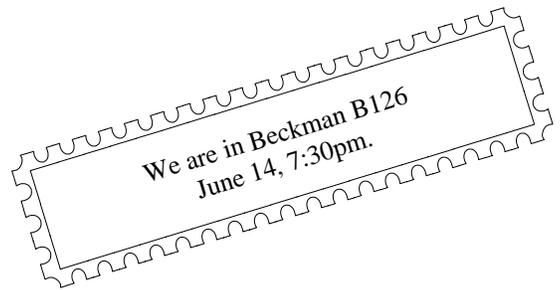




Newsletter of the Pomona Valley Amateur Astronomers

The universe seems neither benign nor hostile,
merely indifferent.
Carl Sagan



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nightwatch

June 2019

Important Message

Please join PVAA in another look back, this time to the 50 year ago Apollo 11 mission. This one of course, is the Big One - where Neil Armstrong and Buzz Aldrin piloted the Apollo Lunar Module Eagle to finally set foot on the moon as Michael Collins flew overhead in Command Module Columbia. As always, the public is welcome to join this free lecture. This would be a great time to invite friends and relations to join you at the meeting as interest is high around the anniversary of this famous mission.

It is also time for Club elections and for the collection of yearly dues, hope to see many of you there.

Claire Stover

Club Events Calendar

Jun 14 General Meeting Apollo 11 Ken Elchert

Jul 10 Board Meeting

Jul 19 General Meeting - Jason Gallicchio on Quantum Entanglement

Jul 27 Star Party - Table Mountain

Aug 3 Nature at Night GS Camp - Nawakwa

Aug 7 Board Meeting

Aug 16 General Meeting - Scott and Nathan Little on Cosmic Strings and Webb Scope

Aug 31 Star Party - TBD

Sept 4 Board Meeting

Sept 13 General Meeting

Sept 19-22 RTMC

Sept 28 Star Party - TBD

Oct 2 Board Meeting

Oct 11 General Meeting

Oct 26 Star Party - TBD

Nov 6 Board Meeting

Nov 15 General Meeting Apollo 12

Nov 23 Star Party - TBD

General Meeting 05/17/2019

Ron Hoekwater opened the meeting with nominations for the PVAA Board, pointing out that a current board member, Cori Charles, is moving out of state and we need to fill that vacancy. He also welcomed nominations for other offices. Jay Zacks volunteered, and was nominated to take Cori's place. Club dues are now due. \$30 for individual, \$40 for a family, and \$12 for Students under 18 years of age.

PVAA's own Ken Elchert gave a presentation on Apollo 10 – the “Dress Rehearsal for the First Manned Lunar Landing”. This was the second Apollo mission to orbit the moon, and the first with the full Apollo spacecraft (CSM + LM). The primary objectives were:

- Evaluate LM performance in cislunar and lunar environments
- Check out LM programmed trajectories and LM radar
- Check out LM communications, propulsion and flight control systems
- Demonstrate crew, space vehicle, and mission support facilities capabilities during a manned lunar mission
- Gather data on the lunar gravitational potential
- Refine the Earth-based manned spaceflight network tracking techniques

The mission was a full “dry run” for the Apollo 11 mission. All operations except the actual lunar landing were performed. This mission had the first color TV from space and the first shave in space with a safety razor and thick shaving gel. This mission still holds the fastest manned speed record of 39,938 kph (24,816 mph) according to the Guinness Book of World Records.

This was the first Apollo mission to have an all veteran crew. Commanding the mission was Col. Thomas Stafford who flew on Gemini 6 and 9, John Young who flew on Gemini 3, and Eugene Cernan who flew on Gemini 9. Apollo 10 was the only Apollo mission to use Pad 39B. Launching the Saturn V does a lot of damage to the launch pad, and they wanted their primary pad, 39A for the actual lunar landing attempt.

Apollo X launched on May 18th, 1969 at 12:49pm EDT. Splashdown was on May 26th at 15:52:53pm EDT in the Pacific Ocean; about 400 miles east of American Samoa & about 3.5 miles from the prime recovery ship the USS Princeton.

The only anomaly caused a loss of control of the LM for a few seconds. This was attributed to an error in the flight-plan checklist. Their command module was named Charlie Brown, and the lunar module was called Snoopy. Snoopy had not gone through Grumman's Super Weight Improvement Program (SWIP), so it was too heavy to land, and the Guidance Computer's programming for the lunar landing had not been installed, as it was still being tested. The “Charlie Brown” command module is currently on display at the Science Museum in South Kensington, London.



USS Princeton
amphibious assault carrier, LPH-5.



