Westminster Astronomical Society Inc, of Maryland

Volume 31, Issue 10
October 2014

The Mason-Dixon Astronomer

October Meeting:

- Wed., October 8th – 7:30 pm
  Bear Branch Nature Center
- **Dr. Michelle Thaller**

  "New World"
  Insights and Information about Exoplanets.

Dinner With Our Speaker!

- Wed., October 8th – 6pm.
- Harry's Main Street Grill
  65 W Main Street
  Westminster, MD 21157

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St*r Points

Two Eclipses in October

October 2014 – Curt Roelle

Weather permitting, this month observers in our region will experience two eclipses. The first to occur is a total lunar eclipse on the 8th, followed by a partial solar eclipse a couple of weeks later on the 23rd. On top of that is the encounter between Mars and Comet C/2013 A1 (Siding Spring) discussed in last month's installment.

Each of the upcoming eclipses is unique. The lunar eclipse will be ongoing at sunrise, whereas the solar eclipse takes place at sunset.

First an obligatory yet important warning about solar observing. Viewing the sun without proper filtration -- with or without a telescope or binoculars -- can cause serious and permanent eye damage. Read on to learn where to view the solar eclipse safely with the help of local amateur astronomers.

All eclipses occur in stages over the course of several hours. The main stages of a lunar eclipse are penumbral, umbral, and totality. These occur as the moon, which is traveling in orbit about the earth, passes through various elements of the earth's shadow cast by the sun into space. When the moon reaches the outer fringes of the shadow's penumbra, a penumbral phase occurs. When the moon begins passing through the umbra, the umbral phase occurs, which is typically referred to as the "partial eclipse" phase. Only when the entire moon is fully engulfed in the umbra is the eclipse can the eclipse be referred to as a "total" eclipse.

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President's Message

October 2014 – Tony Falletta

Greetings Fellow Astronomers!

The wonderful month of October has arrived! This is the month of still warm days, cool nights and the explosion of fall colors on the trees. It is the time of year when one can get in some good observing sessions while sipping some hot apple cider and relishing the scents of wood burning in nearby backyard fire pits. Of course the month of October reminds us that winter approaches in just short time.

My efforts this past month for observing has been a mixed bag. There have been some nights when I have had the time and opportunity to observe but Mother Nature decided to cloud me out while other nights have provided me some fantastic viewing. I took advantage of Cygnus, Lyra and Vulpecula being overhead to get lost up in the Milky Way. A dark sky and Cygnus make for unbeatable glimpse of our home galaxy. I started at the North America Nebula near Deneb, then glided along the body, sidestepping to check out the Veil Nebula, then back down the neck of the swan all the way to the beautiful binary star of Albireo, then I winged over towards Lyra to spy Vega, M57 (The Ring Nebula) and the Double Double, finishing off with a turn towards Vulpecula to see M27 (The Dumbbell Nebula) and the Coathanger. I realized a couple of hours had gone by only when I looked at watch!

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October Meeting – Guest Speaker

Dr. Michelle Thaller (Assistant Director for Science Communication and Higher Education , Sciences and Exploration Directorate – NASA Goddard Space Flight Center)

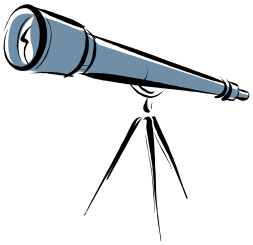
"New World "

Dr. Thaller will provide her unique insights into Exoplanets. This dynamic speaker (and I dare say TV star!) will provide some of the latest information available.

Bio: (blatantly stolen from the MnSTA web site!)

Dr. Michelle Thaller manages the SSC education and public outreach program. She also writes a monthly science column for the Christian Science Monitor and has made numerous appearances on television, including KCET's Life and Times and the Discovery Channel. Thaller was born in Waukesha, Wisconsin. She received a B.S. degree from Harvard in 1992 and a Ph.D. in astrophysics from Georgia State University in 1998. Her research interests have included hot stars, colliding stellar winds, binary star evolution and evolved stellar companions. When she is not out teaching the masses about infrared astronomy and SIRTF, Thaller may be seen renaissance dancing, singing and acting; painting; drawing; or writing about some of the many amazing stories in science.

