

# PRIMEFOCUS

Tri-Valley Stargazers



July 2019



## Meeting Info Stellar Evolution

**Who:**

**Dr. David Dearborn**

**When:**

July 19, 2019

Doors open at 7:00 p.m.

Meeting at 7:30 p.m.

Lecture at 8:00 p.m.

**Where:**

Unitarian Universalist  
Church in Livermore  
1893 N. Vasco Road

## Inside

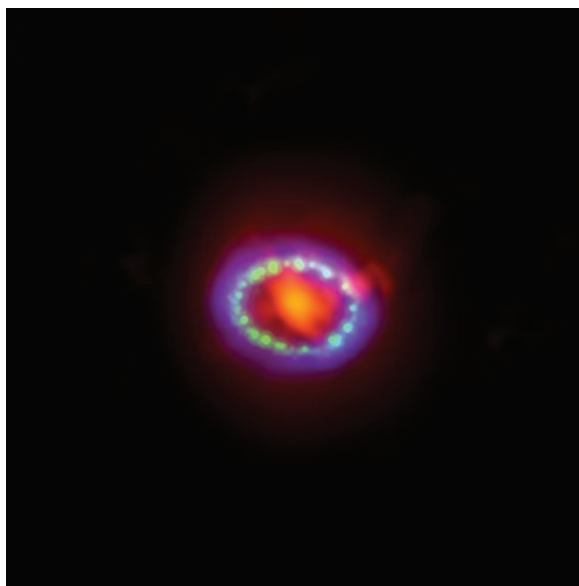
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## July Meeting

### Stellar Evolution

By Dr. David S. P. Dearborn, Lawrence Livermore National Laboratory

By the middle of the 19th century, astronomers and physicists had decided that gravitational energy powered the sun. In the early 20th century a theory of evolution had been devised with young giants and old main sequence stars, resulting in an age for the earth <100 million years. The cries of biologists and geologists were ignored. However physical and astronomical evidence soon built up proving that there was some other unknown energy source! Among all proposals, nuclear fusion eventually won, turning the earlier evolution theory on its head. Today we understand that nuclear fusion has produced the elemental abundances seen today (Carbon and above). With the addition of fusion, we connect stars in different stages of evolution, and understand the various possible ends.



Caption: This image shows the remnant of Supernova 1987A seen in light of very different wavelengths. ALMA data (in red) shows newly formed dust in the centre of the remnant. Hubble (in green) and Chandra (in blue) data show where the expanding shock wave is colliding with a ring of material around the supernova. This ring was initially lit up by the ultraviolet flash from the original explosion, but over the past few years the ring material has brightened considerably as it collides with the expanding shockwave. Credit: ALMA (ESO/NAOJ/NRAO)/A. Angelich. Visible light image: the NASA/ESA Hubble Space Telescope. X-Ray image: The NASA Chandra X-Ray Observatory

Dr. David S. P. Dearborn is a graduate of UCLA (1970) and the University of Texas at Austin (1975). He has held positions at the Copernicus Institute in Warsaw, the Institute of Astronomy in Cambridge, The California Institute of Technology, and Steward Observatory in Tucson. For the last 35 years, he has been a research physicist/astrophysicist at the Lawrence Livermore National Laboratory (LLNL). While most of his LLNL research has supported programmatic efforts, he has maintained an active presence in astrophysics, and recently become involved in planetary physics (asteroid deflection). He has also published significantly in Andean studies (particularly Inca Astronomy).

## News & Notes

### 2019 TVS Meeting Dates

Below are the TVS meeting dates for 2019. 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
Jul. 19	Jul. 22	
Aug. 16	Aug. 19	Jul. 26
Sep. 20	Sep. 23	Aug. 30
Oct. 18	Oct. 21	Sep. 27
Nov. 15	Nov. 18	Oct. 25
Dec. 20	Dec. 23	Nov. 29

### Money Matters

As of the last Treasurer's Report on 6/24/19, our club's checking account balance is \$14,272.