“Charlie Brown” at the Science Museum
in South Kensington, London

Apollo 10 Crew

First all-veteran crew to fly on a U.S. space mission



Cmdr Eugene Cernan, USN
LM Pilot
 Pilot on Gemini 9A
 1934 - 2017

Cmdr John W. Young, USN
CM Pilot
 Pilot on Gemini 3
 Commander of Gemini 10
 1930 - 2018

Col. Thomas P. Stafford, USAF
Commander
 Pilot on Gemini 6A
 Commander of Gemini 9A
 1930 -

Our guest speaker for the night was Lisa Rebull. The title of her presentation was "Getting Your Hands on Real Astronomy Data". Her push was to get the average citizen to help out the scientist with the mountains of data that is currently coming in, or to start your own research project with the data available. This is called "Citizen Science". Most of the data is entirely web-based like Zooniverse. <https://www.zooniverse.org/> - where you can join a project, or create your own. There are other organizations like SETI at Home <https://setiathome.berkeley.edu/> that uses your computer's computational power when you are not using your computer.

Most science projects don't work with Microsoft Internet Explorer, and ask that you use Chrome, Firefox, or Safari. When taking and submitting pictures to the projects, bit-depth matters. JPG and GIF files are 8-bit pixels. 8-bit pixels can hold 256 different colors. PNG pictures are 16-bit and can hold 65,536 different colors. 32-bit pixels can hold over 4 BILLION colors. Pixels are not created equal. It isn't just colors, but how much information that the bit can hold. The FITS (Flexible Image Transport System) is an open standard file format used by most researchers. The initial release was in 1981, and is currently on version 4.0. For more information on FITS, visit:

<https://fits.gsfc.nasa.gov/>

Another great source of astronomical data is the ISRA/IPAC website at: <https://irsa.ipac.caltech.edu/frontpage/>

Here are some more links from Lisa's talk as well as a recap and movie of her talk, in case you missed it:

<http://web.ipac.caltech.edu/staff/rebull/outr/datalinks.html>

For exoplanets go to:

<https://exoplanetarchive.ipac.caltech.edu/> and

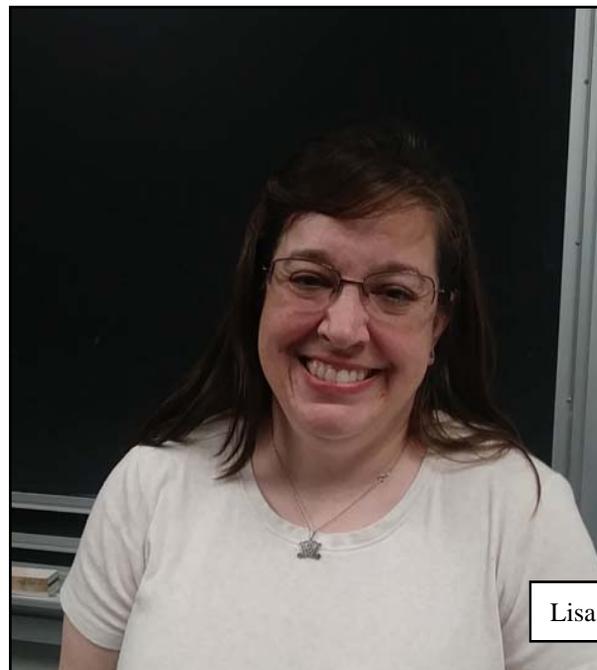
<https://exoplanetarchive.ipac.caltech.edu/docs/data.html>

Follow Emily Lakawalla, at the Planetary Society. She and others have great blogs about current events in space.

<http://www.planetary.org/>

In other words: If you have a desire to look into a scientific question that has been eating at you, there is data available to get you closer to your answer. If you have a little free time and want to make a difference, there are plenty of projects you can join. Don't just absorb presentations, be part of the answers!

Gary Thompson



Lisa Rebull



This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

Jupiter Shines in June

Jupiter stakes its claim as the king of the planets in June, shining bright all night. **Saturn** trails behind Jupiter, and the **Moon** passes by both planets mid-month. **Mercury** puts on its best evening appearance in 2019 late in the month, outshining nearby **Mars** at sunset.

Jupiter is visible almost the entire evening this month. Earth will be between Jupiter and the Sun on June 10, meaning Jupiter is at **opposition**. On that date, Jupiter rises in the east as the Sun sets in the west, remaining visible the entire night. Jupiter will be one of the brightest objects in the night sky, shining at magnitude -2.6. Its four largest moons and cloud bands are easily spotted with even a small telescope.

