



Ye stars! which are the poetry of heaven!  
Lord Byron

**Newsletter of the Pomona Valley Amateur Astronomers**

**Volume 37 Number 06** *nightwatch* **June 2017**



**MEETING ALERT**

We are meeting in **Shanahan B460** in **June**.

In **July**, we meet in **Beckman**.

We are back in **Shanahan B460** for **August**.

More information should be available in June.

**President's Message**

Jupiter and Saturn are wowing us right now, not just in the evening sky, but also in the amazing imagery sent back by the Juno and Cassini probes. And the summer Milky Way is up at a fairly forgiving hour as well, giving deep-sky hunters plenty of real estate to explore.

Closer to home, on Saturday, June 3, SpaceX made history by reflying a previously flown Dragon capsule to the space station. It was also my birthday – pretty good birthday present.

It's the end of our club fiscal year, so if you need to do what must be done when dues are due, then do it!

Our speaker this month is Alex McConahay, who will speak to us about "Nightscapes". I hope to see you there.

*Matt Wedel*

At the May 12<sup>th</sup> election all officers and board members ran unopposed for the 2017 - 2018 term and were re-elected.

The board member-at-large for the 2016 - 2018 term vacated by Karl Rijkse was filled by Richard Wismer.

We would like to thank Karl for his service.

**Club Events Calendar**

**June 9, 2017 General Meeting –**  
**Alex McCohanay - Nightscapes**

**June 24, 2017 Star Party – Grandview**

**June 28 Board Meeting**

**July 7 General Meeting**

**July 22 Star Party -Culp Valley Campground, Anza Borrego**

**July 26 Board Meeting**

**August 4 General Meeting -Vatche Sahakian**

**August 5 Girl Scout Star Party –**

**Cabrillo Beach Youth Center**

**August 12 Star Party - Cow Canyon Saddle, Mount Baldy**

**August 30 Board Meeting**

**September 8 General Meeting**

**September 23 Star Party - Palomar Mountain and**

**Observatory tour 10 AM**

**September 27 Board Meeting**

**October 6 General Meeting**

**October 21 Star Party - Nightfall, Anza Borrego**

**PVAA Officers and Board**

**Officers**

President .....	Mathew Wedel .....	909-767-9851
Vice President ..	Joe Hillberg .....	909-949-3650
Secretary .....	Howard Maculsay ....	909-624-1667
Treasurer .....	Gary Thompson .....	909-935-5509
VP Facilities .....	Jeff Felton .....	909-622-6726

**Board**

Jim Bridgewater (2018).....	909-599-7123
Richard Wismer(2018) .....	
Ron Hoekwater (2019).....	909-391-1943
Cori Charles (2019) .....	909-646-0275

**Directors**

Membership / Publicity....	Gary Thompson ..	909-935-5509
Outreach .....	Jeff Schroeder .....	909-758-1840
Programs .....	Ron Hoekwater .....	909-391-1943
Nightwatch .....	John Stover .....	909-988-9747

PVAA General Meeting 5/12/17



Professor Alma Zook

Pomona College's Professor Alma Zook was the guest speaker for the night. Prof. Zook specializes in Extra Galactic Astronomy. (Objects outside of the Milky Way galaxy.) She really likes to study blazars. A blazer is a

very compact quasar associated with a presumed supermassive black hole at the center of an active, giant elliptical galaxy. A quasar is a quasi-stellar radio source. Blazars are among the most energetic phenomena in the universe.



However, Professor Zook's subject for the night was much closer to home. Her talk was on [Pluto](#). She brought up the recent fly-by of the New Horizon spacecraft. That re-kindled the debate of why isn't Pluto considered a planet anymore? Before answering that question, the professor described our solar system. The inner section consists of rocky planets. (Mercury, Venus, Earth & Mars) Then we have the asteroid belt, which has a couple of dwarf planets – Ceres and Vesta. The next section is the Jovian planets – Large gas giants – Jupiter, Saturn, Uranus & Neptune. Then comes the Kuiper Belt. Lots of space junk with ice balls and rocky left overs.