### Outreach Star Parties

Saturday, July 20: Bankhead Theater, TVS Booth in Lobby and Solar Observing, set-up 12:15pm

Wednesday, July 24: Del Valle Park, South side of the lake, set-up at 8:00pm (see TVS website for updates)

Tuesday, August 6: Bankhead Theater, set-up at 6:30pm

Wednesday, August 7: Taylor Family Foundation Camp, 5555 Arroyo Rd., Livermore, set-up at 8:00pm

Sunday, September 8: Bankhead Theater, TVS Booth in Lobby and Solar Observing, set-up at 3:30pm

### 2019 Club Star Parties

Save the dates for the 2019 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 20: Tesla Vintners, set-up at 8:00pm

August 3: Del Valle (Arroyo Staging Area), set-up at 7:30pm

August 24: H2O Open House, Caravan departs at 6:00pm

September 21: Tesla Vintners, set-up at 6:30pm

October 5: Del Valle (Arroyo Staging Area), set-up at 6:00pm

### CalStar Star Party

The CalStar Star Party will be held on September 25-28. The

location is only 3 hours away at Lake San Antonio in southern Monterey County. CalStar is a loosely organized party with no registration and no structure held at the County park. Just show up and pay the camping fee and join the group of about 100 star gazers in a section of the park reserved for us. For more information see: <https://calstar.observers.org/>

## Calendar of Events

### July 20, 10:00am - 5:00pm

What: Apollo 50th Anniversary Celebration

Who: Staff, Astronomer Gerald McKeegan (1:30pm)

Where: Chabot Space and Science Center, 10000 Skyline Blvd., Oakland, CA 94619

Cost: Free with Admission

During the 1960s and '70s, NASA sent nine missions to the moon. Six of them landed astronauts safely on the surface. This is the only time humans have visited another world. July 20, 2019 marks the 50th anniversary of the first humans landing on the Moon as part of NASA's Apollo 11 lunar mission.

Celebrate the 50th anniversary of Apollo 11 with hands-on moon demos, a new planetarium show, Lunaverse, Moon Documentary, Lunar Talk by Astronomer Gerald McKeegan (1:30pm), Apollo 11 (2019 release) Film, and more!

For more information see: <https://chabotspace.org/calendar/apollo-50th-anniversary-celebration/> or call (510) 336-7373.

### July 23, 7:15pm

What: Northern Lights Excite

Who: Dr. Laura Peticolas, Sonoma State University

Where: Mt. Diablo Astronomical Society, Lindsay Wildlife Experience, Community Room, 1931 First St., Walnut Creek, CA 94597

Cost: Free.

Dr. Peticolas will discuss auroras, and the mysteries scientists are still uncovering about these displays here and on other planets in our solar system.

For more information see: <https://www.meetup.com/A-A-N-C/events/262985106>

### July 29, 8:30pm-11:30pm

What: Astro Imaging Workshop

Who: Glenn N.

Where: Little Uvas Open Space Preserve, 16541-16905 Uvas Rd., Morgan Hill, CA (GPS: 37.091536, -121.719594)

Cost: Free

SJAA is proud to sponsor this outdoor workshop where we help those folks who are interested in learning about the me-

Header Image: SN2019fck in NGC5243 as imaged by Gert Gottschalk at the TVS Open House.

## Calendar of Events (continued)

chanics of AstroPhotography and Imaging. Bring your questions, and/or your complete astrophotography rig (battery powered). I usually give an hour talk about the different kinds of night time photography, then after full dark, demonstrate deep space astrophotography (Nebulae, Galaxies, Globular Clusters, etc.).

