

# PrimeFocus



## WHEN:

June 18, 2021  
Meeting at 7:30pm  
Lecture at 8:00pm

## WHERE:

Virtual Meeting using Zoom  
See the April 2020 issue of PrimeFocus for info on getting connected using Zoom

## TVS QR Code



## INSIDE THIS ISSUE:

News and Notes	2
Calendar of Events	3
TVS Astrophotos	5
What's Up	6
NASA Night Sky Notes	7
Membership/Renewal Application	8

## Power for Astronomy Away from Home Curtis Macchioni, Ph.D., Western Digital Corporation

Traveling to a secluded dark site gives us access to skies that we can only dream about at home. In addition to having to pack up and transport all of our equipment, we have to have a plan to provide the power needed to operate our mounts, cameras, computers, etc. in places where the convenience of a nearby AC outlet is nonexistent. The humble lead acid battery has served to supply power away from home for decades. In this presentation, we will answer the three most important questions required when planning for power away from home: 1) How Much Power Do I Need?; 2) What are My Power Supply Options?; 3) How Do I Connect Everything? We will discuss the latest trends in battery technology using lithium chemistries. And we will examine another trend using a centralized power distribution hub to manage and simplify power distribution to all of our equipment.



Caption: Jackery solar generator power solution used at a remote observing site. Image Credit: Curtis Macchioni; see: <https://www.californiaskys.com/blog/category/power-solutions>

Curtis Macchioni is a physicist working for 38 years in the tech industry including Western Digital Corp for the last 17 years. He bought his first telescope, a 2.4" Unitron refractor at age 13 which he still owns. He re-discovered the astronomy hobby in 2008 and he is focused on beginning astrophotography. For more information see: <https://www.californiaskys.com/>

# News and Notes

## 2021 Meeting Dates

Lecture Meeting	Board Meeting	PrimeFocus Deadline
Jun. 18	Jun. 21	
Jul. 16	Jul. 19	Jul. 2
Aug. 20	Aug. 23	Aug. 6
Sep. 17	Sep. 20	Sep. 3
Oct. 15	Oct. 18	Oct. 1
Nov. 19	Nov. 22	Nov. 5
Dec. 17	Dec. 20	Dec. 3

## Money Matters

As of the last Treasurer's Report on 5/24/21, our club's account balance is \$64,414.24. This includes \$44,460.07 in the H2O Rebuild fund.

## TVS Welcomes New Members

TVS welcomes new members Martin Armenta, Srinivasan Arulanandam, Mark McCarthy, Bernice Mills, Tanveer Singh, and Dan Trimble. Please say hello and chat with them during our Zoom meetings.

## H2O and Del Valle Observing Sites Reopened

The Del Valle and Hidden Hill Observatory sites have reopened for observing by those who have paid their 2021 TVS Membership dues and are approved key holders.

Beginning June 15, California state guidance on COVID-19 restrictions is due to be modified. In consideration with Santa Clara County and Alameda County health orders, TVS will then issue new guidance on use of the H2O and Del Valle observing sites. This revised guidance will be posted on the TVS website and sent via email. Until then, the previously established club guidelines remain in effect.

\*The sites are open for individual use only by club members and immediate family; no guests or group events allowed

\*You use each observing site at your own risk and agree to hold the club and the landowners free of all liability

\*Do not use either observing site if you are not feeling well or suspect you were recently exposed to the virus

\*Announce your intention to use either site on our groups.io group

\*While at either site maintain social distancing of at least 15 feet (about a car's length)

\*Bring hand sanitizer and use it before and after touching any locks or facilities

\*H2O users should wear a mask while at the landowner's home depositing the daily usage fee

\*Club members should not touch or look through each other's equipment. Focuser knobs and eyepieces can potentially spread the virus.

\*H2O keyholders who wish to use the Quick Dome should first contact Ross Gaunt (secretary"at"trivalleystargazers.org) to reserve it for individual use for the day

\*Note that these restrictions do not replace or negate any Alameda or Santa Clara County health orders in place at this time.

