

PRIMEFOCUS

Tri-Valley Stargazers



June 2017



Meeting Info

What:

Summer BBQ and Portable Planetarium Experience

Who:

TVS Family and Friends

When:

June 16, 2017

Set-up at 6:30 p.m.

Dinner at 7:00 p.m.

Where:

Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

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June Meeting

TVS Summer Barbecue and Portable Planetarium Experience

The June TVS meeting will be our annual summer BBQ. Plan on working up an appetite by helping to set-up and get the charcoal going at about 6:30pm. We will start eating around 7:00pm. As a bonus, Dan Bergmann will have the portable planetarium set-up for members to enjoy.



TVS will provide hamburgers, veggie-burgers, and hotdogs, with a variety of toppings including cheese, mushrooms, bacon, etc.

Members are asked to bring a side dish, salad, or dessert to share. Please bring enough to feed about 5-8 people. Use the first letter of your last name to determine which type of dish to bring:

- A-D Green or Fruit Salad
- E-J Appetizer
- K-O Dessert
- P-Z Macaroni or Potato Salad

News & Notes

2017 TVS Meeting Dates

The following lists the TVS meeting dates for 2017. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting.

Lecture Meeting	Board Meeting	Prime Focus Deadline
Jun. 16	Jun. 19	
Jul. 21	Jul. 24	Jun. 30
August: No General Meeting or Board Meeting		
Sep. 15	Sep. 18	Aug. 25
Oct. 20	Oct. 23	Sep. 29
Nov. 17	Nov. 20	Oct. 27
Dec. 15	Dec. 18	Nov. 24

Money Matters

As of the last Treasurer's Report on 5/22/17, our club's checking account balance is \$14,775.54.

Outreach Star Parties: Help Needed.

June 25: Camp Go Beyond

July 8: Cub Scouts at Rancho Los Mochos

July 15: Cub Scouts at Rancho Los Mochos

August 12: Cub Scouts at Rancho Los Mochos

Please contact Eric Dueltgen for more information.

Club Star Parties: 2017 Spring/Summer/Autumn

The following club star parties have been approved by the TVS Board:

June 17: Tesla Winery star party - (Saturn Opposition)

July 15: H2O Open House

July 22: Tesla Winery star party

August 25 – 27: Yosemite/Glacier Point weekend

September 23: Tesla Winery star party

October 21: Tesla Winery star party (Orionids Meteors).

Roland reports that the theme for June 17 club star party at Tesla Vintners is "Beginner's Night." Participants are encouraged to bring notepaper, a full-sky chart (such as http://www.telescope.com/assets/pdf/starcharts/2017-06-starchart_bw.pdf), and binoculars or telescope if they have one. Those working on the Universe Sampler program are further encouraged to bring copies of the blank observation log to record their observations. Using the "Universe Sampler" from the Astronomical League to guide much of our evening, Roland proposes that we do the following.

1. Identify the brightest stars in the June sky and their

associated constellations, including Regulus, Spica, Arcturus, Vega, Deneb, Altair, and Antares.

2. Use the stars of the Big Dipper and the Summer Triangle to learn how to estimate angular distances, azimuths, and altitudes.

3. Find the variable star Beta Lyrae and estimate its magnitude.

4. Observe Jupiter and Saturn in binoculars and/or telescopes.

5. Observe the double stars Mizar and Albireo in binoculars and/or telescopes.

6. Learn to star hop to locate several deep sky objects in binoculars and/or telescopes, including M57 (the Ring Nebula), M51 (the Whirlpool Galaxy), M13 (the Great Hercules Cluster), and M7 (Ptolemy's Cluster).

Roland is open to any suggestions for improvement. Please contact him if you are willing to help with this instructional program, particularly with helping our beginners learn how to star hop. He will be placing an order for some more copies of the Universe Sampler guide with the hope of having them available for the star party.