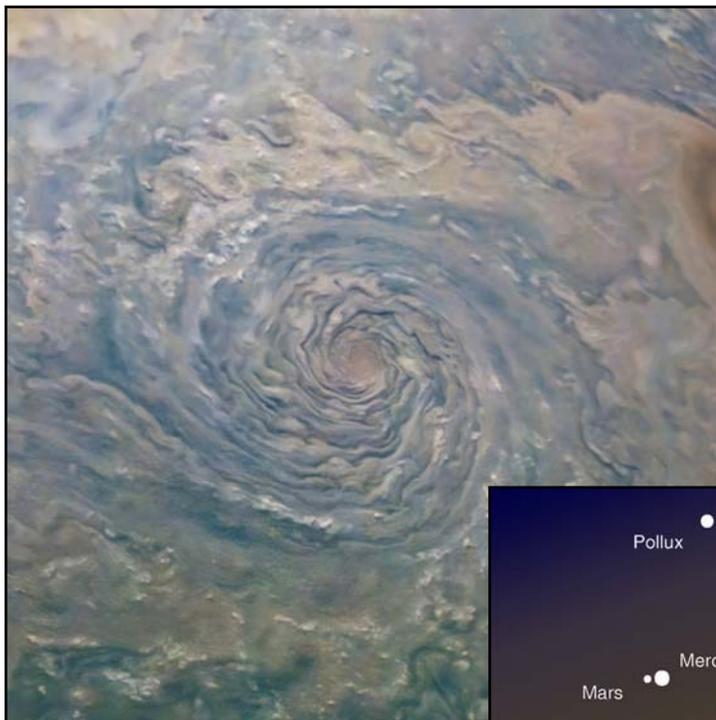
What if your sky is cloudy or you don't have a telescope? See far more of Jupiter than we can observe from Earth with NASA's **Juno** mission! Juno has been orbiting Jupiter since 2016, swooping mere thousands of miles above its cloud tops in its extremely elliptical polar orbits, which take the probe over 5

million miles away at its furthest point! These extreme orbits minimize Juno's exposure to Jupiter's powerful radiation as it studies the gas giant's internal structure, especially its intense magnetic fields. Juno's hardy JunoCam instrument takes incredible photos of Jupiter's raging storms during its flybys. All of the images are available to the public, and citizen scientists are doing amazing things with them. You can too! Find out more at bit.ly/JunoCam

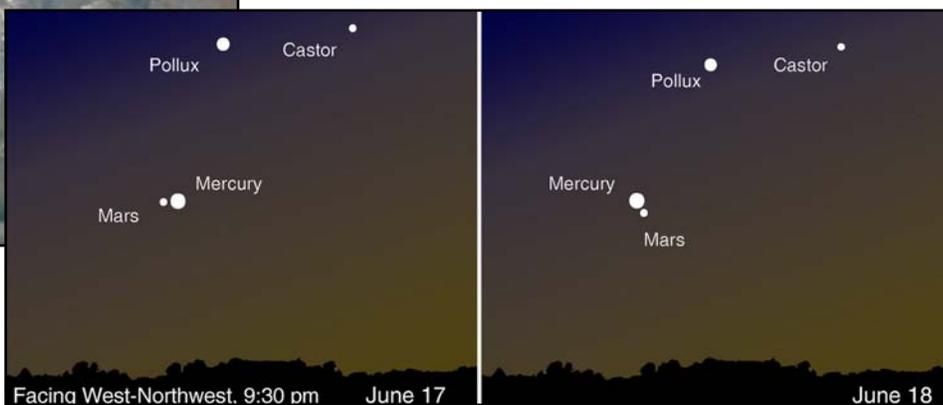
Saturn rises about two hours after Jupiter and is visible before midnight. The ringed planet rises earlier each evening as its own opposition approaches in July. The **Moon** appears near both gas giants mid-month. The Moon's tour begins on June 16 as it approaches Jupiter, and its visit ends on June 19 after swinging past Saturn.

Mercury is back in evening skies and will be highest after sunset on June 23, just two days after the summer solstice! Spot it low in the western horizon, close to the much dimmer and redder **Mars**. This is your best chance this year to spot Mercury in the evening, and nearly your last chance to see Mars, too! The two smallest planets of our solar system pass close to each other the evenings of June 17-18, coming within just $\frac{1}{4}$ degree, or half the width of a full Moon, making for a potentially great landscape photo at twilight.

By David Prosper



Discover more about NASA's current and future missions at nasa.gov



Caption: A giant storm in Jupiter's north polar region, captured by JunoCam on February 4, 2019. Image processing performed by citizen scientists Gerald Eichstädt and Seán Doran. Source: bit.ly/JupiterSpiral

Caption: Mars and Mercury after sunset the evenings of June 17-18, 2019. Image created with assistance from Stellarium.