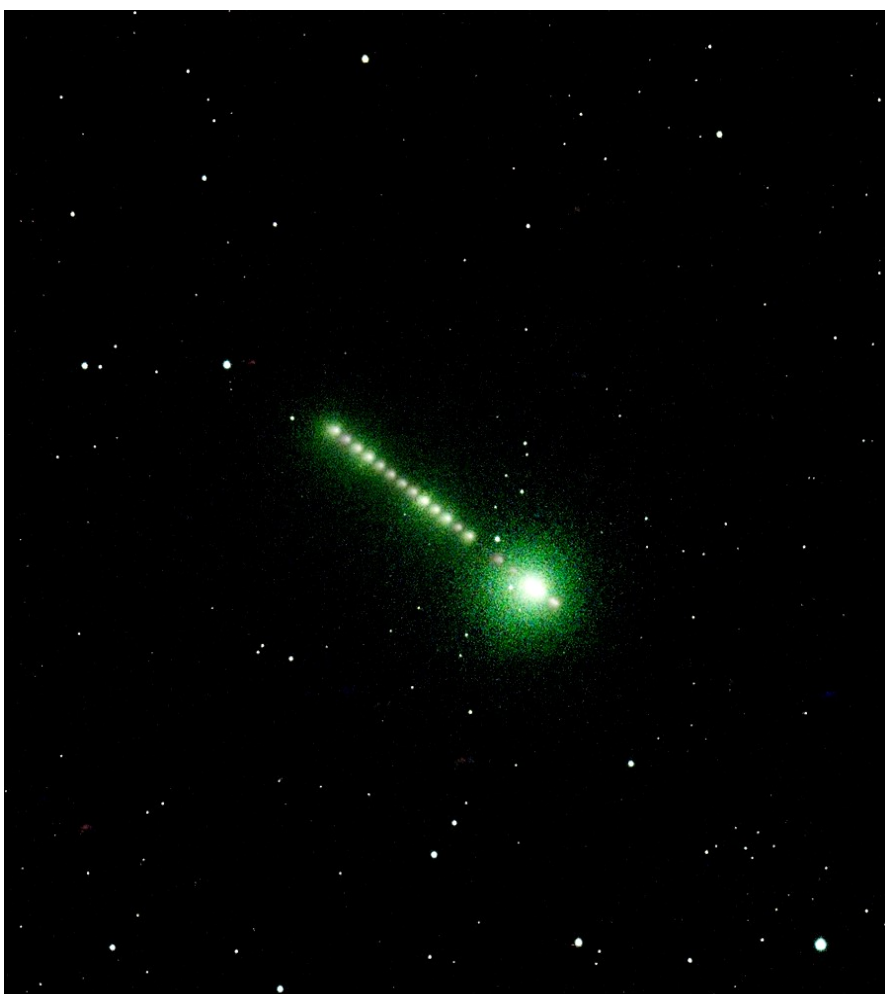




# THE LOS ANGELES ASTRONOMICAL SOCIETY

## THE BULLETIN

JANUARY, 2019  
VOLUME 93, ISSUE 01



December 14, 2018

Comet 46P/Wirtanen tracked and stacked with stars aligned. Each exposure 30 secs at iso 1600 and 5 minutes apart. Imaged with 80mm refractor and canon t3i from SF Valley.

Photo Credit: Nasir Jeevanjee

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*There will be no General Meeting in January in lieu of the Banquet.*

Please sign up for the LAAS Home IO group to receive general announcements for 2019. Contact our club Secretary for further information at [secretary@laas.org](mailto:secretary@laas.org).

# LAAS Officers and Board Members

## For 2019

### **Club Officers for 2019**

Tim Thompson –President

Curtis Byrom – VP

John O'Bryan – Treasurer

Spencer SooHoo – Secretary

### **Board of Directors**

Zoly Dobrovics

Darrell Dooley

Mike Hayford

Alecia Hurst

Joe Phipps

Richard Roosman

Mary Smudde

Greg Thompson

Alternate: Dave Sovereign

YOU ARE INVITED TO

*The LAAS Annual  
Banquet and  
Awards Ceremony*

Sunday, January 20, 2019  
6:00 PM to 11:00 PM

The Quiet Cannon Restaurant  
901 Via San Clemente, Montebello, CA 90640

Buffet Dinner, Cocktails, and Guest Speaker

# LAAS Annual Banquet and Award Ceremony

Date: January 20, 2019

Time: 5 PM to 11 PM

Location: The Quiet Cannon Restaurant - Website: <http://www.quietcannon.com/>

Address: 901 Via San Clemente, Montebello, CA. 90640

Our Annual Banquet and Awards Ceremony is the club's most elegant event of the year. Please join us at the Quiet Cannon Restaurant for an incredible buffet dinner, cocktails, an amazing presentation from our guest speaker.

Awards will be presented to our outstanding club volunteers and we'll have great raffle prizes to win by the end of the night. If you would like to donate a raffle prize, please contact Spencer SooHoo, our club secretary at [secretary@laas.org](mailto:secretary@laas.org).

The banquet speaker will be John Mulchaey, Director of Carnegie Observatories. They are the lead organization for the Giant Magellan Telescope, and the parent organization for Mount Wilson Observatory.

<https://carnegiescience.edu/scientist/john-mulchaey>

<https://users.obs.carnegiescience.edu/mulchaey/>

Please make your reservations as soon as possible. The prices per person will increase for those who pay at the door. As we need to submit payment in advance and reserve enough tables, chairs, and food, please don't wait until any further to reserve your seats. Paying at the door always delays the event as the staff has to set up tables for all additional guests.

