

The Mason-Dixon Astronomer



St*r Points

Pluto Flyby Results Continue Coming

November 2015 – Curt Roelle

As stored images and data collected by the New Horizons spacecraft during its summer flyby of Pluto continue to dribble in, the first scientific results are being published. Although the trip to Pluto took more than nine years and New Horizons sped past Pluto at more than eight miles per second, the results have been worth waiting for and of high quality.

During the “close encounter” phase the spacecraft had less than a day to perform its most detailed observations. In order to save time and concentrate on the data collection, the image and other sensor information was stored onboard for later playback. Some of the early results were transmitted back to earth but in a compressed format so some fidelity was lost. However, over the course of a year following the encounter the entire data set is being transmitted home uncompressed, a lengthy and slow process.

Photographs of the surface of Pluto and its largest moon Charon reveal a variety not only of terrain but colors as well. Preliminary maps have been published showing features such as a large craterless plane Sputnik Planum named for the first Earth satellite. [Note: At a 2007 event in Washington, DC, sponsored by the Russian Embassy to honor the 50th anniversary of Sputniks’ launch, I learned the correct pronunciation of Sputnik is spoot-nik.]



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President's Message

November 2015 – Tony Falletta

Greetings!

November is here ushering in the fall. The days are decidedly cooler and the nights that begin with dew on the grass greets the morning as frost on the ground.

This past month has been one that had a wonderful planetary lineup in the predawn sky. We had the opportunity to see Venus, Jupiter, Mars, Mercury, and even the Moon announcing the new day. I had a few opportunities to enjoy the early morning show. On my first attempt I tried to be proactive and set up my telescope the night before. I had done my backyard astronomy that night and thought, “Hey, I’ll just leave my scope out and come back around 5am with a hot cup of coffee in my hand. It all went as planned until I went outside only to discover my scope was completely covered with dew, even the mirror. My next attempts were met with success after more careful planning. One of my best views had Venus at the top of the lineup then down to Jupiter and Mars and then down further to the horizon where a wonderful crescent Moon was right next to Mercury. Aside from the planetary show, the predawn sky also has Orion in his full glory telling me that winter is approaching.

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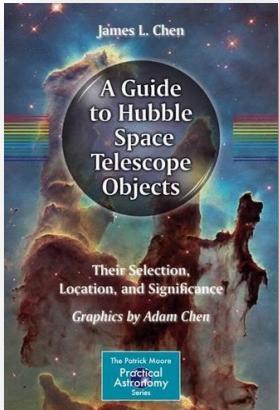
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November Meeting – Guest Speaker

Jim Chen



"Telescope Buyers' Workshop"

The annual WASI Telescope Buyers' Workshop (TBW) is here! Special guest Jim Chen makes a return appearance. Jim's prepared a new briefing about GoTo telescopes to share with WASI members. He will also demonstrate Celestron's new Evolution 6 WiFi enabled telescope and a current model Vixen StarBook German Equatorial telescope mount.

Bio:

Jim is a retired systems engineer and has previously worked for the Department of the Navy and the Federal Aviation Administration. He is also the author of three books in Springer's "Patrick Moore Practical Astronomy" series:

1. [How to Find the Apollo Landing Sites](#)
2. [A Guide to Hubble Space Telescope Objects: Their Selection, Location, and Significance](#)
3. [The Vixen Star Book User Guide: How to Use the Star Book TEN and the Original Star Book](#)

Upcoming Events From Our Calendars



- ❖ **Planetarium Show** November 7th, 7:30 p.m., at Bear Branch Nature Center (BBNC)
- ❖ **Monthly Meeting** November 11th, 7:30 p.m., at Bear Branch Nature Center (BBNC)
- ❖ **Soldiers Delight Public Stargazing** November 14th, 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 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.

Junior Membership (under 18) is just \$5 per year

<http://www.westminsterastro.org>

St*r Points for November...

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Mountain ranges were discovered as well, including Hillary Montes and Norgay Montes. They were named after the first known persons to reach the top of Mt. Everest: Sir Edmund Hillary and Tenzing Norgay.

As far as true colors go, images indicate Pluto has a pinkish salmon tinge and dark browns whereas Charon's colors are darker and more drab. Released images of Pluto's night side showed it to be ringed by a bluish atmosphere appearing similar to the Earth's though far thinner.