Upcoming Events From Our Calendars



- **Planetarium Show** October 4th, 7:30 p.m., at Bear Branch Nature Center (BBNC)
- **Monthly Meeting** October 8th, 7:30 p.m., at Bear Branch Nature Center (BBNC)
- **Soldiers Delight Public Stargazing** October 11th, 8 p.m., at Soldiers Delight Natural Environment Area in Owings Mills

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.

Adult Membership is still only $25 per year.

NEW THIS YEAR – JUNIOR MEMBERSHIP

Yearly Membership For Anyone Under 18 Is Now Just $5!
(YES…JUST FIVE DOLLARS!)
http://www.westminsterastro.org

St*r Points for October…

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For a more in depth discussion of the anatomy of a lunar eclipse, refer to the April issue in the Star*Points online archive at carrollcountytimes.com. Select FEATURES -> Columnists, then look under "Astronomy" for the installment entitled "*April's total eclipse of the moon*."

On the morning of Wednesday, October 8 the moon will be full. The penumbral phase starts about three hours before sunrise, although no darkening of the moon may be visible for another 30 minutes or so. The very dramatic partial eclipse starts at 05:15 as the umbral shadow sweeps across the moon. Totality begins at 06:24, during morning twilight.

The sun rises at 07:11 a.m., 16 minutes past mid-eclipse, followed 5 minutes later by moonset. Thus, it is theoretically possible for a few moments to view both the eclipsed full moon and the sun together above an unobstructed horizon. This is harder than it sounds as the moon will be faint – after all it is totally eclipsed – as well as extremely low on the horizon where the atmosphere, at its thickest, will dim the moon's light.

The following table is a summary of the events for the October 8 lunar eclipse. The eclipse events are from Guy Ottewell's Astronomical Calendar 2014. The surise and moonset events are for Westminster from the U.S. Naval Observatory:

10/08 Total Lunar Eclipse Event	Time (EDT) a.m.
Penumbral eclipse begins	4:14
Partial eclipse begins	5:15
Totality Begins	6:24
Mid-eclipse	6:55
Sunrise	7:11
Moonset	7:16
Totality Ends	7:25
Partial eclipse ends	8:35
Penumbral eclipse ends	9:35

A public viewing of the lunar eclipse with members of the Westminster Astronomical Society (WASI) takes place at the Soldiers Delight Natural Environmental area near Owings Mills in Baltimore County. The event runs from 5 a.m. until 8 a.m. on October 8.

The next great event of the month is the sunset partial solar eclipse on Thursday, October 23rd. It is the opposite of the partial solar eclipse in October, 2013. The 2013 eclipse was in progress at sunrise, whereas this year's October eclipse occurs at sunset.

The following eclipse information comes from NASA's Goddard Space Flight Center. The sunset information is from the U.S. Naval Observatory:

10/23 Partial Solar Eclipse Event	Time (EDT) p.m.
Partial eclipse begins	05:50
Sunset	06:17
Maximum eclipse	06:48
Partial eclipse ends	07:42

The sun will set before maximum eclipse occurs for Westminster. In other words, the horizon will block our view of maximum eclipse.

As far as safe viewing goes, there are safe solar observing filters sold by astronomy vendors. Welders glass with #14 density is also considered safe – but only for naked eye viewing. Other safe observing involve projecting an image, using a small telescope or binoculars, and viewing the projected image – not looking through the telescope and binoculars. A small "pin hole" in a card will also produce a projected image, although it will be rather small.

Perhaps the best and safest way is to view the partial solar eclipse with WASI members at Soldiers Delight on Thursday evening, October 23, from 5 p.m. until 7 p.m.

