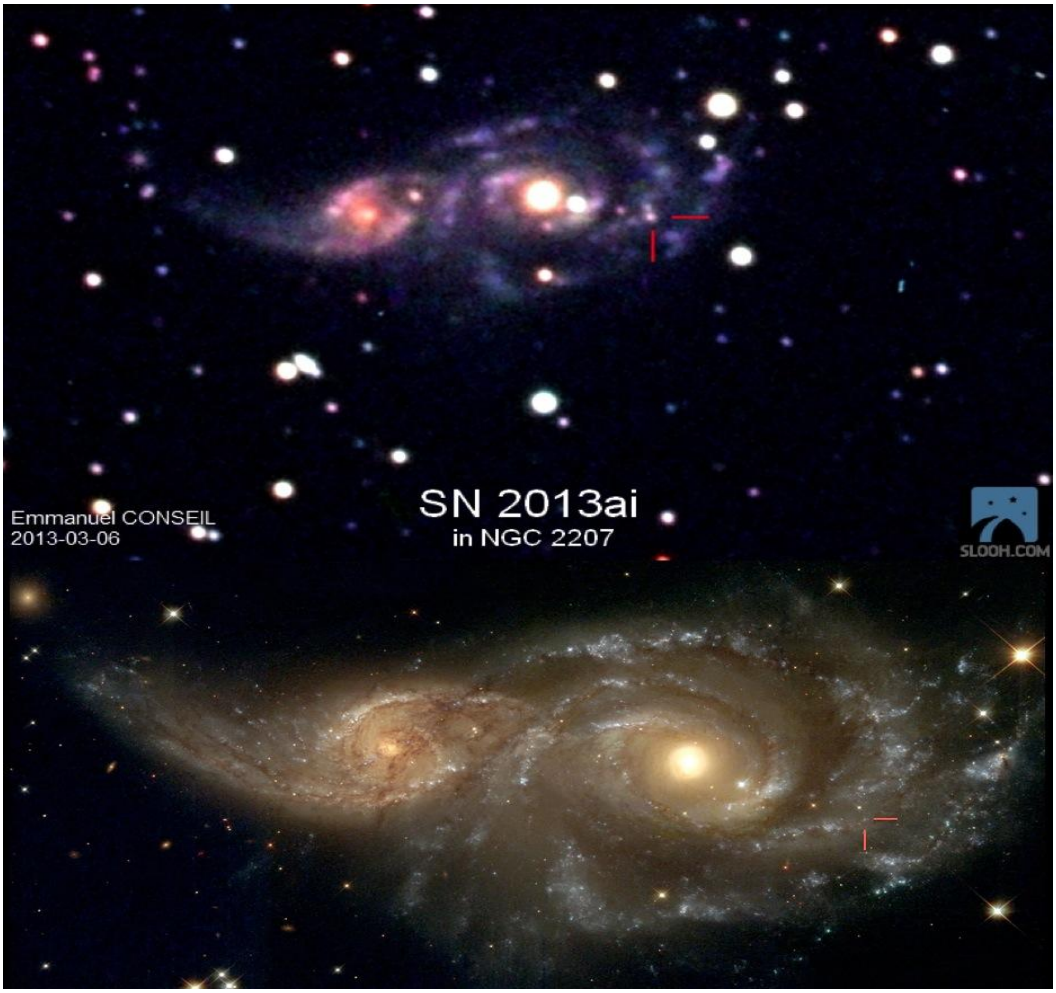
The inrushing matter approaches the center of the star, then rebounds and bounces outwards, creating a shockwave that eventually causes what we see as a core-collapse supernova, the most common type of supernova in the Universe! These occur only a few times a century in most galaxies, but because it's the most massive, hottest, shortest-lived stars that create these core-collapse supernovae, we can increase our odds of finding one by watching the most actively star-forming galaxies very closely. Want to maximize your chances of finding one for yourself? Here's how.

Pick a galaxy in the process of a major merger, and get to know it. Learn where the foreground stars are, where the apparent bright spots are, what its distinctive features are. If a supernova occurs, it will appear first as a barely perceptible bright spot that wasn't there before, and it will quickly brighten over a few nights. If you find what appears to be a "new star" in one of these galaxies and it checks out, report it *immediately*; you just might have discovered a new supernova!

Continued on Page 8…

Continued from Page 7…

This is one of the few cutting-edge astronomical discoveries well-suited to amateurs; Australian Robert Evans holds the all-time record with 42 (and counting) original supernova discoveries. If you ever find one for yourself, you'll have seen an exploding star whose light traveled millions of light-years across the Universe right to you, and you'll be the *very first* person who's ever seen it!




SN 2013ai, via its discoverer, Emmanuel Conseil, taken with the Slooh.com robotic telescope just a few days after its emergence in NGC 2207 (top); NASA, ESA and the Hubble Heritage Team (STScI) of the same interacting galaxies prior to the supernova (bottom).

Read more about the evolution and ultimate fate of the stars in our universe: http://science.nasa.gov/astrophysics/focus-areas/how-do-stars-form-and-evolve/.

While you are out looking for supernovas, kids can have a blast finding constellations using the Space Place star finder: http://spaceplace.nasa.gov/starfinder/.