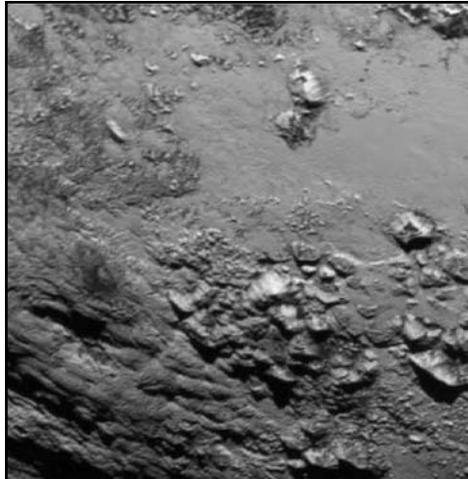
Going back in history we 'started' with 6 planets: Mercury, Venus, Earth, Mars, Jupiter & Saturn. In 1781 Herschel discovered Uranus. The planet count went to 7. On January 1<sup>st</sup>, 1801 Giuseppe Piazzi discovered Ceres. The planet count went to 8. In 1802 Heinrich Olbers discovered Pallas in the asteroid belt. As humanity did not yet know of the 'asteroid belt', the number of planets went to 9. In 1804 Karl Harding discovered the now asteroid Juno. Planets=10. In 1807 Olbers discovered asteroid Vesta. With the plotting of the orbits of these new 'planets' the term 'asteroid belt' came into being. The number of planets returned to 7. On September 23<sup>rd</sup>, 1846 Gottfried Galle discovered Neptune by searching within 1 degree of where mathematician Le Verrier predicted a planet would be found. Planet count = 8. In 1930 Clyde Tombaugh discovered Pluto, which became our 9<sup>th</sup> planet.

After 1992 Pluto's planethood was questioned, as several other similar sized objects were found in the Kuiper Belt. In 2005 Eris was found, and it was 27% more massive than Pluto. In 2006 the [International Astronomical Union](#) defined the term 'planet' to be:

- 1.) The object must orbit around the Sun. (Exoplanets orbit around other stars.)
- 2.) The object must be massive enough to be rounded by its own gravity. More specifically, its own gravity should pull it into a shape defined by [hydrostatic equilibrium](#).
- 3.) It must have cleared the neighborhood around its orbit.