Finally, the encounter between Mars and Comet Siding Spring occurs on October 19. The best views will be from Mars where a number of spacecraft are preparing to observe the passage and detect any atmospheric effects from the passing comet. The comet was closest to earth in late September, but was poorly placed for observing in earth's northern hemisphere.

President's Message

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Here at Bear Branch Nature Center, The Blaine Roelke Observatory installation continues. The exterior of dome has been painted by BBNC while the inside of the dome, but which was in need of some touching up, was done by about a dozen WASI members. Observing chair Steve Conard was there to not only paint but to strike a north/south line for the telescope installation. Each time I stop by to take a look, I see another step completed. We are still looking for an October opening assuming all continues to move forward as planned.

Over in Taneytown, members of our Observatory Committee met with the City's Parks and Recreation department. They were quite interested in our quest for Roll-Off Roof Observatory at Bollinger Park and its' potential for an ideal star party location. WASI Member Erich Bender is continuing his efforts to get Taneytown more detailed information they are requesting as we move forward into northwest Carroll County. I am hopeful that once Taneytown city officials have all the critical data they need they will see what a unique opportunity they have before them.

For October, "Tony's Astronomy Target" is Aquarius the Water Bearer. This constellation is on Meridian October 10th. Aquarius is somewhat different than previous constellations I've picked by the fact it has no notably bright stars and lies in a relatively unremarkable part of the southern sky. The one object in Aquarius I do wish to highlight is M2, a globular cluster shining at magnitude 6.5. M2 is about 37,000 lights away, made up of about 100,000 very old stars. It is a pretty little cluster easy to find and see with just a good pair of binoculars. As you look around Aquarius, head down towards Piscis Austrinus and you'll spot the Helix Nebula. This Nebula lies perfectly in this quiet part of the night sky in the fact this is a beautiful planetary nebula has a low surface brightness. It is best viewed with powerful binoculars which offer low power and a wide field of view. The Helix Nebula also doesn't rise very high in the sky making it a more challenging object to spot. Finally, once done enjoying the Helix, go a little lower in the sky and you'll see Fomalhaut. It is the alpha star of Piscis Austrinus. Fomalhaut is a beautiful 1st magnitude white star which has been called by some the Loneliest Star and by others the Autumn Star. At this time of year, Fomalhaut is basically opposite the Sun so it shines through the night, gliding along the lower part of the sky. Fomalhaut has a note of distinction as it is the star in which the first exoplanet was directly seen. It was announced back it 2008 that a planet was directly imaged.

Thanks for reading and enjoy the night!

I hope to see you at our next meeting.

Clear Skies

Tony Falletta

October's Great Public Events

We have three big astronomical events coming in October.

Total Eclipse of the Moon!

Wednesday morning, October 8th, 5-8am. Yes…AM!

Come join the club at Soldiers Delight Environmental Area for one of the best views of the western horizon in the area. Stop in and join club members to view the eclipse and then head off to work.

Partial Solar Eclipse!

Thursday evening, October 23rd, 5-7pm.

Again the club will be set up at Soldier Delight Environmental Area to view a great partial solar eclipse at sunset. Again, this area provides one of the best views of the western horizon in the area. Stop by on your way home and view one of the most interesting daytime astronomical events

Sidling Springs Comet at Mars!

Saturday, October 18th .

Can you spot the Springs Comet as it approaches Mars? This is the night to try. There is talk about having a club event at Bear Branch Nature Center on this evening. Keep an eye on the web site and the yahoo groups for more information. Closest approach will be at approximately 2:30pm on Sunday (sort of bright for observing). Visual magnitude will be approaching 11 by mid-October. It will be low in the southern sky in twilight…so this one will be tough.

Comet Links..

By Curt Roelle

Here are some web links for comets passed along by our September speaker, Dr. Carey Lisse.