The prices are as follows:

Adults: \$50.00 per person - Pay at the door adults: \$55.00 per person.

Children 12 and under: \$25.00 - Pay at the door children: \$30.00 per child.

Friends and family members are always welcome to attend. Please pay for your guests and write their names on your checks or in the "comment" section of the PayPal link. Use this link to submit your reservations now: <https://fs30.formsite.com/LAAS/form12/index.html>

Please also send an email with your full name, and the names of all guests to:

Andee at [communications@laas.org](mailto:communications@laas.org)

You may also mail a check for you and your guests to:

LAAS

c/o Griffith Observatory

2800 E. Observatory Rd

Los Angeles, CA 90027

Attn: Treasurer/Banquet

What to wear? We want you to be comfortable! The appropriate attire is "**business-casual**."

Continued on next page

Cocktails and wine may be purchased throughout the evening.

The dinner is buffet-style and begins at 6 PM. Below is the full menu:

Salads:

Chinese Ginger Chicken Salad  
Mixed Field Greens  
Waldorf Salad

Fresh Seasonal Fruit

Entrees:

Roasted Chicken with Garlic, Lemon & Thyme  
Beef Stroganoff  
Salmon Florentine, with Spinach, Tomatoes and Garlic  
Vegetable Lasagna

Vegetables:

Fresh Seasonal Vegetables

Accompaniments:

Rice Pilaf  
Roasted New Potatoes

Desserts: A Variety of Cakes

Rolls, Bread, Coffee and Tea





# A Brief History of Telescopes in Space

## Evan Hilgemann

In 1946, a 32 year old astronomy professor by the name of Lyman Spitzer Jr. wrote a paper that would define his career. The paper was called “Astronomical Advantages of an Extra-Terrestrial Observatory” and is generally credited as the first serious study on the advantages of putting an astronomical telescope in space. Innumerable technical challenges loomed ahead for even a small project, Yes Spitzer was not lacking in ambition. He would eventually become the driving force behind the Hubble Space Telescope, achieving a number of firsts along the way.

As any amateur astronomer who has experienced a night of poor atmospheric conditions realizes, the Earth’s atmosphere severely limits what can be seen through a telescope. By putting a telescope in space one can eliminate atmospheric distortions and achieve a resolution near that of a telescope’s theoretical maximum resolution\*. The Earth’s atmosphere also absorbs much of the electromagnetic spectrum including infrared signals, ultraviolet, x-rays, and gamma rays, all of which are important to the advancement of astronomy. These benefits provided the motivation for astronomers in the first half of the 20<sup>th</sup> century.

As Spitzer noted in a later paper, there were successes in spaceborne astronomy even before the opening of the space age. The first milestone was achieved on October 10, 1946, when the Naval Research Lab launched a sub-orbital V-2 rocket from White Sands, New Mexico. On top of the rocket was a small spectrograph that became the first instrument to ever image the spectrum of the sun into the ultraviolet range. A second historic occurrence came on September 25<sup>th</sup>, 1957, when the Princeton University Observatory flew a 12 inch telescope to 82,000ft on a balloon (above 98% of the Earth’s atmosphere), and took images of the sun at near the theoretical maximum resolution of the instrument.

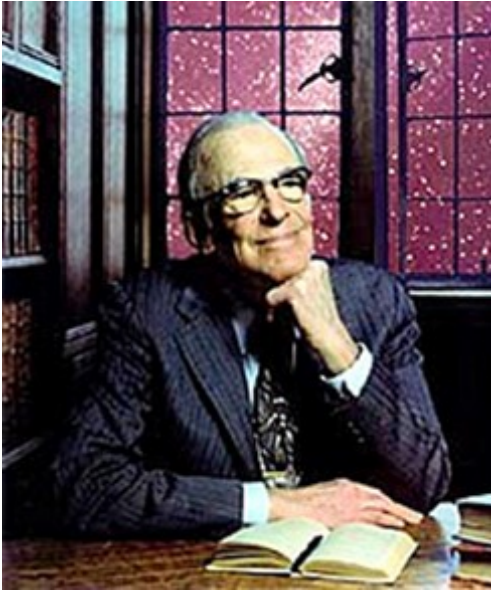
At the beginning of the space age, visions of what a space telescope might look like are both similar and very different from today’s technology. In 1952 Collier’s magazine published a now famous series of articles on the future of space technology by visionaries such as Wernher von Braun. A space observatory is described as a “small lattice work structure” that will “house a reflector-type telescope with a parabolic mirror 100 inches in diameter, similar to the one in the famous Mt. Wilson telescope.” This isn’t all that different from the Hubble Space Telescope, except that the proposed telescope would be placed some distance away from a large space station. Astronauts would control the telescope from the station and presumably be on hand to perform maintenance and change out the plates or film in the camera. However, early successes in space astronomy proved the effectiveness of robotic missions and eliminated the need for humans to be nearby.

\*This is known as the diffraction limit and is proportional to the wavelength of light being observed divided by the diameter of a telescope. This is the mathematical reason why telescopes with larger mirror achieve higher resolution. Similarly, it is also the reason why radio telescopes must have a much larger collecting area than an optical telescope to gather useful information.