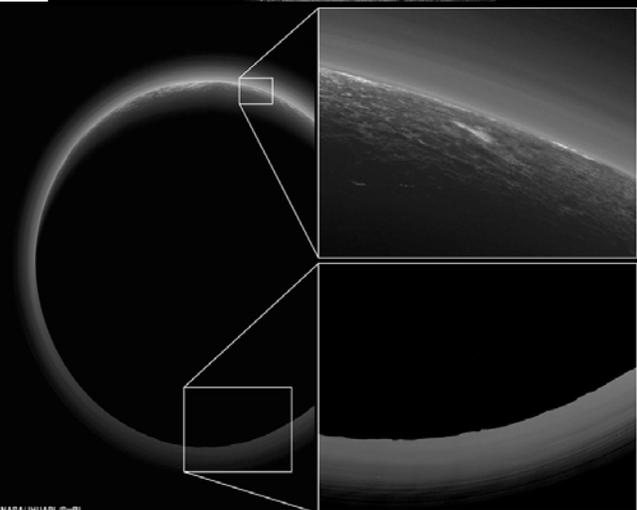
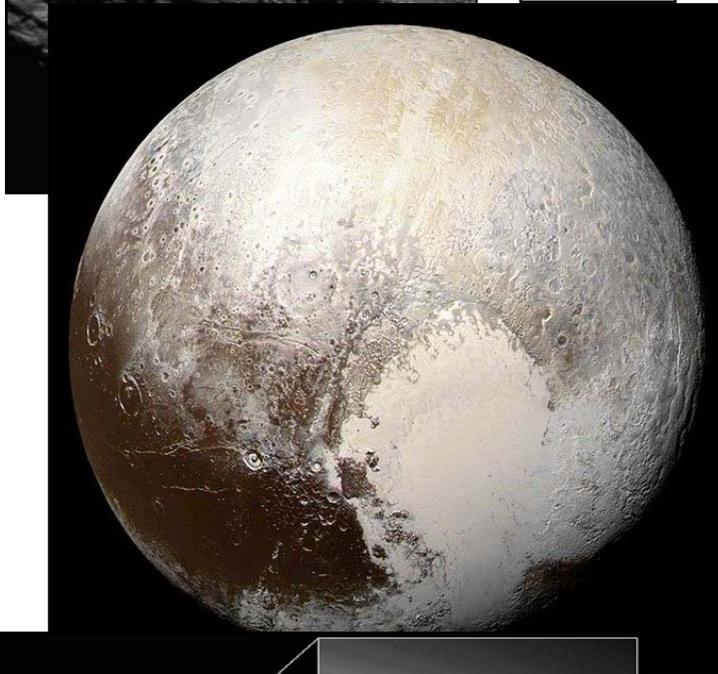
It was this 3<sup>rd</sup> rule that relegated Pluto to dwarf planet status. Professor Zook suggests the book: "The Pluto Files: The Rise and Fall of America's Favorite Planet" by Neil DeGrasse Tyson.

Gary Thompson



Mountain Range on Pluto - New Horizons

Pluto - New Horizons



Atmosphere of Pluto - New Horizons

## What's Up? - Lord of Rings

Uranus has the coldest surface of all our planets at -371 F. It's been called an ice giant since it's much more frigid than gas giants Saturn and Jupiter. This is probably because Uranus oddly orbits tilted at 97.8 degrees to its orbital plane. It moves pole first through its 84 year solar orbit. So it gets 42 years of daylight and 42 years of freezing darkness. This makes it have the coldest planetary atmosphere in our system. These temperature extremes produce surface winds of up to 560 mph. There are a lot of ices of ammonia, methane, and even water in its layered blue-green cloud system. It spins on its axis in an unusually retrograde direction at a fast 17 earthly hours every tilted day. Its poles lie where most planets have their equator. It's thought that these weird extremes happened because early in its existence Uranus collided with one or two Earth sized planets that knocked it on its orbital side.

Uranus is barely visible to the naked eye at about 6th magnitude, but it's the third largest planet in size after Jupiter and Saturn. Its gassy volume with its ice layers is 63 times the size of Earth. It moves so slowly it was long classified as a star. Actually, it's the next planet out beyond Saturn, the first planet to be discovered by a telescope.

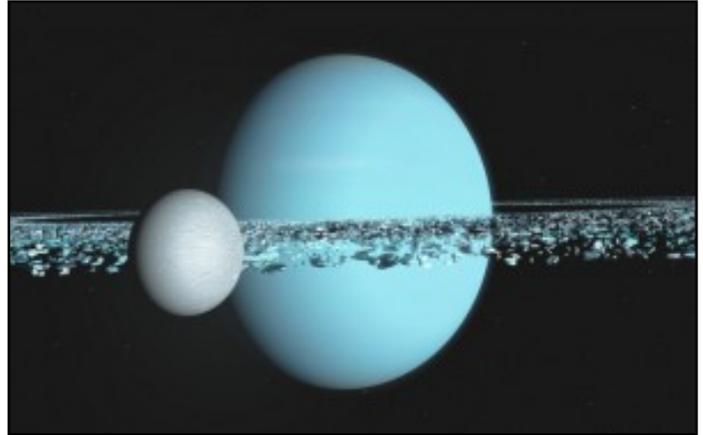
It was viewed and catalogued as a star by famous astronomers like John Flamsteed and Pierre Lemonnier with their 18th century telescopes. It was English astronomer William Herschel with his self designed telescope who detected orbital movements that led him to believe he had found a large comet. In March of 1781 he reported it as a comet without a tail. As it grew to appear larger and have a circular orbit not typical of the elliptical orbits of comets, he realized he had discovered a distant planet out beyond Saturn.