All events will now be held at Little Uvas Open Space Preserve, instead of Coyote Valley. This is a darker spot, much better for nighttime photography and astroimaging. Note the following please: This is a dirt road and field to park in, no modern conveniences although sometimes there is a porta potty, but not always. There are horses loose in the field, PLEASE be careful opening the gate and be sure to close it behind you so the horses don't end up on the busy road! Don't assume the person(s) behind you will close the gate. Please check that they do or do it yourself.

Please arrive BEFORE sunset, which will be at 8:30. The gate should be "dummy locked" so you can open it, enter, and close it behind you. You can park in the flat field to your left just after you drive in. You can leave anytime, just again be careful with the gate/horses and close the gate behind you.

If you have a rig you can set it up in the field close to the road.

This site has fewer creature comforts (NO BATHROOMS), but it's darker than Coyote Valley and even darker than RCDO, if you been there for a Starry Nights Star Party.

For more information see: <https://www.meetup.com/SJ-Astronomy/events/257517784/>

### July 30, 7:00pm

**What:** Apollo 11 50th Anniversary Panel Discussion  
**Who:** NASA Scientists: Greg Schmidt, Tony Colaprete, Lynn Harper, and Brian Day  
**Where:** Foothill College, Appreciation Hall (1500), 12345 El Monte Road, Los Altos Hills, CA 94022  
**Cost:** Free, Registration Required, \$3 parking (Credit Cards or \$1 dollar bills)

We will host a panel discussion with four NASA scientists and engineers about the legacy of the Apollo landings and the future Artemis missions. Fifty years ago, humans first set foot on the moon. Those first steps are still felt today. Join us for a discussion of the legacy of the Apollo program - and a look at future manned missions to the moon.

For more information and Registration see: <https://www.eventbrite.com/e/apollo-11-50th-anniversary-panel-discussion-tickets-64680493096>.

### August 5, 7:30pm

**What:** The Universe in the Infrared: Spitzer's Final Voyage  
**Who:** Luisa Rebull, Research Scientist, Caltech/IPAC  
**Where:** California Academy of Sciences, 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.

The infrared lies beyond the red end of the visible spectrum of light. Cool and dusty things throughout the Universe appear bright in infrared. The Spitzer Space Telescope is one of NASA's Great Observatories, designed to observe the universe in infrared light. It was launched in 2003 with an expected lifetime of 5 years. Spitzer has succeeded beyond our wildest

continued on p.4

<p><b>Officers</b></p> <p><b>President:</b> Roland Albers president@trivalleystargazers.org</p> <p><b>Vice-President:</b> Eric Dueltgen vice_president@trivalleystargazers.org</p> <p><b>Treasurer:</b> David Feindel treasurer@trivalleystargazers.org</p> <p><b>Secretary:</b> Ron Kane secretary@trivalleystargazers.org</p> <p><b>Past President:</b> Rich Combs past_president@trivalleystargazers.org</p>	<p><b>Volunteer Positions</b></p> <p><b>Astronomical League Rep.:</b> Dennis Beckley alrep@trivalleystargazers.org</p> <p><b>Club Star Party Coordinator:</b> Eric Dueltgen coordinator@trivalleystargazers.org</p> <p><b>Del Valle Coordinator:</b> David Feindel delvalle@trivalleystargazers.org</p> <p><b>Historian:</b> Hilary Jones historian@trivalleystargazers.org</p> <p><b>Internat. Dark-Sky Assoc. Rep.:</b> Aadi Duggal darksky@trivalleystargazers.org</p> <p><b>Librarian:</b> Ron Kane librarian@trivalleystargazers.org</p> <p><b>Loaner Scope Manager:</b> Ron Kane telescopes@trivalleystargazers.org</p>	<p><b>Night Sky Network Rep.:</b> Ross Gaunt nnsn@trivalleystargazers.org</p> <p><b>Newsletter Editor:</b> Ken Sperber newsletter@trivalleystargazers.org 925-361-7435</p> <p><b>Observatory Director/Key Master:</b> Chuck Grant observatory@trivalleystargazers.org</p> <p><b>Outreach Coordinator:</b> Eric Dueltgen outreach@trivalleystargazers.org</p> <p><b>Potluck Coordinator:</b> Jill Evanko potluck@trivalleystargazers.org</p> <p><b>Program Coordinator:</b> Dan Helmer programs@trivalleystargazers.org</p> <p><b>Publicity Coordinator:</b> Jim Theberge publicity@trivalleystargazers.org</p>	<p><b>Refreshment Coordinator:</b> Laurie Grefsheim</p> <p><b>Webmaster:</b> Hilary Jones webmaster@trivalleystargazers.org</p> <p><b>Web &amp; E-mail</b> www.trivalleystargazers.org info@trivalleystargazers.org</p> <p><b>TVS E-Group</b> To join the TVS e-group 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.</p>
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## Calendar of Events (continued)

