

The Mason-Dixon Astronomer



May Meeting:

- Wed., May 14th –
7:30 pm
Bear Branch Nature
Center
- **Dr. Demos Kazanas**
"The Universe at Large:
Its Birth, Growth and
Future; A Personal
Account"

Dinner With Our Speaker!

- Wed., May 14th – 6pm.
- Harry's Main Street Grill
65 W Main Street
Westminster, MD 21157

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St*r Points

May's Parade of Planets

May 2014 – Curt Roelle

May nights offer the chance to see all six planets known to the ancients. This month's column is a travel guide to help you see them for yourself. The best seats are in your back yard. With the exception of one planet, all you need to see them is your own unaided pair of eyes, and perhaps a pair of eyeglasses if you happen to be nearsighted. But if you have a telescope or binoculars, don't hesitate to drag them out and have a closer look.

The parade begins during early evening twilight. The first planet will be our most difficult to find. Although Mercury is at its highest during evening for the year, it is low in the west.

In mid-May around 8:30 p.m. ET, Mercury can be found about 15 degrees above the west-northwestern horizon. Look directly above and a little to the left of the point where the sun set about 20 minutes earlier. For Mercury you may need binoculars. Sweep this area of the sky looking for a star-like object. Good luck!

Second in the procession is the king of the planets, the giant gas ball Jupiter. You can't miss it because it's the brightest "star" in that part of the sky where it is currently located.

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President's Message

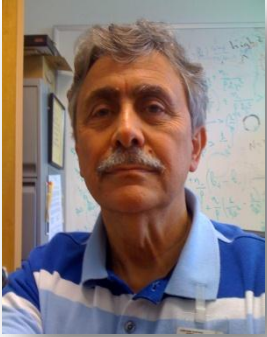
May 2014 – Tony Falletta

Greetings Fellow Astronomers!

The warmer days of spring are finally upon us! The rising temperatures have re-ignited my stargazing passion. When I have been home and the stars shining, I've been giving my scopes a shakedown from their winter hibernation. I hope you too have taken the opportunity to step out under the night sky and enjoy its wonders. One of my telescopes is a hydrogen-alpha solar scope. In an effort to share my passion, I've set up my scope many times at the nearest school bus stop. As the parents wait for their little ones to come home in the afternoon, I show them our home star. Many of them, in awe of what they have seen, bring their kids, fresh off the bus directly to the eyepiece to share in the wonder. I'm always amazed at the fact that so many people have never directly viewed the Sun in this manner. I'm all too happy to offer the view.

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May Meeting – Guest Speaker



Dr. Demos Kazanas (NASA Goddard Space Flight Center)

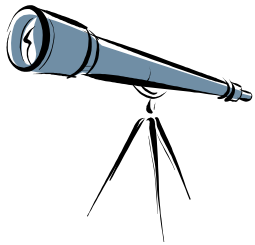
“The Universe at Large: Its Birth, Growth and Future; A Personal Account.”

Dr. Kazanas will provide a brief review of the theoretical and observational understanding of the Universe as a whole (including an account of the BICEP2 results). He will present some personal, rather unorthodox, views concerning the meaning of the current observational and theoretical status of our knowledge of the universe.

Bio:

Dr. Demosthenes 'Demos' Kazanas is an astrophysicist at the NASA Goddard Space Flight Center. His research interest is in high energy astrophysics: Radiation emission from accreting black holes, and neutron stars; structure of accretion disks; pulsar magnetosphere models; and structure of active galactic nuclei. Other interests involve cosmology and the gravitational theory of conformal gravity.

Upcoming Events From Our Calendars



- ❖ **Planetarium Show** May 10th, 7:30 p.m., at Bear Branch Nature Center (BBNC)
- ❖ **Soldiers Delight Public Stargazing** May 10th, 8 p.m., at Soldiers Delight Natural Environment Area in Owings Mills
- ❖ **Monthly Meeting** May 14th, 7:30 p.m., at Bear Branch Nature Center (BBNC)
- ❖ **Hoffman’s Ice Cream Shop – Sundial Dedication**
May 24th, 1:00 p.m., 934 Washington Rd. Westminster

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 to 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 May...