*In this 1952 magazine cover, Collier’s magazine boldly predicted that “Man Will Conquer Space Soon” in 1952. However, future developments in space, particularly related to astronomy, would be dominated by robotics. ([www.rmastri.it/](http://www.rmastri.it/))*

The first true astronomical space telescope is somewhat debatable depending on how broad your definition of a telescope is. Regardless, the honor is generally credited to the Orbital Astronomical Observatory 2 (OAO-2) which carried a whopping 15 separate telescopes in two instrument packages into space in 1968. The success of OAO-2 along with OAO-4 later on proved the feasibility of astronomical observations from orbit and increased awareness in the scientific community.



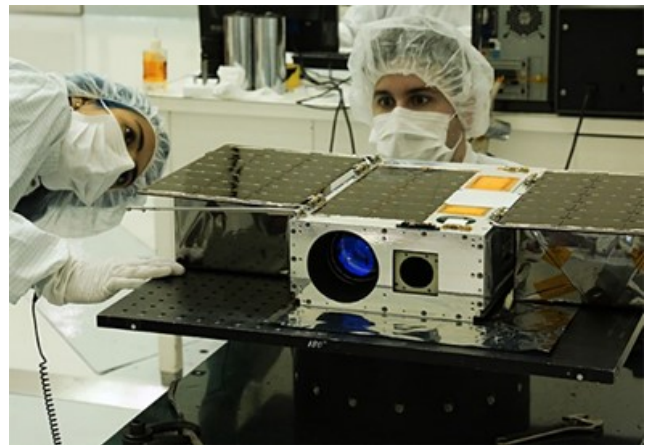
*Lyman Spitzer Jr. will be remembered by his relentless push to build the Large Space Telescope. (Wikipedia)*

During all this time, Spitzer was busy pushing his own plans for a space telescope. True to form, his original propositions were quite ambitious even by today's standards. In a 1962 paper called "Beginning and Future of Space Astronomy," he considered putting instruments as large as 10 meters across in space. This is about as large as the biggest ground-based telescopes today. Spitzer shepherded these ideas for decades and eventually secured support in the 1970s to pursue the Large Space Telescope, a project that turned into the Hubble Space Telescope. The telescope came in at 2.4 meters in diameter. Large enough to revolutionize our understanding of the universe but still notably smaller than his original studies envisioned.

Only today are we approaching the scale of Spitzer's ambitions. When launched, the James Webb Telescope will deploy a segmented mirror to 6.5 meters in diameter. A number of even larger telescopes are currently being studied by NASA for potential future implementation. One of them, LUVIOR (Large UV/Optical/InfRared surveyor) features a telescope with a primary mirror 15 meters in diameter. However, any potential implementation is still a decades away.

Although larger apertures are key in astronomy, one might also look small for the

next big thing. In November 2017 JPL launched a 6U CubeSat called ASTERIA (Arcsecond Space Telescope Enabling Research in Astrophysics). CubeSats are small spacecraft (ASTERIA is a bit bigger than a box of cereal) that are relatively low cost and high risk of failure compared to a typical mission. ASTERIA has successfully demonstrated several technologies necessary for astronomical observations including accurate pointing and precision photometry (measuring brightness of stars), a first for a CubeSat. This opens the doors to more ambitious low-cost missions that could potentially play a key role in future astrophysics missions.



ASTERIA during final spacecraft integration and test  
(jpl.nasa.gov)

Spitzer notes in his original 1942 paper, "[Space Telescopes], if practicably feasible, could revolutionize astronomical techniques and open up completely new vistas of astronomical research." I imagine that statement will hold true as long as humanity continues to push the boundaries and pursue ever more capable telescopic technologies.

*This work was done as a private venture and not in the author's capacity as an employee of the Jet Propulsion Laboratory, California Institute of Technology. Any views and opinions expressed herein do not necessarily state or reflect those of NASA, JPL, or the California Institute of Technology.*

# The January 20<sup>th</sup> Total Lunar Eclipse

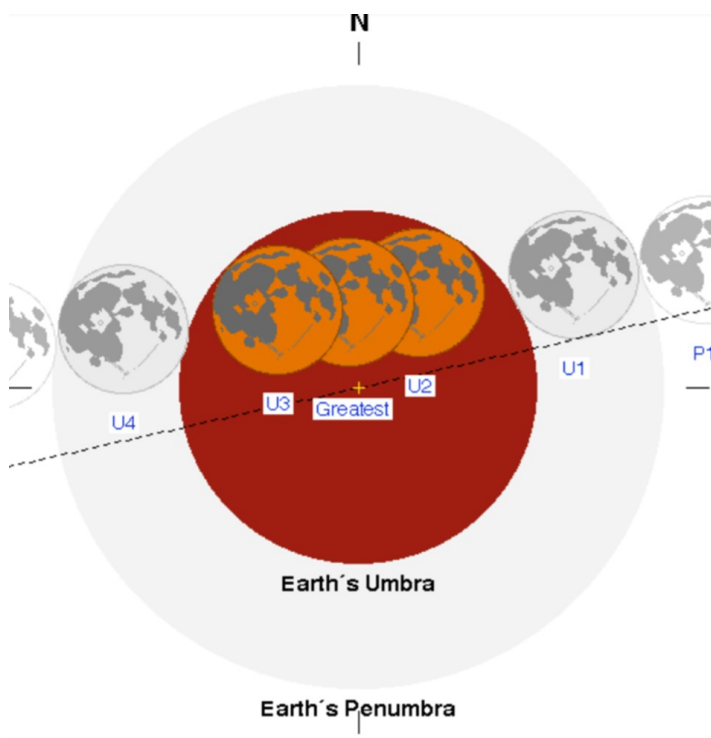
## by David Nakamoto

On the night of January 20<sup>th</sup> 2019, the moon will pass deeply into the darkest part of earth's shadow, producing a three and a half hour lunar eclipse. This hasn't happened in our evening skies since September 27<sup>th</sup> 2015, and it won't happen again for another three years, until May 15<sup>th</sup> 2022.