This atmosphere is being studied from Earth as well. In the days leading up to the New Horizons flyby, an "occultation" of Pluto occurred during which it passed in front of a 12th magnitude star, and thus occulted or blocked the star's light. The event was visible from New Zealand and far southern Australia. According to Sky and Telescope magazine, a group observing from a site where Pluto passed centrally over the star, observed a "central flash." That is caused by Pluto's atmosphere acting as a lens magnifying the star's brightness. Objects without atmospheres such as asteroids do not brighten when the distant starlight is blocked during an occultation. The occultation confirmed the existence of the atmosphere surrounding Pluto.



All images courtesy of NASA's New Horizons Photo Gallery



The entire catalog of knowledge we've learned about Pluto has only been collected during the last 85 years. That was because Pluto wasn't discovered until 1930 when Clyde Tombaugh noticed it on photographic plates taken during a planet search at Flagstaff's Lowell Observatory. The history of Pluto's moons is even more recent. Charon wasn't discovered until it was revealed in images taken in 1978 by the U.S. Naval Observatory, also at Flagstaff.

In 2005 two more moons of Pluto were discovered thanks to images taken by the Hubble Space Telescope (HST). The moons were given the names Nix and Hydra after characters in Greek mythology. A very interesting and detailed post discovery slide presentation given by co-discoverer Max Mutchler at a regular meeting of the local Westminster Astronomical Society, Inc. (WAS) is available online (http://www.stsci.edu/~mutchler/talks/Pluto_WAS.pdf).

The final two of Pluto's five known moons were discovered in 2011 and 2012, respectively – after New Horizons had left Earth and was en route to Pluto. Like Nix and Hydra before them, Kerberos and Styx were discovered in images taken by the HST and named after mythological characters.

President's Message

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The evening sky for November has a few objects of note I like to look at. With a telescope, you'll see Saturn lying low in the setting sky but Uranus, which was in opposition on October 21st, shining at magnitude 5.7 is in Pisces and Neptune at a dimmer magnitude of 7.8 is in Aquarius. Hunt these outer ice giants down and you won't be disappointed. Grabbing my binoculars, I take a look at the constellation Perseus. Once there I enjoy the view of the Alpha Persei Cluster. This association of stars lying at Alpha Persei is made up of a couple of dozen stars. It looks like an open cluster but is only a stellar association. I would be remiss if I didn't mention The Double Cluster. These side-by-side clusters, lying between Perseus and Cassiopeia, are absolutely gorgeous in my binoculars. Moving from Perseus towards Taurus lies spectacular M45, the Pleiades. It shows best in the wide field view that binoculars provide. M45 also makes for impressive view for first time viewers. I always seem to get an, "Oh wow!" reaction from people.

Our upcoming meeting will be our annual Telescope Buyers Workshop hosted by Jim Chen. Jim has presented the Workshop to us before and is wonderful speaker. The last time he hosted this topic he provided some wonderful and practical advice to both our members and visitors alike. If you are thinking of getting some astronomical gear, don't miss this meeting!

Thanks for reading and enjoy the night. I hope to see you at our next meeting.

Clear Skies

Tony Falletta

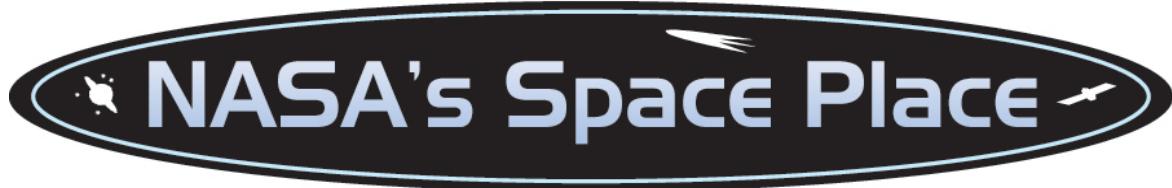
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How we know Mars has liquid water on its surface