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In mid-May at 9:00 p.m. Jupiter is due west and about one third of the way upward from the horizon to the zenith. If you're not convinced you're looking at the right object, wait a little while and look again when more stars have emerged and look for two stars that will help confirm your suspicion.

Jupiter currently forms an attractive right triangle with two stars above. They are known as the Gemini twins Pollux and Castor. The stars represent the twins' heads. Pollux is directly above Jupiter and to its right is Castor.

By month's end Jupiter will have moved leftward and the triangle becomes more obtuse. This triangular trio, first mentioned here in January, has vigorously persevered.

In a telescope Jupiter is a bright cream colored ball with faint red or brown bands. Small telescopes will show Jupiter's four brightest moons although all may not be visible at any given time. One or more could be hiding in Jupiter's shadow, behind the planet, or directly in front and difficult to see.

The third planet to find is Mars. Turn left from Jupiter, facing south, and you will see yellowish-orange Mars about halfway up from the horizon. On Sunday, May 11 Mars is located to the upper right of the bright waxing gibbous moon.

In a telescope Mars is small, only about 1/3 of the apparent diameter of Jupiter in a telescope. Mars was at its closest to us last month. Currently Mars appears to be slowly shrinking as the distance between it and the earth is increasing.

In a decent telescope its small polar cap becomes visible with a magnification of at least 100x. I viewed Mars recently through a very nice 125mm (5 inch aperture) apochromatic refractor telescope belonging to the Westminster Astronomical Society (WASI). I could easily see the polar cap and several darker markings on the surface of Mars at 112x. The telescope had the advantage of being motor driven. Thus, it tracked Mars automatically allowing for prolonged viewing while maintaining Mars in the center of the eyepiece field.

Around this same time (9:00 p.m.) our fourth planet, Saturn, is rising in the southeast. Saturn is a masterpiece in almost any telescope. The rings are easily visible as are from one to a handful of its brightest moons.

This is the month when Saturn reaches opposition – its nearest point to earth for the year. Thus it remains up all night long. As Saturn gets highest the view should become clearer as the climbing planet is viewed where earth's atmosphere is less dense.

Saturn is best placed for telescopic viewing around midnight during May. On the night of May 14, Saturn is located to the left of the nearly full moon.

Our fifth planet won't be up for several hours. So you may either continue viewing Mars and Saturn until then, or set your alarm clock and get some sleep. Venus can be found low and to the east in the morning twilight around 5:30 a.m. It outshines any other star or planet in the sky.

In a telescope Venus is a dazzling gibbous ball. Best views of Venus are typically made during daytime, when Venus is high in the sky and visible and its glare is reduced. So I would recommend tracking it, manually if needed, with your telescope as it rises higher in the morning sky.

How long can you follow Venus? Are you able to keep tabs on it after sunrise with a telescope? Send an e-mail and let me know if you have success or not.

How about the sixth major planet visible in May? Look below your feet. It's the earth.

President's Message

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As I write this, the rescheduled Messier Marathon is this coming weekend on Saturday, April 26th. Our last attempt at the Marathon was March 29th. The weather was not cooperative therefore requiring the alternate date. So far the weather looks promising. I am optimistic for a successful hunt. The location is the same, the Marstown Observatory in New Windsor. Be there by 7:30pm to set up your equipment. Be sure to bring some warm clothes, hot coffee or cocoa and some energy food to keep you going!