From Los Angeles, sunset occurs around 5:10pm, and twilight ends around 5:30pm. The moon will already be in the lighter part of earth's shadow, the penumbra, but this is difficult to detect. The moon enters the umbra, the dark part of earth's shadow, around 7:30pm. This part of the eclipse will be obvious even to the unaided eye. The eclipse progresses through the umbra until around 10:50pm.

The chart below is taken from the NASA eclipse website at <https://eclipse.gsfc.nasa.gov/eclipse.html>

The light grey area is the penumbra, the barely perceptible outer part of earth's shadow. The red disk is earth's umbra, the part that produces the dark red colors.



As to what you'll see, that can only be answered if you look. I've seen total lunar eclipses that were bright red. Others were almost black. The moon is illuminated by a ring of sunrises and sunsets all around the rim of the earth, and what colors you'll see is dependent on clouds, volcanic dust, and other atmospheric phenomenon.

And of course, clouds might interfere, as they did during the last evening total lunar eclipse back in September 27<sup>th</sup> 2015, when clouds prevented observations of the moon until after the umbral part of the eclipse had passed. Hopefully that will not happen this time around.

Use different magnifications. A magnification around 90x is great for an overall view, but higher mags will reveal how features like the large crater Copernicus change as the earth's shadow passes over it.

up there. But you can view the eclipse anywhere. Simply look at the moon!

Griffith Observatory will be hosting an event, as undoubtedly will other observatories/planetariums. The observatory's own telescopes will be trained on the moon, as well as those from the Los Angeles Astronomical Society and the LA Sidewalk Astronomers. And if the September 27<sup>th</sup> 2015 event was any indication, LOTS of people will join us up there. But you can view the eclipse anywhere. Simply look at the moon!

Dave Nakamoto

[Dinakamoto@hotmail.com](mailto:Dinakamoto@hotmail.com)



# Outreach Reports and Photos

By Van Webster

**Christopher Dena Elementary School** - East Los Angeles

**Date:** Tuesday, November 27, 2018

**Time:** 5:30 PM - 7:30 PM



A fine turnout of astronomers from the Los Angeles Astronomical Society made their way to East Los Angeles for an evening of observing at Christopher Dena Elementary School. The campus is located in the center of an older development of low rise apartment buildings that occupy about 10 city blocks. This was the third year that LAAS members had participated in the school's "Starry Night" event.

The sky was overcast with thin, high clouds which made for a pretty sunset but did not bode well for the evening's viewing. As the sun went down and the air cooled, the clouds mostly dissipated and the skies became clear. Mars was the brightest object in the sky. The summer triangle shone overhead and Aldebaran was visible in the east. Saturn was low on the horizon to the west and hid behind a stand of trees for its brief appearance.

First telescope views showed Mars with a crisp circumference and minimum atmospheric distortion. Zolly quickly got Neptune and the seeing permitted a high magnification.

Other targets included the Double-Double and the Pleiades.

The school staff did a terrific job of setting up the viewing area, turning off as many lights as they could and managing crowd control. The students and their families waited their turn in orderly lines and the telescopes were busy as we started at about 5:30 PM.

The felicitous skies were destined not to last as high overcast enveloped the night sky. By 7:00 PM only Mars and Neptune were still visible. The crowd seemed pleased enough with even this limited celestial offering and continued to line up until the event closed at 7:30.

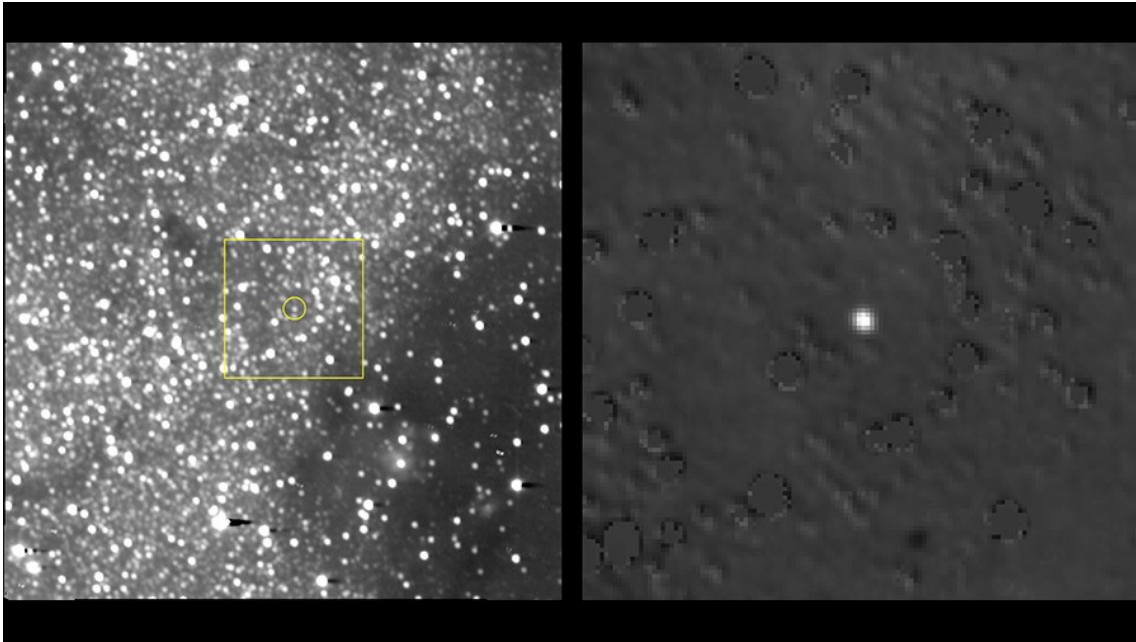
Each of the astronomers was given a hand assembled gift bag of drinks and snacks to fortify us for the evening's activities. A thank you card was enclosed that read in part, "Thank you to the moon and back. We really appreciate you coming to our school."