Ross Gaunt, our club secretary, emailed the updated lock combinations and usage instructions for each site to all H2O key holders and all Del Valle registered users. If you are a H2O key holder or Del Valle registered user and didn't get Ross's email, please let Ron (president"at"trivalleystargazers.org) or Ross know and we'll straighten it out.

## Outreach Star Party Schedule

July 7, 8:00pm: Valley Community Church, 4455 Del Valley Pkwy., Pleasanton

Contact Eric Dueltgen if you are interested in participating in future events (outreach"at"trivalleystargazers.org).

## 2021 Club Star Party Schedule

Save the dates for the 2021 Club Star Parties.

Del Valle star parties are also public outreach events. They are jointly hosted with the EBRPD and held at the Arroyo Staging Area. The public is invited for the first 1.5-2 hours, while club members can stay the remainder of the night.

Tesla Vintners star parties are open to only club members and their guests. These star parties end at midnight, but participants can leave earlier, should they wish.

H2O star parties are open to the public. The open house ends at midnight, and all participants are encouraged to stay the duration. The drive to H2O takes about 1 hour, and the caravan leaves promptly from the corner of Mines and Tesla Rds.

July 10, 8:00pm: TVS Club Star Party, Tesla Vintners, 5143 Tesla Rd., Livermore

September 4, 7:00pm: TVS Club Star Party, Tesla Vintners, 5143 Tesla Rd., Livermore

October 2, 6:30pm: TVS Club Star Party, Tesla Vintners, 5143 Tesla Rd., Livermore

## H2O Rebuild

The rebuild committee is planning the next work party activities. It is anticipated that participation by the general membership will be required to assist in the construction of our new observing and imaging capability. Look for club emails soliciting your participation. This is your opportunity to make a hands-on contribution to the legacy of TVS!

# Calendar of Events

## June 14, 7:30pm

What: Venus: A Lost Habitable World?  
Who: Suzanne Smrekar (NASA Jet Propulsion Laboratory)  
Sponsor: California Academy of Sciences  
Online: \$15; [www.eventbrite.com/e/virtual-benjamin-dean-astronomy-lecture-14-june-2021-tickets-156613795077](https://www.eventbrite.com/e/virtual-benjamin-dean-astronomy-lecture-14-june-2021-tickets-156613795077)

Venus today is supremely uninhabitable. Yet it may have been the first planet in our solar system with conditions suitable for life! Just as we can learn about the evolution of civilization from archeological sites, Venus—our twin planet—has deep lessons for what makes our home planet unique. Its geology today may resemble Earth's billions of years ago, when processes evolved that shaped Earth into a living world.

Suzanne Smrekar is a Senior Research Scientist at NASA's Jet Propulsion Laboratory and is Deputy Principal Investigator for the InSight Mars lander. She has been involved in several missions dedicated to studying the solar system, including the Magellan Venus Orbiter, the Mars Reconnaissance Orbiter, and instruments carried aboard the Mars Polar Lander. She is also helping to develop the recently-approved VERITAS mission to Venus.

For more information see:

<https://www.calacademy.org/events/benjamin-dean-astronomy-lectures/venus-a-lost-habitable-world>

## June 16, 1:00-2:30pm

What: Rovers, Helicopters, and Ancient Martians: Why We Explore Mars  
Who: Prof. Andrew Fraknoi (Foothill College, Retired)

Sponsor: SF State University/The Osher Lifelong Learning Institute

Online: Registration Required:  
<https://www.meetup.com/A-A-N-C/events/278336011>

With three countries sending missions to Mars in 2021, including the first Mars helicopter, there is new interest in the red planet. What do we know, and what do we hope to learn, about this alien world next-door? Fraknoi will discuss the discoveries that revealed ancient Mars as a world much like the Earth, with lakes, rivers, and possibly the stirrings of life. Although Mars today is very different, since the small planet lost much of its atmosphere, we nevertheless hope to find evidence of past life – perhaps implying a second genesis – on its sandy surface. Using beautiful color images from the latest space probes, Fraknoi will show us the beauty of Mars and how new probes are exploring it. No background in science is required.