On the observatory front there hasn't been much change. We continue to work with the County on the construction and installation details for the Blaine Roelke Observatory here at BBNC. We are still looking to begin installation of this beautiful dome this coming summer. Over in Taneytown, a few members of our Observatory Committee are scheduled to meet with City Officials in early May. It is at this meeting where WASI will formally present our planned roll-off roof observatory. Once this initial step is complete, we will look to see what Taneytown can do to help bring this project into fruition. We won't have a timeline for a roll-off roof observatory until we have an agreement in place with the City of Taneytown. Lastly, in Manchester, we are still pursuing the idea of a smaller observatory at Charlotte's Quest Nature Center.

Our May Meeting will feature Dr. Demos Kazanas of the NASA Goddard Space Flight Center. Dr. Kazanas' presentation is titled, "The Universe at Large: Its Birth, Growth and Future, a Personal Account". Dr. Kazanas visited us last year and presented, "The Ins and Outs of Black Holes". It was a fascinating discussion and I'm very glad he has returned to speak with us again.

As usual, we will be having dinner at Harry's Main Street Grill in Westminster prior to the meeting. All are welcome so please join us for a bite to eat and some casual conversation with your fellow members and Dr. Kazanas.

As the temperatures have gradually warmed up, I hope you have been able to get in some observing. The April highlight was the Lunar Eclipse but all I got see was raindrops. This was a big disappointment for sure but I would not be deterred. On the nights when the skies did cooperate, Mars was there in the evening sky. Mars reached opposition on April 8th lending to awesome views of the red planet. Jupiter, also up in the western evening sky is still a jewel to be seen though it is lessening a bit in brightness. Saturn is currently taking center stage as it reaches opposition on May 10th. Saturn is absolutely one of those astronomical objects that always has people saying, "Wow!"

Lastly, "Tony's Astronomy Target" for May is Canes Venatici, The Hunting Dogs, which is on Meridian on May 20th. This small constellation lies beneath the handle of Ursa Major, the Big Dipper. Its brightest star, Alpha Canum Venaticorum is known as Cor Caroli, the Heart of Charles. Cor Caroli is a nice blue/white double star. The blue star is at 2.9 magnitude while its white companion is at 5.6. After seeing Cor Caroli, strike a line from there to Megrez. Megrez is the star in the Big Dipper that connects the handle to the pot. About a third of the way to Megrez, you'll run into Y Canum Venaticorum (Y CVn) this star is also known as LaSuperba. Y CVn is a deep red carbon star. Carbon stars atmospheres typically have many molecules that contain carbon which filters out the blue light of the star thus yielding the beautiful red color. From Y CVn, make a U-turn and head down towards Arcturus. On the way, stop and see M3, a wonderful Globular Cluster of about a 500,000 stars and has a magnitude of 6.2. M3 is an easy binocular target that looks great in the field of view that binoculars offer. While you're in that neighborhood, you might be inclined to venture further down to get into and lost the Virgo Cluster!

That's all for now. I hope to see you all at our May meeting to see Dr. Kazanas perhaps get in some stargazing too.

Clear Skies,

Tony Falletta

Hoffman's Ice Cream Sundial Dedication

WASI's Bob Clark will be hosting the unveiling of a combination of the analemma and sun dial to occur at Hoffman's Ice Cream Store in Westminster Maryland on Saturday, 1 pm, 24 May 2014.

This event combines some astrophysics with some ancient, but real, astronomy and everyone's favorite food ice cream.

No reservations, no cost. Hoffman's Ice Cream Store 934 Washington Road Westminster MD 21157

So you ask...what is an analemma? Well...Wikipedia describes it this way:

“In astronomy, an analemma is a curve representing the changing angular offset of a celestial body (usually the Sun) from its mean position on the celestial sphere as viewed from another celestial body (usually the Earth). The term is used when the observed body appears, as seen from the viewing body, to move in a way that is repeated at regular intervals, such as once a year or once a day. The analemma is then a closed curve, which does not change.”

Or

“An alternative, equivalent description of the solar analemma is as a graph of the Sun's declination plotted against the equation of time.”