By Ethan Siegel

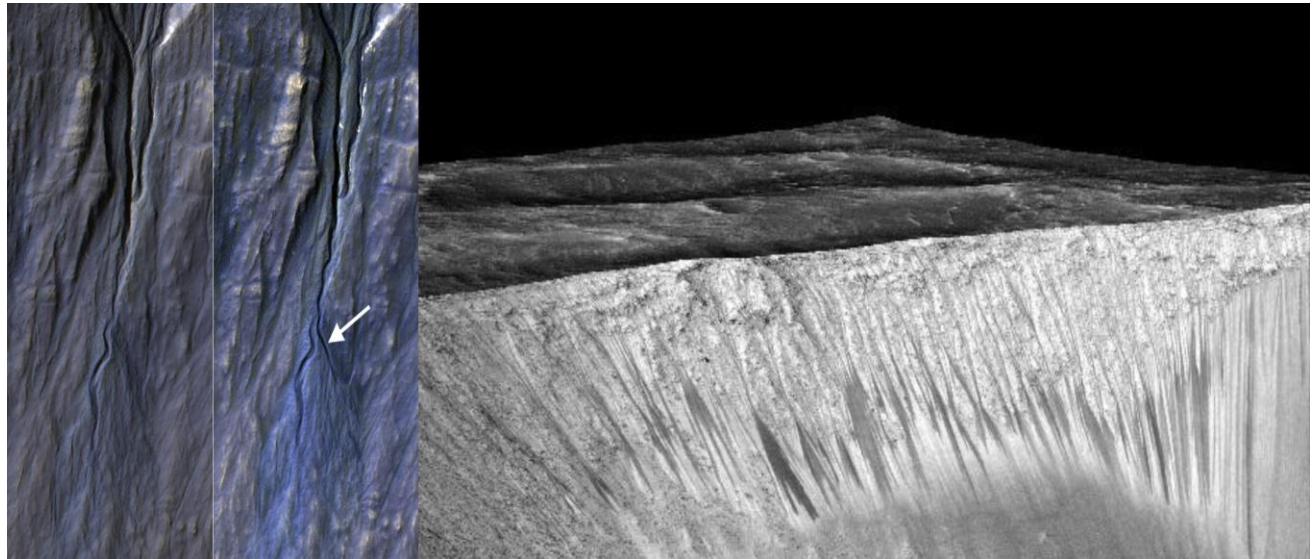
Of all the planets in the solar system other than our own, Mars is the one place with the most Earth-like past. Geological features on the surface such as dried up riverbeds, sedimentary patterns, mineral spherules nicknamed "blueberries," and evidence of liquid-based erosion all tell the same story: that of a wet, watery past. But although we've found plenty of evidence for molecular water on Mars in the solid (ice) and gaseous (vapor) states, including in icecaps, clouds and subsurface ices exposed (and sublimated) by digging, that in no way meant there'd be water in its liquid phase today.

Sure, water flowed on the surface of Mars during the first billion years of the solar system, perhaps producing an ocean a mile deep, though the ocean presence is still much debated. Given that life on Earth took hold well within that time, it's conceivable that Mars was once a rich, living planet as well. But unlike Earth, Mars is small: small enough that its interior cooled and lost its protective magnetic field, enabling the sun's solar wind to strip its atmosphere away. Without a significant atmosphere, the liquid phase of water became a virtual impossibility, and Mars became the arid world we know it to be today.

But certain ions—potassium, calcium, sodium, magnesium, chloride and fluoride, among others—get left behind when the liquid water disappears, leaving a “salt” residue of mineral salts (that may include table salt, sodium chloride) on the surface. While pure liquid water may not persist at standard Martian pressures and temperatures, extremely salty, briny water can indeed stay in a liquid state for extended periods under the conditions on the Red Planet. It's more of a "sandy crust" like you'd experience on the shore when the tide goes out than the flowing waters we're used to in rivers on Earth, but it means that under the right temperature conditions, liquid water does exist on Mars today, at least in small amounts.

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The measured presence and concentration of these salts, found in the dark streaks that come and go on steep crater walls, combined with our knowledge of how water behaves under certain physical and chemical conditions and the observations of changing features on the Martian surface supports the idea that this is the action of liquid water. Short of taking a sample and analyzing it in situ on Mars, this is the best current evidence we have for liquid water on our red neighbor. Next up? Finding out if there are any single-celled organisms hardy enough to survive and thrive under those conditions, possibly even native to Mars itself!



Images credit: NASA/JPL-Caltech/Univ. of Arizona, of a newly-formed gully on the Martian surface (L) and of the series of gullies where the salt deposits were found (R).