## June 19, 7:30pm

What: Prediction: Forecasting on Time Scales from Microseconds to Eons  
Who: Prof. Greg Laughlin (Yale University)  
Sponsor: Mt. Tam Astronomy Program  
Online: <https://us02web.zoom.us/j/89697734661#success>

Scientific forecasts span a staggering breadth of time scales, and they range in precision from vague & qualitative to exact & quantitative. This presentation will provide an overview of predictability. We'll look at examples drawn from trading, meteorology, celestial mechanics, and cosmology. Finally,

### **Officers**

#### **President**

Ron Kane  
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#### **Past President**

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#### **Astronomical League Rep.**

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info@trivalleystargazers.org

### **TVS E-Group**

To join the TVS e-group just send an email message to TVS at: info@trivalleystargazers.org asking to join the group. Make sure you specify the e-mail address you want to use to read and post to the group.

## Calendar of Events (con't)

we'll end with the latest research-based forecasts for what will happen to the Universe in the extremely distant future.

For more information see:

<https://www.mttamastronomy.org/calendar> and  
<https://youtube.com/MtTamAstronomy>

### June 19 and 26, 9:30pm-10:30pm

What: Virtual Telescope Viewing

Who: Chabot Staff

Sponsor: Chabot Space and Science Center

Online: [www.youtube.com/channel/UCarFXs-04xmdHW\\_PVc7LWRg](http://www.youtube.com/channel/UCarFXs-04xmdHW_PVc7LWRg)

Each week, our astronomers will guide us through spectacular night sky viewing through Nellie, Chabot's most powerful telescope. Weather permitting, we will be able to view objects live through the telescopes and our astronomers will be available to answer your pressing astronomy questions.

Nellie is a 36-inch reflector telescope, housed in a rolling roof observatory that allows access to 180 degrees of sky. This modern, research-quality telescope offers breathtaking views of the cosmos.

For more information, see:

<https://chabotspace.org/events/events-listing/>

### June 23, 7:00pm

What: Is Oxygen Really a Biosignature?

Who: Jade Checlair (University of Chicago) and Dr.  
Joshua Krissansen-Totton (University of CA, Santa Cruz)

Sponsor: SETI Institute

Online: REGISTRATION REQUIRED

<https://www.eventbrite.com/e/seti-talks-is-oxygen-really-a-biosignature-tickets-158758485905>

Biosignatures, the footprint of life on other planets, or exoplanets, could be the easiest way for astronomers to prove that we are not alone, and oxygen has been for decades the top contenders in proving that life exists elsewhere. But how truly useful is oxygen as a biosignature?

In Earth's history, oxygen is the byproduct of photosynthesizers such as plants, algae and cyanobacteria. With the fast growth of the field of exoplanets and the arrival of future extremely large telescopes and space-based telescopes that could soon find oxygen signatures, or its light-modified form, ozone, are we on the verge of finding life on an exoplanet?

Scientists have been busy modeling exoplanet formations, chemistry and their atmosphere, and as a byproduct of this work, they succeeded in poking holes in the atmospheric oxygen-means-life scenario. We invited two scientists to discuss the discovery of potential false positives for

atmospheric oxygen as a biosignature. Jade Checlair is a planetary scientist at the University of Chicago who models the atmosphere and climate of habitable exoplanets and will show how the observation of oxygen on a large number of exoplanets would allow astronomers to discover true Earth-like exoplanets. Joshua Krissansen-Totton, an astrobiologist at the University of California, Santa Cruz, models the atmospheric evolution of rocky planets to anticipate exoplanet biosignatures and their false positives.

Hypothetical scenarios have been proposed for non-biological oxygen accumulation on exoplanets, especially around M-dwarf stars, as oxygen remains behind as hydrogen escapes the atmosphere of their planets. The researchers will also discuss numerous other ways that planet atmospheres can be filled with oxygen from a non-biological source.

In this bleak environment, there is still hope. Oxygen false positives could, in principle, be distinguished from inhabited planets using contextual clues and corroborating signs of life. But the task may not be straightforward, and proving beyond reasonable doubt that there is life on exoplanets could require telescopes much more advanced than anything currently being built. We hope to answer these questions with our speakers in this conversation moderated by SETI Institute Senior Astronomer Franck Marchis.