expectations, observing things from dust in our Solar System out to dusty galaxies at the edge of the Universe. On January 30, 2020, Spitzer will complete its mission. Dr. Rebull will summarize some of the interesting engineering that made this mission so successful, and cover several scientific highlights from the past 16 years of Spitzer operations.

See [www.calacademy.org/events/benjamin-dean-astronomy-lectures](http://www.calacademy.org/events/benjamin-dean-astronomy-lectures) for lecture and reservation information.

### August 10, 8:00pm

**What:** Astrobiology Under Our Feet & Out to the Stars  
**Who:** Dr. Penelope Boston, Director, NASA Astrobiology Institute, NASA Ames Research Center  
**Where:** Mt. Tamalpais State Park, Cushing Memorial Amphitheater, more commonly known as the Mountain Theater, Rock Spring parking area  
**Cost:** Free.

The Age of Astrobiology has begun. We have a whole Solar System—and a galaxy of star-warmed worlds beyond—to explore for life. How do we look for life here and way out there? How will we know it when we find it? Our exploration begins at Earth. We must apply what we are learning about our own amazing home planet to our search for life beyond.

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

## Recent TVS Events By Ken Sperber

Last month TVS hosted its annual summer BBQ. About 35 people turned out to share in the fun and enjoy the fine food prepared by Ron Kane. Roland, his wife, and daughter shopped for the main course, while other club members contributed the appetizers and desserts.



Image Caption: TVS President Roland Albers addresses the attendees at the TVS BBQ that was held on June 21. Image Credit: Jennifer Siders

On June 22 TVS held a club star party at Tesla Vintners. About 12 car loads of people showed up sporting everything from binoculars to a 24" Dobson. For those planning to attend the Golden State Star Party this event provided an excellent opportunity for a telescope tune-up. As seen on p.5, at this event Jennifer Siders took a nice image of M57.



Image Caption: Telescope set-up at Tesla Vintners Club Star Party. Image Credit: Jennifer Siders

On July 9 TVS held an Outreach Star Party at the Bankhead Theater. The star party was held in conjunction with one of a series of Bankhead Theater events to celebrate the 50th Anniversary of Apollo 11. TVS will be providing outreach as part of these Bankhead Theater events on July 20, August 6, and September 8. Please join in the festivities (see p.2).



Image Caption: TVS Outreach event at the Bankhead Theater on July 9. Image Credit: Jennifer Siders

## TVS Member Astrophotos



Image Caption: Jennifer Siders took this image of M57, the Ring Nebula, at the Tesla Vintners Club Star Party on June 22. She used a Sky-Watcher Skymax 102 with a Fuji X-T1 camera. The camera was set at ISO 3200 using 15 second exposures. 10 images were taken and stacked. The Skymax is controlled by an iPhone app, SynScan Pro, which also controls the camera.