Our CIOC site dedicated to ISOn and Siding Spring is at www.cometcampaign.org

The COBS/Crni Vrnh site is at http://cobs.si

And for what it's worth, here's my favorite comet site:
Weekly Information about Bright Comets (2014 Sept. 13: North)

Weekly Information about Bright Comets (2014 Sept. 13: ...
Weekly Information about Bright Comets (2014 Sept. 13: North) Japanese version Home page Updated on September 13, 2014 Last week South Next week...
View on www.aerith.net Preview by Yahoo

WASI Café Press Store…

Ever wonder where all that great, WASI logo, gear comes from? Well…wonder no more!

Visit our CafePress store http://www.cafepress.com/wasi_store and find dozens of items with our logo. Items such as hats, shirts, mugs, baby clothes, dog clothes, clocks, cell phone cases, license plate frames, and much, much more.

A portion of each sale comes back to the club. So help the club and get some really cool things for yourself or your loved ones!

NASA's Space Place

Twinkle, twinkle, variable star

By Dr. Ethan Siegel

As bright and steady as they appear, the stars in our sky won't shine forever. The steady brilliance of these sources of light is powered by a tumultuous interior, where nuclear processes fuse light elements and isotopes into heavier ones. Because the heavier nuclei up to iron (Fe), have a greater binding energies-per-nucleon, each reaction results in a slight reduction of the star's mass, converting it into energy via Einstein's famous equation relating changes in mass and energy output, $E = mc^2$. Over timescales of tens of thousands of years, that energy migrates to the star's photosphere, where it's emitted out into the universe as starlight.

There's only a finite amount of fuel in there, and when stars run out, the interior contracts and heats up, often enabling heavier elements to burn at even higher temperatures, and causing sun-like stars to grow into red giants. Even though the cores of both hydrogen-burning and helium-burning stars have consistent, steady energy outputs, our sun's overall brightness varies by just ~0.1%, while red giants can have their brightness's vary by factors of thousands or more over the course of a single year! In fact, the first periodic or pulsating variable star ever discovered—Mira (omicron Ceti)—behaves exactly in this way.

There are many types of variable stars, including Cepheids, RR Lyrae, cataclysmic variables and more, but it's the Mira-type variables that give us a glimpse into our Sun's likely future. In general, the cores of stars burn through their fuel in a very consistent fashion, but in the case of pulsating variable stars the outer layers of stellar atmospheres vary. Initially heating up and expanding, they overshoot equilibrium, reach a maximum size, cool, then often forming neutral molecules that behave as light-blocking dust, with the dust then falling back to the star, ionizing and starting the whole process over again. This temporarily neutral dust absorbs the visible light from the star and re-emits it, but as infrared radiation, which is invisible to our eyes. In the case of Mira (and many red giants), it's Titanium Monoxide (TiO) that causes it to dim so severely, from a maximum magnitude of +2 or +3 (clearly visible to the naked eye) to a minimum of +9 or +10, requiring a telescope (and an experienced observer) to find!

Visible in the constellation of Cetus during the fall-and-winter from the Northern Hemisphere, Mira is presently at magnitude +7 and headed towards its minimum, but will reach its maximum brightness again in May of next year and every 332 days thereafter. Shockingly, Mira contains a huge, 13 light-year-long tail -- visible only in the UV -- that it leaves as it rockets through the interstellar medium at 130 km/sec! Look for it in your skies all winter long, and contribute your results to the AAVSO (American Association of Variable Star Observers) International Database to help study its long-term behavior!