For more information, see: <https://www.seti.org/talks>

### July 17, 7:30pm

What: Oumuamua: Interstellar Visitor

Who: Prof. Douglas Lin (University of CA, Santa Cruz)

Sponsor: Mt. Tam Astronomy Program

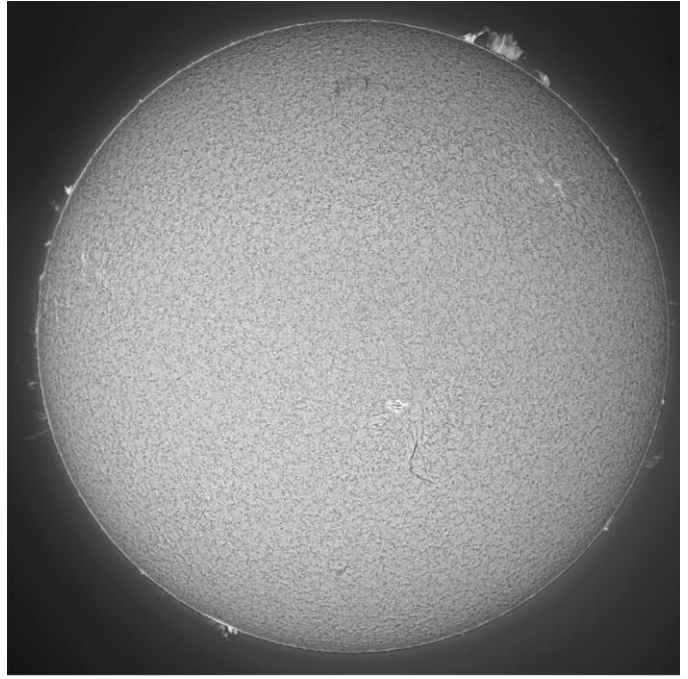
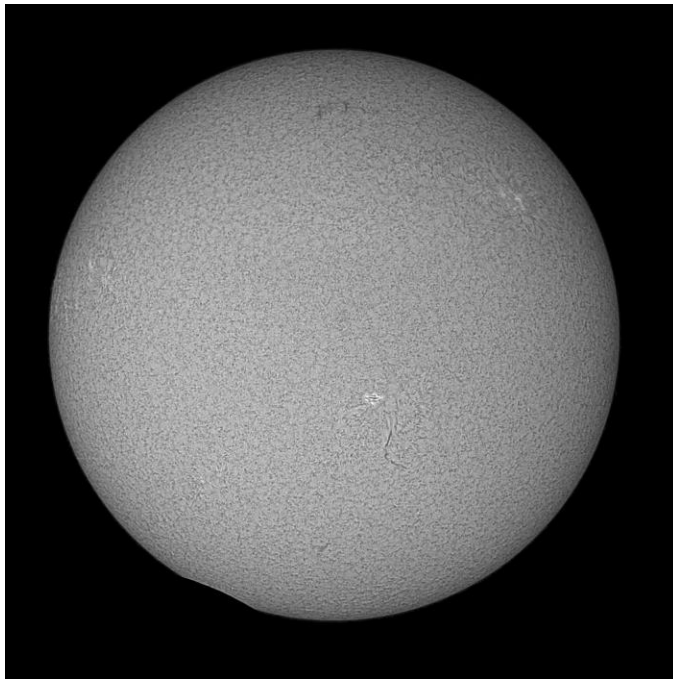
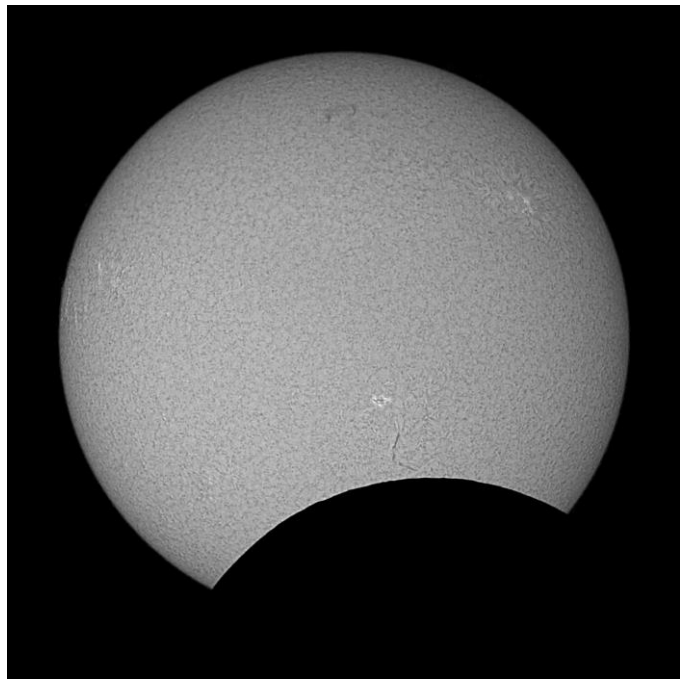
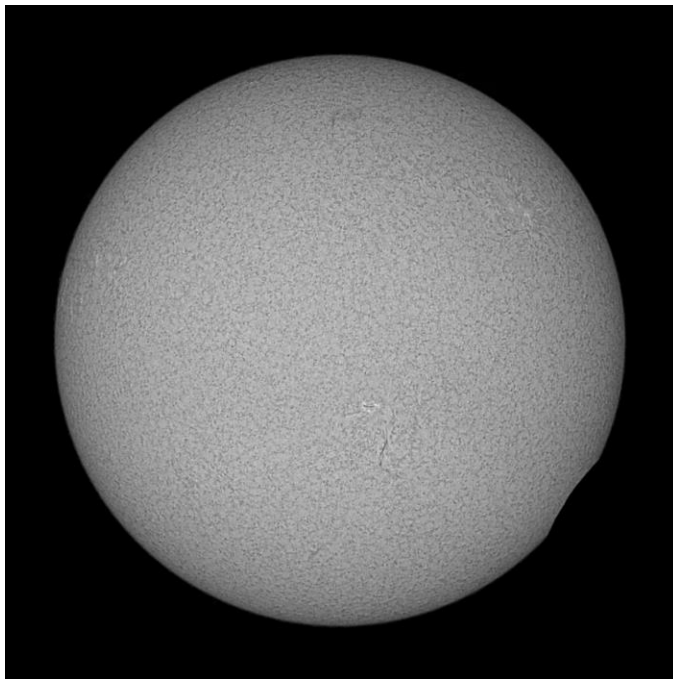
Online: <https://us02web.zoom.us/j/89697734661#success>