Calendar of Events

Present - August 31, 10:00am-5:00pm, Wednesday-Sunday

What: California's First Philanthropist: The Legacy of James Lick

Who: Exhibition

Where: Pioneer Hall at the Presidio, 101 Montgomery, Suite 150, Presidio of San Francisco, 94129

Cost: Free

James Lick used his wealth to establish charitable organizations to address the basic needs of the many who were less fortunate. He willed his entire fortune to benefit the people of California. In addition to endowing existing service organizations, including homes for the elderly, schools for orphans, and The Society for the Prevention of Cruelty to Animals, Lick allocated \$700,000 to build "a telescope superior to and more powerful than any telescope yet made" on Mount Hamilton. Other beneficiaries included the California Academy of Sciences, The Mechanics Library, landmarks in Golden Gate Park, as well as The California School for Mechanical Arts, the first to enroll young women interested in studying industrial design and manufacturing. This exhibition considers the legacy of James Lick, and features images by Isaiah West Taber, who documented many of the projects Lick funded, including The

Header Image: Gert Gottschalk took this image of dramatic Earthshine from the Del Valle observing site on May 17, 2017.

Calendar of Events (continued)

Lick Observatory and The Academy of Sciences.

For more information see: <http://www.californiapioneers.org/museum/today-in-the-museum/>

June 17, 8:30pm

What: Screening of the movie "Gravity"
Who: Prof. Thomas Targett, Sonoma State University
Where: Mt. Tamalpais State Park, Cushing Memorial Amphitheater, more commonly known as the Mountain Theater, Rock Spring parking area
Cost: Free

"Gravity" stars Sandra Bullock and George Clooney as NASA astronauts stranded in orbit. This tense film earned 7 Oscars at the 2014 Academy Awards, including Best Director for Alfonso Cuarón.

For more information see: <http://www.friendsofmonttam.org/astronomy/schedule>

June 19, 7:30pm

What: The Two Sides of Kepler: Planets and Stars
Who: Dr. David Charbonneau, Harvard University & Dr. Ruth Angus, Oxford University
Where: California Academy of Science, 55 Music Concourse Dr., Golden Gate Park, San Francisco, CA
Cost: Advanced ticketing required. Academy members \$12, Seniors \$12, General \$15. Reserve a space online or call 1-877-227-1831.

To coincide with the Kepler & K2 Science Conference taking place in Mountain View, the Academy is pleased to host a double-header talk by two scientists who use the Kepler Mission to explore different aspects of the Universe! David Char-

bonneau discovers exoplanets with Kepler, while Ruth Angus studies the ages of stars. Hear directly from two scientists doing cutting-edge work with this amazing instrument.

See www.calacademy.org/events/benjamin-dean-astronomy-lectures for lecture and reservation information.

June 21-25

What: Golden State Star Party
Who: You
Where: Aiden, CA
Cost: \$70 or \$25/night. No refunds, but registration can be transferred to other parties without restriction.

If you've never been out to a sky beyond your backyard or local astronomy sites, you're in for an amazing treat. Have you seen a dark sky, or only remember them from childhood? For you, that first view at GSSP will be truly incredible.

Do you need a telescope to attend? No! But if you have one, bring it. If not, binoculars, or just your eyes will do. There will be plenty of telescopes to look through.

Do you think you're too much of a beginner? It's a friendly and helpful group – you'll fit right in and make new friends under an amazing sky. Whether you're an observer or imager, you'll have lots of company, get plenty of help, and see lots of new equipment and sights.

Campers and RV's are welcome (no hookups). There is limited hotel accommodations in nearby towns.

For more information see: <http://goldenstatestarparty.org/index.php/golden-state-star-party/newcomers-and-novices-welcome/>

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TVS E-Group

So how do you join the TVS e-group, you ask? Just send an e-mail message to the TVS e-mail address (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.

TVS Open House Club Star Party: May 20



Image Caption: TVS members setting up at the May 20 TVS Open House Club Star Party. Image Credit: Hilary Jones

Calendar of Events (continued)

July 7, 6:00pm - 10:00pm

What: \$5 First Fridays
Who: Chabot Exhibit
Where: Chabot Space and Science Center, 10000 Skyline Blvd., Oakland, CA 94619
Cost: Chabot Admission\$5, Free for Members

At \$5 First Fridays you can join a Night Hike through the redwoods or enjoy various laser and planetarium shows. Admission also includes hands-on activities and live demonstrations throughout the center, as well as any special events that are going on that evening. It's fun for the whole family!

See www.chabot.space.org/first-fridays.htm for more information and to pre-purchase tickets, or call (510) 336-7373.