# Ring in the New Year with New Horizons!

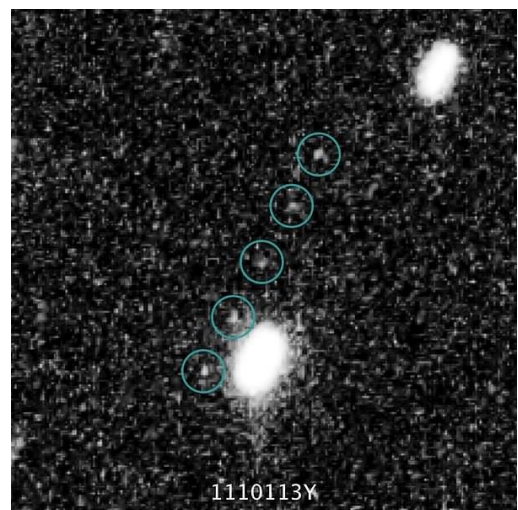
## NASA Night Sky Network

New Horizons makes its next historic flyby on January 1, 2019, when the distant NASA spacecraft zooms past the mysterious Kuiper Belt Object known as [2014 MU69](#) (nicknamed **Ultima Thule** after a public naming contest). New Horizons has sped towards this small world since its Pluto flyby in July 2015. Mission planners anticipate their closest approach to Ultima Thule will occur on **January 1, 2019, at 12:33 am Eastern Time**. That means for some folks in the Americas, the probe's flyby will be perfectly timed with their own New Year's Eve celebrations!



*New Horizons took this photo of its next target, 2014 MU689 - aka Ultima Thule - on December 2, 2018, when the spacecraft was 24 million miles from this icy, tiny object - and over 4 billion miles from Earth! The image on the right shows Ultima Thule more clearly after the subtraction of the background stars from the image on the left. Image Credit: [NASA/JHUAPL/SwRI](#)*

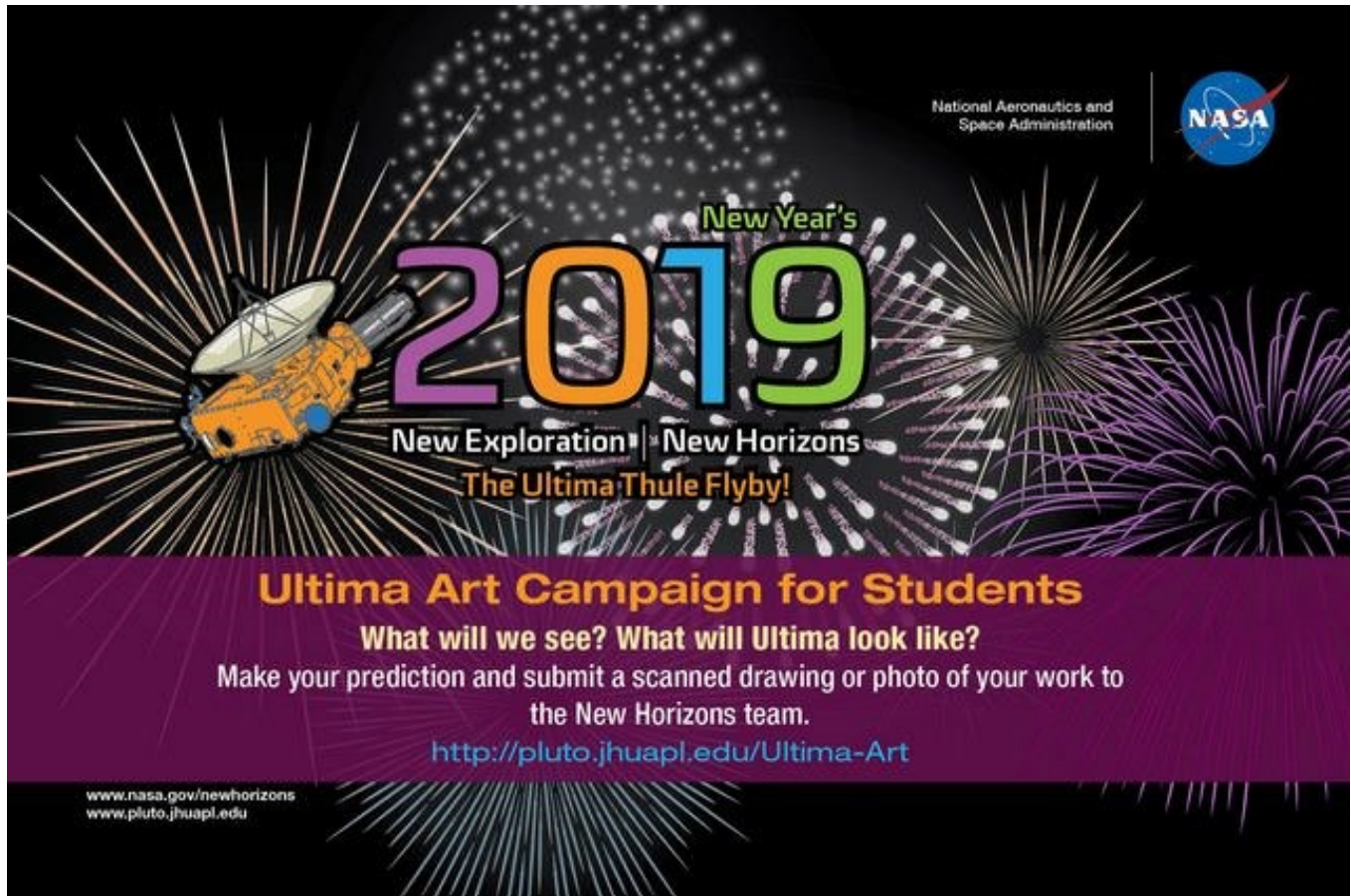
Ultima Thule is the first target of a space probe's flyby discovered after the mission's launch: an intense survey by the Hubble Space Telescope in 2014 found both it and several other potential flyby targets. Since then, [followup observations](#) around the world helped narrow the parameters of a few of Thule's primary characteristics including its size, general shape, color, and orbit, which in turn have helped mission planners fine-tune the details of the impending flyby. Recent record-setting [adjustments to its trajectory](#) ensure that the probe will speed past the surface of Ultima at a distance of approximately 2,200 miles, even closer than its earlier flyby of Pluto. Studying this distant object will help unlock secrets about the formation of our solar system in addition to broadening our understanding of the Kuiper Belt. Ultima Thule's orbit keeps it far away from the warming radiation of our Sun, which scientists believe has preserved it as a sort of ancient time capsule from the primordial era of our solar system. Altogether, this New Year's flyby is poised to ring in 2019 with some incredible scientific discoveries!