In 2017, astronomers detected an elongated object swinging past Earth on its way out of the solar system. The size, shape, and motion of Oumuamua (roughly "scout" in Hawaiian) inspired a few excited researchers to suggest the visitation of an interstellar "spaceship." This presentation will explore the physical nature of Oumuamua and a vast fleet of its extrasolar cohorts.

For more information see:

<https://www.mttamastronomy.org/calendar> and  
<https://youtube.com/MtTamAstronomy>

## TVS Astrophotos By Sibylle Fröhlich



Caption: Sibylle Fröhlich imaged the June 10, 2021 partial solar eclipse from Berlin using an Orion ED80mm refractor with a Lunt Solar Systems LS60F H-Alpha solar filter using a DMK41AU02.AS camera. For each image, a 20-second AVI video was recorded at 15fps using an exposure of 1/222 sec. The best 120 frames were stacked and processed in Registax. The upper left image was taken at 11:38am local time, 2 minutes after first contact. The upper right image was taken at 12:45pm, about 6 minutes after maximum eclipse. The bottom left image was taken at 1:41pm, 2 minutes before second contact. Gert Gottschalk assembled the full suite of Sibylle's images into a timelapse movie, which can be found at:

[https://www.trivalleystargazers.org/gert/sun\\_2021/210610\\_Part\\_SoFi\\_crf16\\_4fps.mp4](https://www.trivalleystargazers.org/gert/sun_2021/210610_Part_SoFi_crf16_4fps.mp4)

The bottom right post-eclipse image was taken at 1:46pm. It combined the surface image with that obtained from an AVI using a longer exposure (1/19 sec) to capture the prominence detail. The prominences, the surface filaments, and sunspots belie the increased solar activity as the Sun approaches the next solar maximum, predicted to occur in about 2025.