Image Caption: Dennis Beckley, Joy Milsom, Jack Mowchenko, Chuck Grant, Scott Jacobson, Ken Sperber, and Roland Albers were among the many TVS members who attended this years Golden State Star Party. Not in the photo were TVS members Ozgur Aktas, Charles Fox, Curtis Macchioni, and Rich Ozer. Image Credit: Ken Sperber

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

All times are Pacific Daylight Time

### July

- 12-15 Fri- Over the next 4 nights the Moon passes from Scorpius into Sagittarius and is in the vicinity of Jupiter, Antares, ending up less than  $2^{\circ}$  from Saturn (Night)
- 16 Tue **Full Moon (2:38pm)**
- 20 Sat 50th Anniversary of the landing of Apollo 11 on the Moon
- 24 Wed **Last-Quarter Moon (6:18pm)**
- 28 Sun The waning crescent Moon trails Aldebaran in Taurus by about  $5^{\circ}$  (Dawn)
- 29-30 Mon The Delta Aquariid meteor shower peaks; best in the morning (see July S&T p.50) (All Night)
- 31 Wed **New Moon (8:12pm)**

### August

- 5 Mon The crescent Moon is less than  $7^{\circ}$  from Spica (Dusk)
- 7 Wed **First-Quarter Moon (10:31am)**
- 9 Fri Mercury is at greatest western elongation. Look for it low on the ENE horizon (Dawn)
- 9 Fri The Moon and Jupiter are about  $2^{\circ}$  apart (Evening)
- 11 Sun The Moon and Saturn are about  $3^{\circ}$  apart (Evening)
- 12-13 Mon The Perseids peak this night until dawn, but the nearly Full Moon washes out all but the brightest meteors
- 15 Thu **Full Moon (5:29am)**
- 23 Fri **Last-Quarter Moon (7:56am)**
- 24-25 Sat- The Moon is about  $2^{\circ}$  from Aldebaran on the morning of the 24th, and on the morning of the 25th it occults Zeta Tauri (Predawn; see S&T, August 2019, p. 50)
- 27 Tue The crescent Moon is about  $7^{\circ}$  from Pollux (Predawn)
- 28 Wed The crescent Moon is near M44, the Beehive Cluster (Dawn)

# NASA Night Sky Notes

## Observe the Moon and Beyond: Apollo 11 at 50

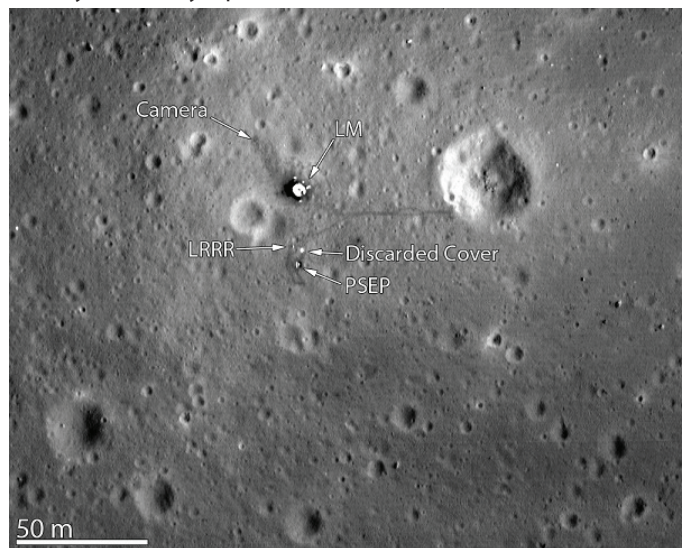
By David Prosper

Saturn is at opposition this month, beckoning to future explorers with its beautiful rings and varied, mysterious moons. The Moon prominently passes Saturn mid-month, just in time for the 50th anniversary of Apollo 11!