Soon it was accepted as the first planet to be discovered by an astronomer. Herschel was given an annual stipend of 200 pounds by King George III so he could move to Windsor where the Royal Family could view it through his telescope. Inspired by this royal support, Herschel decided to name it after King George of England. It would be called George's Star, or Georgium Sidus in Latin.

Naturally, this nationalistic name wasn't popular with other countries. Astronomer Jerome Lalande suggested Herschel to honor its discoverer. Others liked the name Neptune because of its blue-green color. (This would be later used for an even bluer ice giant.) It was pointed out that all other planets had names of classical Roman gods. Finally after many years the name Uranus was agreed on. This was a Roman version of the Greek sky god Ouranos, so it became the first planet named after a Greek god rather than a Roman one. But importantly Uranus was the father of the Titans, and the Titan Saturn was the father of Jupiter.

But William Herschel, in a sort of patriotic revenge, decided to name Uranus' moons after characters from the very British plays of Shakespeare. He attempted to follow tradition by selecting gods and fairy creatures. So Uranus' largest moon (946 miles in diameter) became Titania, the female version of Titan (the largest moon of Saturn). Titania is not a goddess, but a Fairy Queen from A Midsummer Night's Dream. Her Fairy King is Oberon who became the second largest moon (981 mi). Ariel, a fairy from The Tempest, became the third largest moon

(720 mi). He then had to go to the satirical playwright Alexander Pope for the spirit name Umbriel (727 mi). Miranda, a pretty princess from The Tempest, became a 293 mile moon. As 27 total moons were discovered, the naming had to include more familiar human characters like Desdemona (36 mi) and Juliet (68 mi). None of Uranus' moons are very large.



In 1977, it was discovered during an occultation that Uranus had a ring system, but one thinner than Saturn's. These rings were directly photographed by the Voyager II probe in 1986. Voyager also discovered many smaller moons and new rings. Now there were 13 rings all relatively dark compared to Saturn's bright rings. It all showed that rings around giant planets were not unique just to Saturn.

But Uranus is so far and coldly remote from Earth observation that only future space probes will unlock its icy giant secrets.

*Lee Collins*

### Link to Space Junk Video

This is interesting and fairly well done. 12 minutes.

<https://www.youtube.com/watch?v=zT7typHkpVg>

Ludd Trozpek



### This article is provided by NASA Space Place.

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## The Fizzy Seas of Titan

With clouds, rain, seas, lakes and a nitrogen-filled atmosphere, Saturn's moon Titan appears to be one of the worlds most similar to Earth in the solar system. But it's still alien; its seas and lakes are full not of water but liquid methane and ethane.

At the temperatures and pressures found on Titan's surface, methane can evaporate and fall back down as rain, just like water on Earth. The methane rain flows into rivers and channels, filling lakes and seas.

Nitrogen makes up a larger portion of the atmosphere on Titan than on Earth. The gas also dissolves in methane, just like carbon dioxide in soda. And similar to when you shake an open soda bottle, disturbing a Titan lake can make the nitrogen bubble out.

But now it turns out the seas and lakes might be fizzier than previously thought. Researchers at NASA's Jet Propulsion Laboratory recently experimented with dissolved nitrogen in mixtures of liquid methane and ethane under a variety of temperatures and pressures that would exist on Titan. They measured how different conditions would trigger nitrogen bubbles. A fizzy lake, they found, would be a common sight.

On Titan, the liquid methane always contains dissolved nitrogen. So when it rains, a methane-nitrogen solution pours into the seas and lakes, either directly from rain or via stream runoff. But if the lake also contains some ethane—which doesn't dissolve nitrogen as well as methane does—mixing the liquids will force some of the nitrogen out of solution, and the lake will effervesce.