*Discovery Image of 2014 MU69 by the [Hubble Space Telescope](#).*

*Image Credit: NASA/ESA/SwRI/JHU/APL/The New Horizons KBO Search Team*





National Aeronautics and Space Administration

NASA

New Year's  
**2019**  
 New Exploration | New Horizons  
 The Ultima Thule Flyby!

**Ultima Art Campaign for Students**  
 What will we see? What will Ultima look like?  
 Make your prediction and submit a scanned drawing or photo of your work to the New Horizons team.  
<http://pluto.jhuapl.edu/Ultima-Art>

[www.nasa.gov/newhorizons](http://www.nasa.gov/newhorizons)  
[www.pluto.jhuapl.edu](http://www.pluto.jhuapl.edu)

You can find various ways to [get involved](#) with New Horizons before the flyby, including a fun [art campaign](#) for students and various media events. Keep up with the latest news from the New Horizons mission team on their official [homepage](#) and [Twitter account](#). You can even send a short message to New Horizons: messages from well-wishers will be beamed to the probe from Earth on January 1.



Follow us on [Facebook](#), [Twitter](#) and [Instagram](#) for the latest NSN news and outreach photos, and subscribe to our [YouTube](#) channel for recordings of our monthly astronomy webinars, as well as archives of our Outreach Toolkit demonstration videos. **#NightSkyNetwork #AstronomyOutreach**



The NASA Night Sky Network is managed by the [Astronomical Society of the Pacific](#). The ASP is a 501c3 non-profit organization advancing science literacy through astronomy.

## Meet The New Members



Andrew Inohara

Stephanie Madison and Sean Hurst

Tom Meneghini

Pauline Adamek and Ash Revell

Gurgen Grigoryan

Ronald Wilkness

Laurence Johnson

Matthew Tran

## LAAS Board Meetings

Our LAAS Board Meetings take place once a month at the Garvey Ranch Park Observatory. You can find the dates for these meetings on our event calendar. All members are welcome to attend all Board meetings. These meetings begin at 8 PM.

NEW: You may listen to recorded meetings by logging in to our website at LAAS.org and clicking on the "Members Only" tab.

Before you try to access the "Members Only" information, you need to request login credentials from our Webmaster. On the left hand side of the page, scroll down and find "Login." Click "Login" for further information.

## Volunteer Opportunities

Every LAAS member is a volunteer at some point. Some members volunteer to share telescopes with the public, while others tackle administrative duties, help out at our community and public events, or join a club committee. Taking photos at our events and writing articles about events for our club newsletter are great ways to volunteer. Participating at one of our out-reach events is another fine and fulfilling opportunity. This is YOUR club. Don't sit back and let other members do the work and have all the fun! Speak with a club officer and find out how you can volunteer and get more involved in the LAAS as a member.

## Time To Renew Your Membership?

Please remember to renew your membership once you receive notice from the Club Secretary in your email inbox. Use this link to learn how to renew your membership: <https://fs30.formsite.com/LAAS/MemberRenewal/index.html>

Please send any new contact information to the club secretary at [secretary@LAAS.org](mailto:secretary@LAAS.org).