July 12, 7:00pm

What: Making Contact: Jill Tarter and the Search for ET
Who: Jill Tarter, Sarah Scoles, Elliot Gillum, and more
Where: Cubberley Community Center, 4000 Middlefield Road, Palo Alto, CA
Cost: Free

In July, Pegasus Books will release 'Making Contact: Jill Tarter and the Search for Extraterrestrial Intelligence' by Sarah Scoles. Jill has been a pioneer in SETI research – it has been and still is her life's work. Jill currently holds the Bernard M. Oliver Chair for SETI at the SETI Institute, serves on the management board for the Allen Telescope Array (ATA), is President Emeritus of the California Academy of Sciences Board of

Trustees and continues to make ground-breaking impacts in the worlds of science, education and the arts. 'Making Contact' is Jill's story.

Sarah Scoles is a science writer and contributor at Wired Science, previously serving as associate editor at Astronomy and as public education lead at the National Radio Astronomy Observatory in Green Bank, West Virginia.

Join Jill and Sarah in conversation about 'Making Contact,' followed up with a lively discussion about New Directions in SETI Research with SETI Institute scientist Eliot Gillum, who has been developing a new type of optical SETI instrument and SETI Institute President and CEO Bill Diamond.

There will be an opportunity to buy 'Making Contact' and a book signing following the presentations.

For more information see: <http://www.seti.org/csc/lectures>, e-mail info@seti.org, or phone 650-961-6633.

H2O Open House Star Party By Ken Sperber

I always look forward to the TVS Open House, as it is an opportunity to share the enjoyment of the night sky with both new and veteran club members. By any measure, the May 20th Open House far exceeded expectations. Chuck and Joy performed a census that revealed the largest attendance that anyone can remember: 33 people and 23 cars! Twenty-two of the participants heeded Rich's call for a group photo, which was taken by Hilary Jones (see above).

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Club Member Images: NGC6946 and Supernova 2017eaw

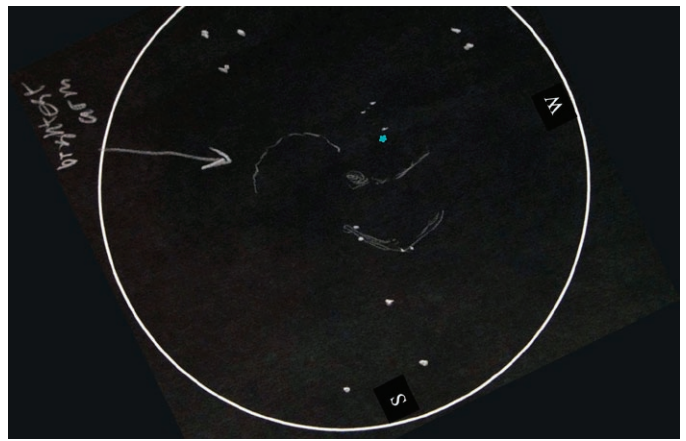
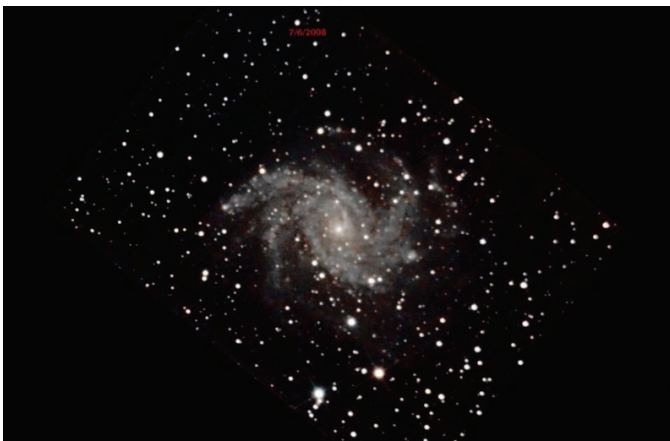
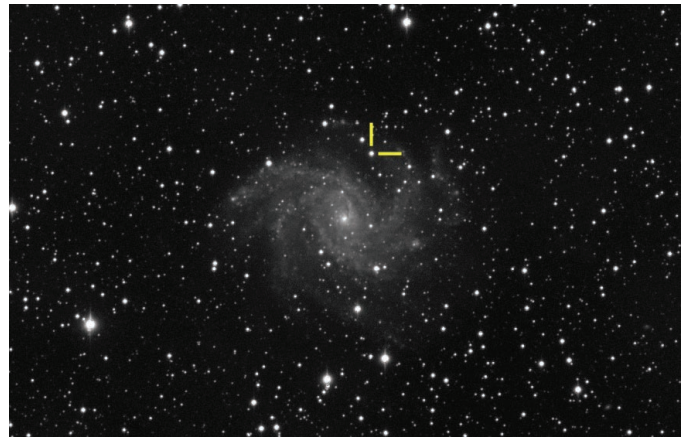