"It will be a big frothy mess," says Michael Malaska of JPL. "It's neat because it makes Earth look really boring by comparison."

Bubbles could also arise from a lake that contains more ethane than methane. The two will normally mix, but a less-dense layer of methane with dissolved nitrogen—from a gentle rain, for example—could settle on top of an ethane layer.

In this case, any disturbance—even a breeze—could mix the methane with dissolved nitrogen and the ethane below. The nitrogen would become less soluble and bubbles of gas would fizz out.

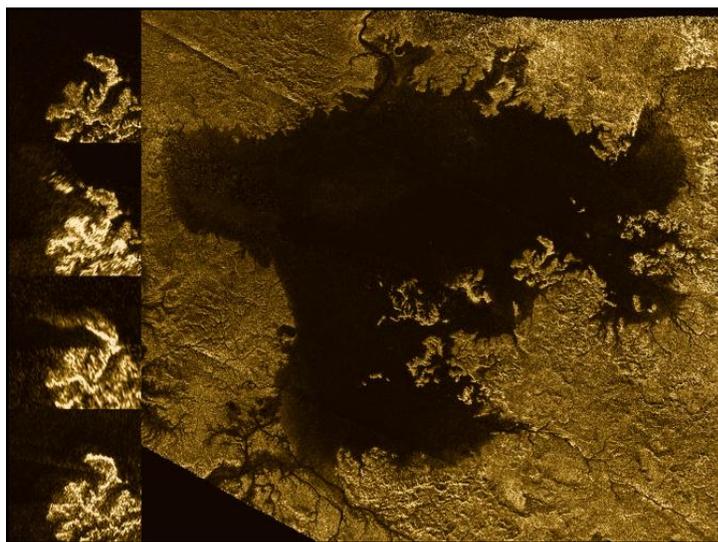
Heat, the researchers found, can also cause nitrogen to bubble out of solution while cold will coax more nitrogen to dissolve. As the seasons and climate change on Titan, the seas and lakes will inhale and exhale nitrogen.

But such warmth-induced bubbles could pose a challenge for future sea-faring spacecraft, which will have an energy source, and thus heat. "You may have this spacecraft sitting there, and it's just going to be fizzing the whole time," Malaska says. "That may actually be a problem for stability control or sampling."

Bubbles might also explain the so-called magic islands discovered by NASA's Cassini spacecraft in the last few years. Radar images revealed island-like features that appear and disappear over time. Scientists still aren't sure what the islands are, but nitrogen bubbles seem increasingly likely.

To know for sure, though, there will have to be a new mission. Cassini is entering its final phase, having finished its last flyby of Titan on April 21. Scientists are already sketching out potential spacecraft—maybe a buoy or even a submarine—to explore Titan's seas, bubbles and all.