# A Guide To The Night Sky

## By Tre Gibbs



HAPPY NEW YEAR !! Winter is in full swing, and while you may not notice it, the days are *slowly* getting longer. Ever since December 21st, the first day of winter in the Northern Hemisphere, the sun's arc across the sky has been gradually making its way north, thereby increasing our daylight and reducing our darkness. It definitely becomes more noticeable as we head into mid to late February but fear not, it's happening now.

A hold over from most of last year, Mars, The God of War, remains visible in our evening skies all month long. Mars climbs high in the south-southwest by mid month, but as Earth continues to speed away from it, Mars gradually loses its brightness, becoming less like a beacon and more like an average looking star - albeit with a slight reddish/orange tint. In the early evening skies of January 12th,

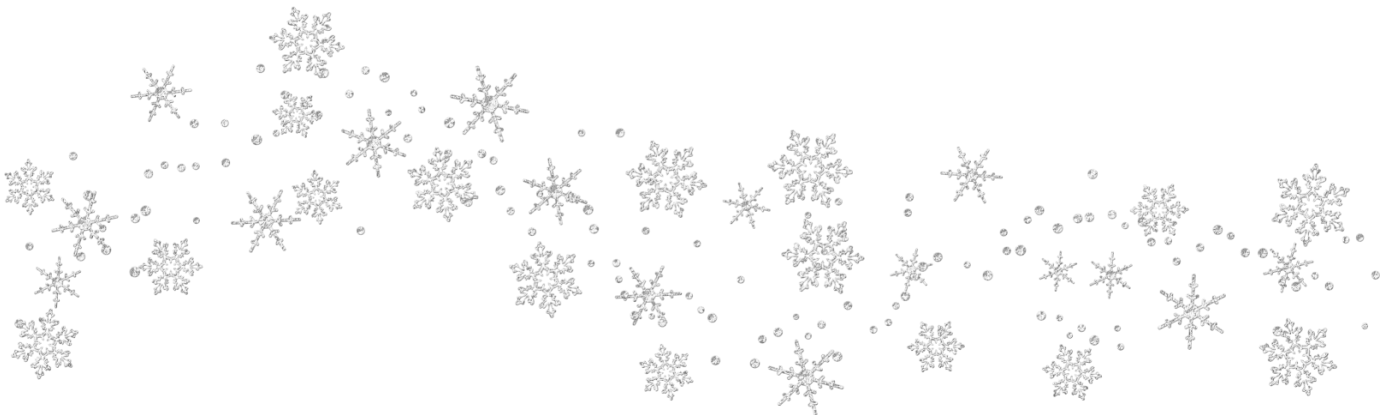
look for the young crescent moon just below (and to the left of) Mars.

Venus, The Goddess of Beauty and Love, and Jupiter, The Roman King of the Gods are also visible - but you'll need to get up before sun rise in order to spot these two magnificent wanderers. On January 1st, as some of you may be heading to bed after a rigorous New Year's Eve celebration - around 6:30 am - look for both Venus and Jupiter low on the horizon in the southeast. Although you'll need an unobstructed eastern view, since Jupiter will be much closer to the horizon than Venus and of course weather permitting, you'll be able to see the waning crescent moon just above bright Venus. If you get up early the next morning, on January 2nd, you may notice that the moon, always on the move, is now in-between Venus and Jupiter...and on the morning of the 3rd, the moon has slipped closer to the sun and is now below Jupiter.

January's Full Moon happens on the 20th this month, at 9:17 pm. January's Full Moon is known as The Full Wolf Moon, since it was this time of year when hungry wolves would howl outside villages, looking for food. Although the moon is technically full for only a moment (since it is constantly in motion around our planet), it will appear full the night before (1/19) and the night after (1/21). Remember - the *full* moon always rises at sunset, which is the reason why it appears full.

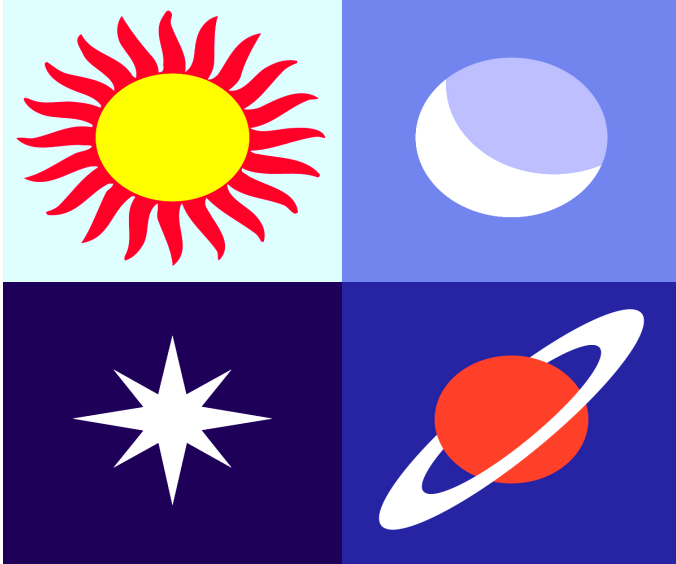
That's it for this month - and as always, keep looking up!

Tre Gibbs





# Almanac



**January 3, 4 - Quadrantids Meteor Shower.** The Quadrantids is an above average shower, with up to 40 meteors per hour at its peak. It is thought to be produced by dust grains left behind by an extinct comet known as 2003 EH1, which was discovered in 2003. The shower runs annually from January 1-5. It peaks this year on the night of the 3rd and morning of the 4th. The moon will be a thin crescent and should not interfere with what could be a good show this year. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Bootes, but can appear anywhere in the sky.