Image Caption: (top-left) Ron Markham imaged Supernova 2017eaw on May 20 at the TVS H2O Open House. He used an 8" f/5 Newtonian telescope and a SBIG STF-8300. LRGB exposures were each 25 x 90 seconds. (top-right) Gert Gottschalk imaged the supernova on May 27 from the Del Valle site. He used a 130mm f/6.5 refractor and a ST-10XME. The luminance exposures were 9 x 2 minutes. (lower-left) Ron Markham imaged NGC6846 on July 6, 2008, with this image providing a reference against which the supernova images can be compared. (lower-right) Ken Sperber, Ron, and Dennis observed the supernova on May 20 at the TVS H2O Open House. The observations and Ken's drawing, with the supernova indicated by the blue dot, were made using Ken's 20" f/5 Dobsonian telescope using an 11mm eyepiece.

I arrived at H2O at about 6pm, well in advance of the caravan that was to leave the corner of Mines and Tesla Roads at 6:30pm. I was the fifth car to arrive, and there would be at least two more arrivals well before the caravan even topped the hill. Already, the site was bristling with activity, with three of the group preparing for imaging, and the others more casually setting up for observing. As I sat eating my dinner, I wondered where the caravan would park, thinking that some might have to park below the hill gate, and walk up to the site.

Then at about 8pm, a bit later than expected, the caravan poured in. Car after car was deftly shuttled to parking spots along the rim of the observing site, and then the true scope (no pun intended) of the crowd became evident, as multiple people exited from each car, with the anticipation of the observing to come.

The 17.5" club telescope, named in honor of Jack Marling (one of the founding members of TVS, former owner of Lumicon,

and patron of much of the H2O observatory equipment), ran all night on the new battery, which keeps its charge thanks to a newly installed solar panel. Thanks to Chuck Grant, the observatory director, and others who have worked (and continue to work) to upgrade the Marling scope, one of the club's most valuable resources. Chuck provided views through the club scope, showing guests highlights of the night sky, including Jupiter, M51 (the Whirlpool Galaxy), M57 (the Ring Nebula), among others, ...

Jupiter popped out, even in bright twilight, and Dave Childree keenly sighted it in his 18" Newtonian. Quite surprisingly, the seeing was very good, since usually just after sunset the near-surface air is turbulent, as the Earth radiates away the heat of the day causing thermals that degrade the view. The Great Red Spot was visible front and center, and it was by no means pale. It stood out as a bright salmon color, in contrast to the white zones and brown belts that gird the planet. Not wanting the hog eyepiece time from others queueing

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What's Up By Ken Sperber (adapted from S&T and The Year in Space)

All times are Pacific Daylight Time

June

- 14 Wed Saturn at opposition
- 17 Sat **Last-Quarter Moon (8:33am)**
- 20-21 Tue- Crescent Moon about 8 degrees right (lower-left) of Venus on the 20th (21st) (predawn)
- 23 Fri **New Moon (11:31pm)**
- 27 Tue Regulus is about 2 degree away from the crescent Moon
- 30 Fri Jupiter about 4 degrees left of the Moon (Evening)
- 30 Fri **First-Quarter Moon (5:51pm)**

July

- 3-7 Mon- Brilliant Venus about 7 degrees south of M45, the Pleiades (dawn)
- 6 Thu Saturn about 3 degrees below the Moon (all night)
- 8 Sat **Full Moon (9:07pm)**
- 9 Sun Saturn about 3 degrees from the Moon
- 13 Thu Venus 3 degrees north of Aldebaran
- 16 Sun **Last-Quarter Moon (12:26pm)**
- 20 Thu Crescent Moon about 3 degrees lower-right of Venus (dawn)
- 23 Sun **New Moon (2:46am)**
- 24 Mon Super-thin crescent Moon 5 degrees to the lower-right of Mercury, Regulus upper-left of Mercury (dusk)
- 27 Thu Delta Aquariid Meteor Shower peaks in the morning
- 28 Fri Crescent Moon is about 3 degrees to the upper-left of Jupiter, Spica 8 degrees to their left (dusk)
- 30 Sun **First-Quarter Moon (8:23am)**

up to observe Jupiter, I went down to my scope for a longer look. I could clearly see blue scalloped intrusions extending into the North Tropical Zone. Europa lay to one side of Jupiter, with Io and Ganymede lined up on the other side. It was quite the sight, one of the best views of Jupiter that I have had. However, it was fleeting, as the seeing deteriorated a bit soon thereafter.