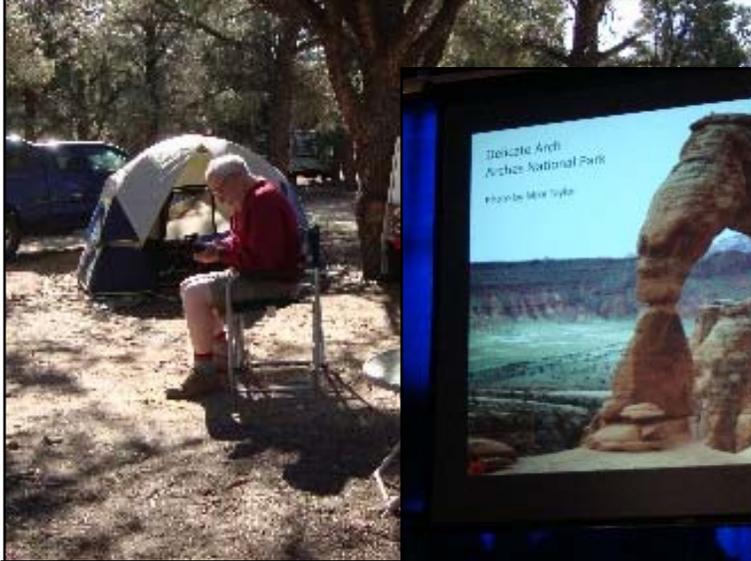
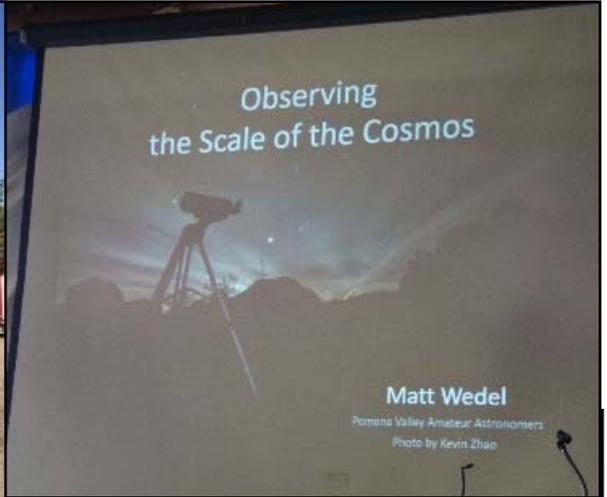
*Marcus Woo*



To teach kids about the extreme conditions on Titan and other planets and moons, visit the NASA Space Place:

<https://spaceplace.nasa.gov/planet-weather/>

*Caption: Radar images from Cassini showed a strange island-like feature in one of Titan's hydrocarbon seas that appeared to change over time. One possible explanation for this "magic island" is bubbles. Image credits: NASA/JPL-Caltech/ASI/Cornell*

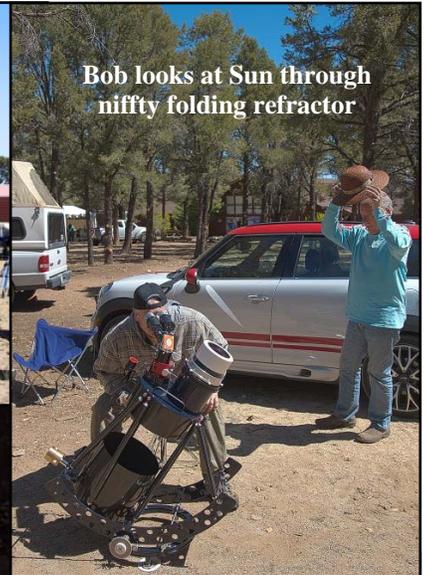




Ludd works on binoculars



Steve and Matt question scope builder



Bob looks at Sun through nifty folding refractor



Laura, Ludd, Bob, and Jim enjoying night



Bob



Bob tests new scope and makeshift mount



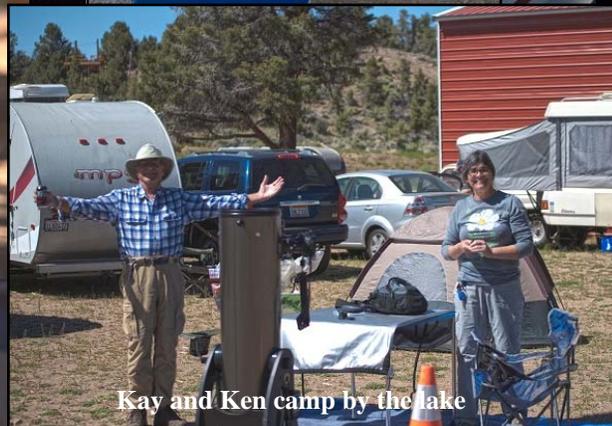
Laura returns from lecture



Some of Ludd's Purchases



Bob back at camp



Kay and Ken camp by the lake



Laura