**January 6 - New Moon.** The Moon will be located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 01:28 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

**January 6 - Venus at Greatest Western Elongation.** The planet Venus reaches greatest eastern elongation of 47 degrees from the Sun. This is the best time to view Venus since it will be at its highest point above the horizon in the morning sky. Look for the bright planet in the eastern sky before sunrise.

Need Help With A New Telescope?

Visit the Garvey Ranch Observatory on any Wednesday night 7 PM to 10 PM for tips and assistance from your fellow LAAS members.

Learn more: [The Garvey Ranch Park Observatory](#)

**January 6 - Partial Solar Eclipse.** A partial solar eclipse occurs when the Moon covers only a part of the Sun, sometimes resembling a bite taken out of a cookie. A partial solar eclipse can only be safely observed with a special solar filter or by looking at the Sun's reflection. The partial eclipse will be visible in parts of eastern Asia and the northern Pacific Ocean. It will be best seen from north-eastern Russia with 62% coverage. ([NASA Map and Eclipse Information](#))

**January 21 - Full Moon, Supermoon.** The Moon will be located on the opposite side of the Earth as the Sun and its face will be fully illuminated. This phase occurs at 05:16 UTC. This full moon was known by early Native American tribes as the Full Wolf Moon because this was the time of year when hungry wolf packs howled outside their camps. This moon has also been known as the Old Moon and the Moon After Yule. This is also the first of three supermoons for 2019. The Moon will be at its closest approach to the Earth and may look slightly larger and brighter than usual.

**January 22 - Conjunction of Venus and Jupiter.** A conjunction of Venus and Jupiter will be visible on January 22. The two bright planets will be visible within 2.4 degrees of each other in the early morning sky. Look for this impressive sight in the east just before sunrise.

**January 21 - Total Lunar Eclipse.** A total lunar eclipse occurs when the Moon passes completely through the Earth's dark shadow, or umbra. During this type of eclipse, the Moon will gradually get darker and then take on a rusty or blood red color. The eclipse will be visible throughout most of North America, South America, the eastern Pacific Ocean, western Atlantic Ocean, extreme western Europe, and extreme western Africa. ([NASA Map and Eclipse Information](#))

Source: <http://www.seasky.org/astronomy/astronomy-calendar-2019.html>



# January 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2 Garvey Nite	3	4	5
6	7	8	9 Garvey Nite	10 Outreach/ Highland Park	11 Outreach/ Highland Park	12 Public Star Party
13	14	15 Outreach/ Pasadena	16 Garvey Nite	17 Outreach/S. Pasadena	18	19
20 <b>Annual Banquet and Awards</b>	21	22	23 Garvey Nite	24 Outreach/ Redondo Beach	25 Outreach/ Reseda	26
27	28	29	30 Garvey Nite	31		

Additional events with updated information may be posted on the calendar. Please log on to your account on the Night Sky Network (NSN) to view the complete schedule of club events. Link: <https://nightsky.jpl.nasa.gov/>

## LAAS Outreach Program

The mission of LAAS is to promote interest in and advance the knowledge of astronomy, optics, telescope making and related subjects. In furtherance of its mission, LAAS conducts public star parties and other outreach events that are intended to enhance the public's understanding of astronomy and its enjoyment and appreciation of the beauty and wonders of our universe.



We provide outreach events at local schools, Griffith Observatory, Mt. Wilson Observatory, various state and county parks, and community events.

Join our Outreach team of volunteers today.

Contact Heven Renteria, our Outreach Coordinator at [Outreach@LAAS.org](mailto:Outreach@LAAS.org)



Want to include astronomy outreach at your school's science night or open house? Follow the link below to access the request form:

[https://nightsky.jpl.nasa.gov/club-eventrequest.cfm?Club\\_ID=1344](https://nightsky.jpl.nasa.gov/club-eventrequest.cfm?Club_ID=1344)

## LAAS Club Swag

### LAAS JACKETS, T-SHIRTS, AND CAPS

Share your club spirit with the public and wear your club colors to help identify you as a member of the LAAS today by ordering a new jacket, t-shirt or cap.

If you would like to purchase club jackets, T-shirts, or caps featuring our club logo, please look for Richard Roosman at the public star party and at our general meeting. Richard will have the club merchandise on sale from 2 PM to 6 PM at the star party.

For further information, feel free to contact Richard at [Richardinwalnutpark@msn.com](mailto:Richardinwalnutpark@msn.com).

You can also use the link on Paypal, if you would like to place an order for club merchandise by using the following link:

<http://laas.org/joomlasite/index.php/laas-merchandise>





## Amazon Smiles

The LAAS is now listed on Amazon Smiles. When you purchase any goods on Amazon.com, Amazon will donate a small percentage of the funds they receive from you, back to the LAAS. Here's some information to help bring in funds for our club projects:

What is AmazonSmile?

AmazonSmile is a simple and automatic way for you to support your favorite charitable organization every time you shop, at no cost to you, with the added bonus that Amazon will donate a portion of the purchase price to your favorite charitable organization., such as the LAAS!

Learn more by following this link: <http://smile.amazon.com/>



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John O'Bryan, Jr.

Treasurer

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**LAAS Message Phone:**

213- 673-7355 Checked daily

**Griffith Observatory:**

213-473-0800

**Sky Report:**

213-473-0880

**Lockwood Site:**

661-245-2106

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