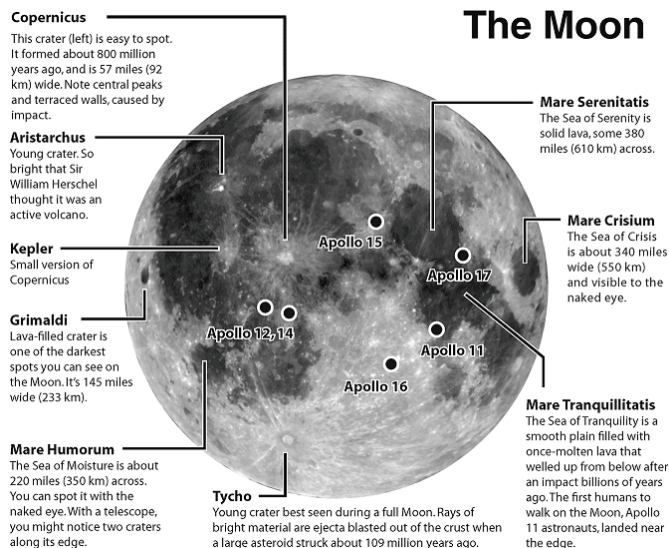


Saturn is in opposition on July 9, rising in the east as the Sun sets in the west. It is visible all night, hovering right above the teapot of Sagittarius. Saturn is not nearly as bright as Jupiter, next door in Scorpius, but both giant planets are easily the brightest objects in their constellations, making them easy to identify. A full Moon scrapes by the ringed planet late in the evening of the 15th through the early morning of the 16th. Some observers in South America will even see the Moon occult, or pass in front of, Saturn. Observe how fast the Moon moves in relation to Saturn throughout the night by recording their positions every half hour or so via sketches or photos.

celestial neighbor, a mission made possible by the tremendous power of the Saturn V rocket – still the most powerful rocket ever launched. Just a few days later, on July 20, 1969 at 10:56 pm EDT, Neil Armstrong and Buzz Aldrin set foot on the lunar surface and became the first people in history to walk on another world. The astronauts set up equipment including a solar wind sampler, laser ranging retroreflector, and seismometer, and gathered up almost 22 kilograms (48 pounds) of precious lunar rocks and soil samples. After spending less than a day on the Moon's surface, the duo blasted off and returned to the orbiting Columbia Command Module, piloted by Michael Collins. Just a few days later, on July 24, all three astronauts splashed down safely in the Pacific Ocean. You can follow the timeline of the Apollo 11 mission in greater detail at [bit.ly/TimelineApollo11](http://bit.ly/TimelineApollo11) and dig deep into mission history and science on NASA's Apollo History Site: [bit.ly/ApolloNASA](http://bit.ly/ApolloNASA).



Caption: Earth-based telescopes can't see any equipment left behind at the Apollo 11 landing site, but the cameras onboard NASA's Lunar Reconnaissance Orbiter (LRO) can. This is Tranquility Base as seen from the LRO, just 24 kilometers (15 miles) above the Moon's surface, with helpful labels added by the imaging team. Image Credit: NASA Goddard/Arizona State University. See more landing sites at: [bit.ly/ApolloLRO](http://bit.ly/ApolloLRO)



Caption: Observe the larger details on the Moon with help from this map, which also pinpoints the Apollo landing site. Full handout available at [bit.ly/MoonHandout](http://bit.ly/MoonHandout)

While observing the Saturn-Moon celestial dance the early morning of the 16th, you can also contemplate the 50th anniversary of the launch of the Apollo 11 mission! On June 16, 1969, Apollo 11 blasted off from Cape Canaveral in Florida on a journey of almost a quarter million miles to our nearest

Have you ever wanted to see the flag on the Moon left behind by the Apollo astronauts? While no telescope on Earth is powerful enough to see any items left behind the landing sites, you can discover how much you can observe with the Flag on the Moon handout: [bit.ly/MoonFlag](http://bit.ly/MoonFlag)

You can catch up on all of NASA's current and future missions at [nasa.gov](http://nasa.gov)

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](http://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 (\$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.

**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 ([www.trivalleystargazers.org/privacy.shtml](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.