Unfortunately, I didn't keep a log of all of the objects that I observed (and shared with others) at the Open House, but some of the standouts were NGC4565 (a beautiful edge-on galaxy), NGC6543 (the Cat's Eye Planetary Nebula), M13 (the Great Globular Cluster in Hercules), M27 (the Dumbbell Nebula), and later in the night NGC6888 (the crescent Nebula), NGC6992, 6995, 6960 (the Veil Nebula), M20 (the Trifid Nebula), M8 (the Lagoon Nebula), M17 (the Swan Nebula), and M16 (the Eagle Nebula).

One of the interests that most people had was observing Supernova 2017eaw in galaxy NGC6946, which had exploded

on May 14 (at least in Earth time...). At the Open House Ron Markham imaged the SN 2017eaw and fortunately he had a previous image of NGC6946 for comparison (see p.5), and Gert Gottschalk also imaged it a week later from the Del Valle site (see p.5). Fortunately, I did a drawing of NGC6946 on May 30, 2014 as part of the Astronomical League Arp Club, but even with that I had a tough time observing the SN before the caravan left the hill. After a 30-45 minute rest, at about 1am I was able to easily observe the SN. I was pleased to share the view with Ron and Dennis, but later, confirming the observation against images gave me fits, but that is a story for another day.

For more information on Ron Markham's and Gert Gottschalk's imaging of SN 2017eaw, see: <http://rml3.com/astro/ngc6946> and http://www.trivalleystargazers.org/gert/CCD_Gallery/ngc6946_st10xme.html

The Fizzy Seas of Titan

By Marcus Woo

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.

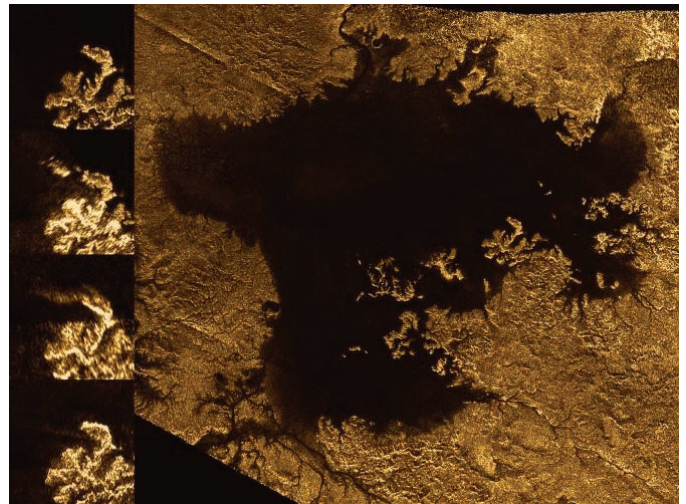


Image Caption: Radar images from Cassini showed a strange island-like feature in one of Titan's hydrocarbon seas that appeared to change over time. One possible explanation for this "magic island" is bubbles. Image credits: NASA/JPL-Caltech/ASI/Cornell

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/>



Tri-Valley Stargazers
P. O. Box 2476
Livermore, CA 94551
www.trivalleystargazers.org

Tri-Valley Stargazers Membership Application

(or apply for membership online: www.trivalleystargazers.org/membership.shtml)

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 (\$5). Must be a full-time high-school or college student.

Regular member (\$30).

Patron member (\$100). Patron membership grants use of the club's 17.5" reflector at H2O. You must be a member in good standing for at least one year, hold a key to H2O, and receive board approval.

Hidden Hill Observatory Access (optional):

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.

Magazine Subscriptions (optional): Discounted subscriptions are available only to new subscribers. All subsequent renewals are handled directly with the magazine publishers.

One-year subscription to Sky & Telescope magazine (\$32.95).

One-year subscription to Astronomy magazine (\$34).

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 other than other club members and the Astronomical League without your express permission.

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