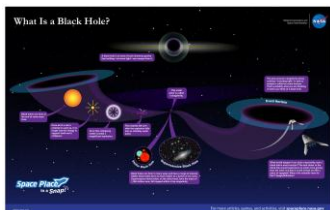
What this usually means is that someone spent an entire year plotting points to show the motion of the sun. They usually turn out to represent an elongated figure 8 pattern. Do you understand why? Do you understand the connection to a sun dial? Come on out and let Bob explain this phenomenon.



WASI Turns 30...

While I suspect Curt will craft a nice article for a future edition of the MDA (hint, hint), I thought I better mention that May marks the 30th anniversary of the first meeting of the Westminster Astronomical Society.

Happy Birthday WASI...



A black hole is an area of such immense gravity that nothing—not even light—can escape from it.

What is a black hole?

NASA's Space Place in a SNAP! is a series of quick, narrated tours of animated infographics that illustrate key science concepts. Not only are they fun and entertaining on their own, they also come with a downloadable poster and a transcript of the video, making for a cross-disciplinary learning experience. The latest topic—black holes! Find out what they are today at <http://spaceplace.nasa.gov/black-holes>.



The Power of the Sun's Engines

By Dr. Ethan Siegel

Here on Earth, the sun provides us with the vast majority of our energy, striking the top of the atmosphere with up to 1,000 Watts of power per square meter, albeit highly dependent on the sunlight's angle-of-incidence. But remember that the sun is a whopping 150 million kilometers away, and sends an equal amount of radiation in all directions; the Earth-facing direction is nothing special. Even considering sunspots, solar flares, and long-and-short term variations in solar irradiance, the sun's energy output is always constant to about one-part-in-1,000. All told, our parent star consistently outputs an estimated 4×10^{26} Watts of power; one *second* of the sun's emissions could power all the world's energy needs for over 700,000 years.

That's a literally astronomical amount of energy, and it comes about thanks to the hugeness of the sun. With a radius of 700,000 kilometers, it would take 109 Earths, lined up from end-to-end, just to go across the diameter of the sun once. Unlike our Earth, however, the sun is made up of around 70% hydrogen by mass, and it's the individual protons — or the nuclei of hydrogen atoms — that fuse together, eventually becoming helium-4 and releasing a tremendous amount of energy. All told, for every four protons that wind up becoming helium-4, a tiny bit of mass — just 0.7% of the original amount — gets converted into energy by $E=mc^2$, and that's where the sun's power originates.

You'd be correct in thinking that fusing $\sim 4 \times 10^{38}$ protons-per-second gives off a tremendous amount of energy, but remember that nuclear fusion occurs in a *huge* region of the sun: about the innermost quarter (in radius) is where 99% of it is actively taking place. So there might be 4×10^{26} Watts of power put out, but that's spread out over 2.2×10^{25} cubic meters, meaning the sun's energy output *per-unit-volume* is just $18 \text{ W} / \text{m}^3$. Compare this to the average human being, whose basal metabolic rate is equivalent to around 100 Watts, yet takes up just 0.06 cubic meters of space. In other words, **you emit 100 times as much energy-per-unit-volume as the sun!** It's only because the sun is so large and massive that its power is so great.

It's this slow process, releasing huge amounts of energy *per reaction* over an incredibly large volume, that has powered life on our world throughout its entire history. It may not appear so impressive if you look at just a tiny region, but — at least for our sun — that huge size really adds up!

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Check out these “10 Need-to-Know Things About the Sun”:

<http://solarsystem.nasa.gov/planets/profile.cfm?Object=Sun>.

Kids can learn more about an intriguing solar mystery at NASA’s Space Place:

<http://spaceplace.nasa.gov/sun-corona>.