# What's Up

By Ken Sperber (adapted from S&T)

All time are Pacific Daylight time

## June

- 17 Thu First-Quarter Moon (8:54pm)**  
19 Sat The Moon in Virgo is  $\sim 5^\circ$  from Spica (Evening)  
20 Sun Summer Solstice: Longest day of the year in the Northern Hemisphere  
21 Mon Venus is  $5^\circ$  from Pollux, very low near the west-northwest horizon (Dusk, see June S&T, p.47)  
22 Tue The Moon in Scorpius is  $\sim 3.5^\circ$  from Antares (Evening)  
23 Wed Mars is in M44, the Beehive Cluster (Dusk, see June S&T, p.47)  
**24 Thu Full Moon (11:40am)**  
27 Sun The Moon and Saturn are  $\sim 5^\circ$  apart in the south, with Jupiter to their left (Dawn)  
28 Mon The Moon forms a triangle with Jupiter and Saturn (Dawn)  
30 Wed The Moon, Jupiter, and Saturn form a graceful arc in the south (Dawn)

## July

- 1 Thu Last-Quarter Moon (2:11pm)**  
2 Fri Venus is near M44, the Beehive Cluster, very low in the west-northwest. Mars  $\sim 6^\circ$  to their upper left (Dusk)  
5 Mon Earth at aphelion, 3.4% farther from the Sun than at January perihelion  
6 Tue Crescent Moon in Taurus, about halfway between Aldebaran and M45, the Pleiades (Dawn)  
7 Wed The Moon forms a wide triangle with Aldebaran and Mercury low in the east-northeast (Dawn)  
8 Thu The Moon is one day shy of new, about  $5^\circ$  left of Mercury (Dawn)  
**9 Fri New Moon (6:17pm)**  
11 Sun The Moon forms a  $6^\circ$  line with Venus and Mars, low in the west-northwest (Dusk)  
12 Mon Venus and Mars are separated by  $0.5^\circ$ , with the Moon to their upper left (Dusk)  
16 Fri The Moon in Virgo is  $\sim 6^\circ$  from Spica in the west (Evening)  
**17 Sat First-Quarter Moon (3:11am)**  
19 Mon The Moon in Scorpio is  $\sim 1^\circ$  from Beta Scorpii, with Antares to their lower left (Evening)  
21 Wed Venus in Leo is  $\sim 1^\circ$  from Regulus (Dusk)  
**23 Fri Full Moon (7:37pm)**  
24 Sat The Moon and Saturn form a vertical pair low in the southwest. Jupiter is to their upper left (Dawn)  
25 Sun The Moon is located in between Jupiter and Saturn, forming a shallow arc (Dawn)  
26 Mon The Moon and Jupiter are separated by  $\sim 5^\circ$  (Dawn)  
28- Wed The Southern Delta Aquariid Meteor shower is visible all night  
29 Thu Use binoculars to see Mars and Regulus very low on the western horizon. Venus is to their upper left (Dusk)  
**31 Sat Last-Quarter Moon (6:16am)**

# NASA Night Sky Notes



## Astrophotography With Your Smartphone

By David Prosper

Have you ever wanted to take night time photos like you've seen online, with the Milky Way stretched across the sky, a blood-red Moon during a total eclipse, or a colorful nebula? Many astrophotos take hours of time, expensive equipment, and travel, which can intimidate beginners to astrophotography. However, anyone with a camera can take astrophotos; even if you have a just smartphone, you can do astrophotography. Seriously!

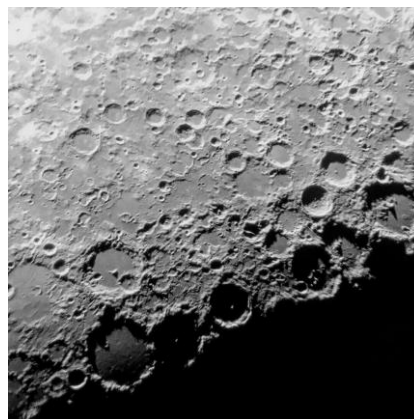


Caption: A small tripod for a smartphone. They are relatively inexpensive – the author found this at a local dollar store!