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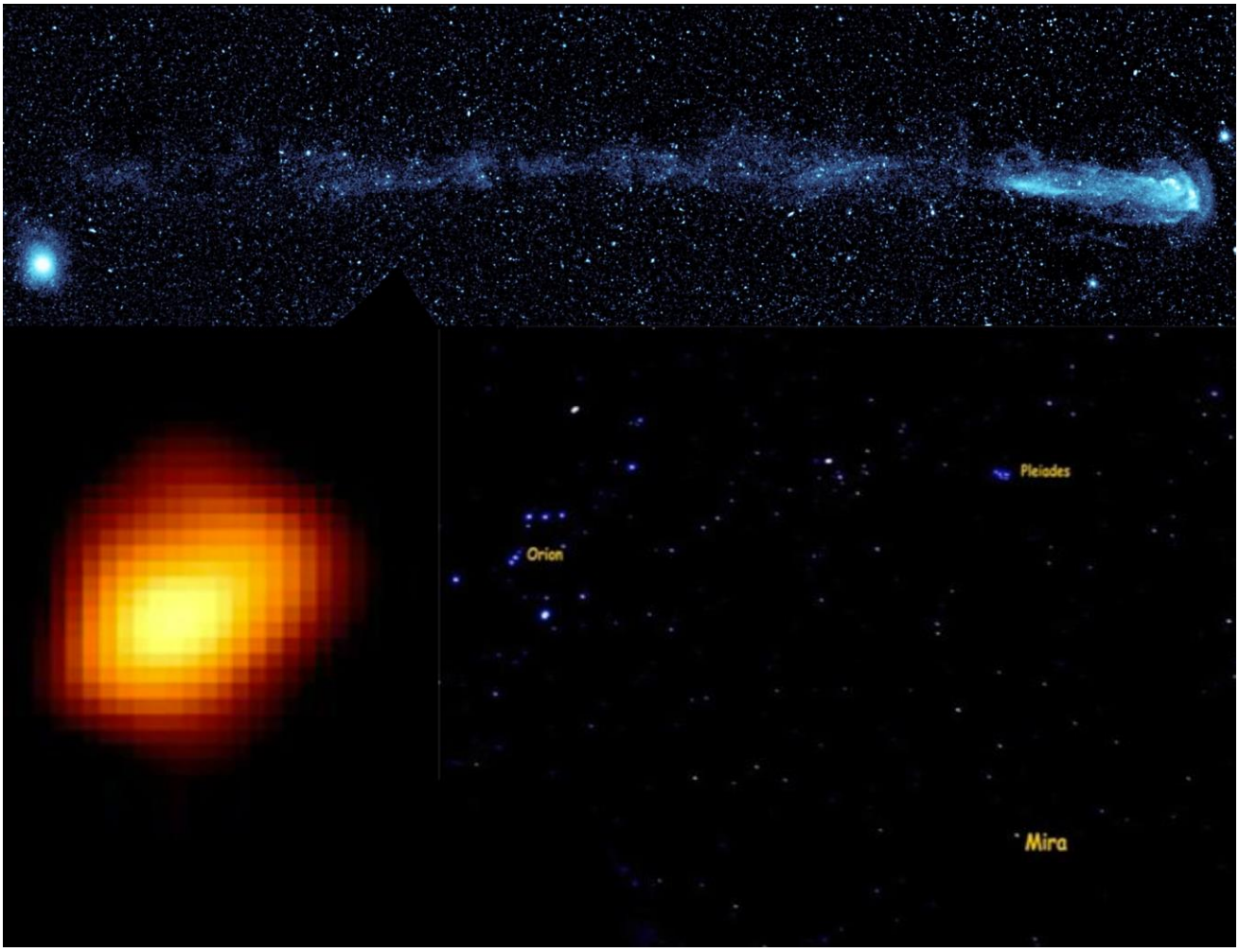
Check out some cool images and simulated animations of Mira here: http://www.nasa.gov/mission_pages/galex/20070815/v.html

Kids can learn all about Mira at NASA's Space Place: http://spaceplace.nasa.gov/mira/en/



Images credit: NASA's Galaxy Evolution Explorer (GALEX) spacecraft, of Mira and its tail in UV light (top); Margarita Karovska (Harvard-Smithsonian CfA) / NASA's Hubble Space Telescope image of Mira, with the distortions revealing the presence of a binary companion (lower left); public domain image of Orion, the Pleiades and Mira (near maximum brightness) by Brocken Inaglory of Wikimedia Commons under CC-BY-SA-3.0 (lower right).