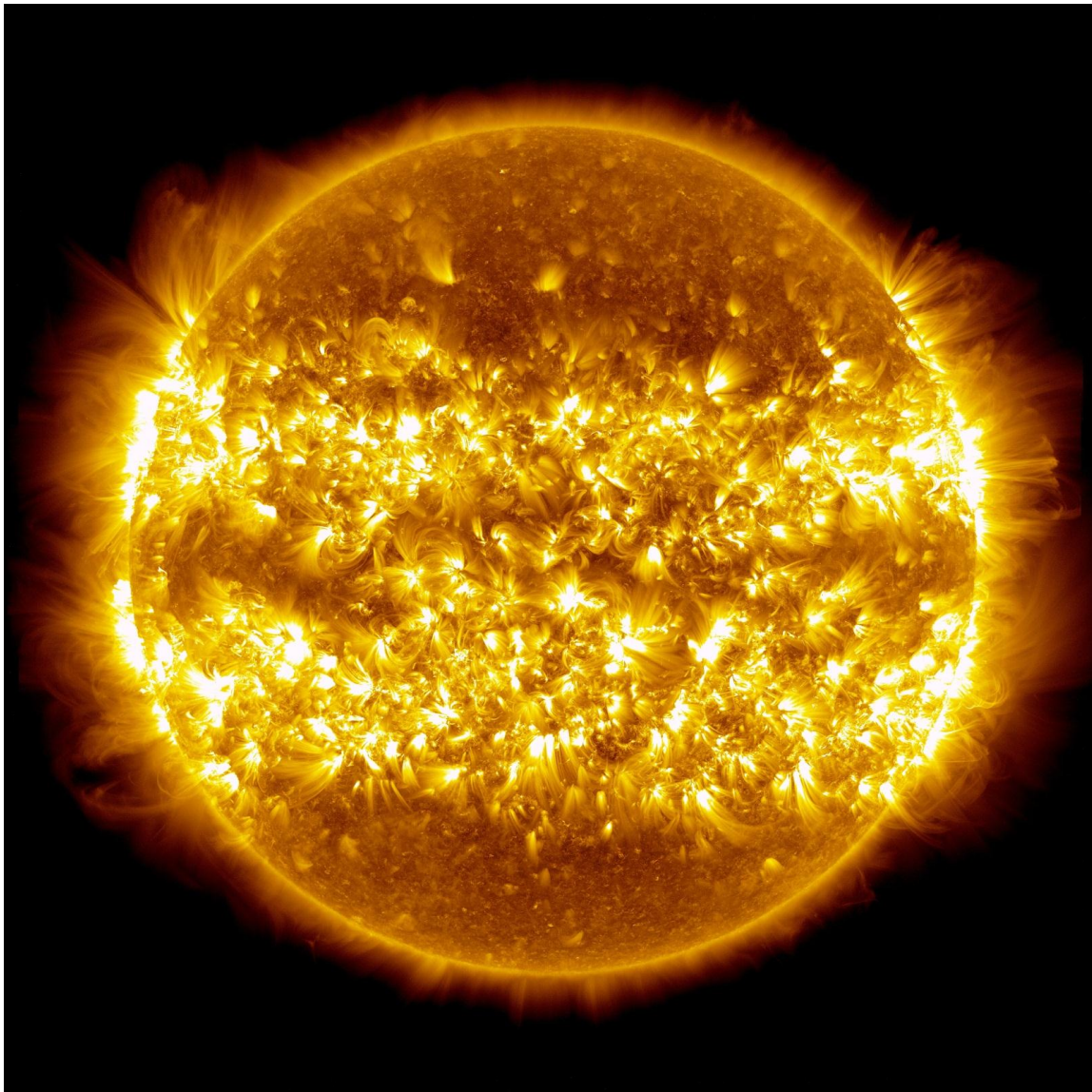


Image credit: composite of 25 images of the sun, showing solar outburst/activity over a 365 day period; NASA / Solar Dynamics Observatory / Atmospheric Imaging Assembly / S. Wiessinger; post-