Don't expect Hubble-level images starting out! However, you can take surprisingly impressive shots by practicing several basic techniques: steadiness, locked focus, long exposure, and processing. First, steady your smartphone to keep your subjects sharp. This is especially important in low light conditions. A small tripod is ideal, but an improvised stand, like a rock or block of wood, works in a pinch. Most camera apps offer timer options to delay taking a photo by a few seconds, which reduces the vibration of your fingers when taking a shot. Next, lock your focus. Smartphones use autofocus, which is not ideal for low-light photos, especially if the camera readjusts focus mid-session. Tap the phone's screen to focus on a distant bright star or streetlight, then check for options to fine-tune and lock it. Adjusting your camera's exposure time is also essential. The longer your camera is open, the more light it gathers - essential for low-light astrophotography. Start by setting your exposure time to a few seconds. With those options set, take a test photo of your target! If your phone's camera app doesn't offer these options, you can download apps that do. While some phones offer an "astrophotography" setting, this is still rare as of 2021. Finally, process your photos using an app on your phone or computer to bring out additional detail! Post-processing is the secret of all astrophotography.

You now have your own first astrophotos! Wondering what you can do next? Practice: take lots of photos using different

settings, especially before deciding on any equipment upgrades. Luckily, there are many amazing resources for budding astrophotographers. NASA has a free eBook with extensive tips for smartphone astrophotography at [bit.ly/smartastrophoto](https://bit.ly/smartastrophoto), and you can also join the Smartphone Astrophotography project at [bit.ly/smartphoneastroproject](https://bit.ly/smartphoneastroproject). Members of astronomy clubs often offer tips or even lessons on astrophotography; you can find a club near you by searching the "Clubs and Events" map on the Night Sky Network's website at [nightsky.jpl.nasa.gov](https://nightsky.jpl.nasa.gov). May you have clear skies!



Caption: The Moon is large and bright, making it a great target for beginners. The author took both of these photos using an iPhone 6s. The crescent moon at sunset (left) was taken with a phone propped on the roof rack of a car; the closeup shot of lunar craters (right) was taken through the eyepiece of a friend's Celestron C8 telescope.

This article is distributed by the NASA Night Sky Network, a coalition of hundreds of astronomy clubs across the US dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.gov](https://nightsky.jpl.nasa.gov) to find local clubs, events, stargazing info and more.



Tri-Valley Stargazers  
P.O. Box 2476  
Livermore, CA 94551  
[www.trivalleystargazers.org](http://www.trivalleystargazers.org)

## Tri-Valley Stargazers Membership Application

### Contact information:

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Street Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Email Address: \_\_\_\_\_

Status (select one): \_\_\_\_\_ New member \_\_\_\_\_ Renewing or returning member

**Membership category** (select one): Membership term is for one calendar year, January through December.

\_\_\_\_\_ Student member (\$10). Must be a full-time high-school or college student.

\_\_\_\_\_ Regular member (\$30).

**Hidden Hill Observatory Access** (optional): Must be 18 or older.

\_\_\_\_\_ One-time key deposit (\$20). This is a refundable deposit for a key to H2O. New key holders must first hear an orientation lecture and sign a usage agreement form before using the observing site.

\_\_\_\_\_ Annual access fee (\$10). You must also be a key holder to access the site.

**Donation** (optional):

\_\_\_\_\_ Tax-deductible contribution to Tri-Valley Stargazers

**Total enclosed:** \$ \_\_\_\_\_

Member agrees to hold Tri-Valley Stargazers, and any cooperating organizations or landowners, harmless from all claims of liability for any injury or loss sustained at a TVS function. TVS will not share information with anyone except as detailed in our Privacy Policy (<http://www.trivalleystargazers.org/privacy.shtml>).

Mail this completed form along with a check to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551.