

# PRIMEFOCUS

Tri-Valley Stargazers



April 2011



## Meeting Info

What:

New Views of the Sun

Who:

Prof. Phil Scherrer

When:

April 15, 2011

Doors open at 7:00 p.m.

Lecture at 7:30 p.m.

Where:

Unitarian Universalist

Church in Livermore

1893 N. Vasco Road

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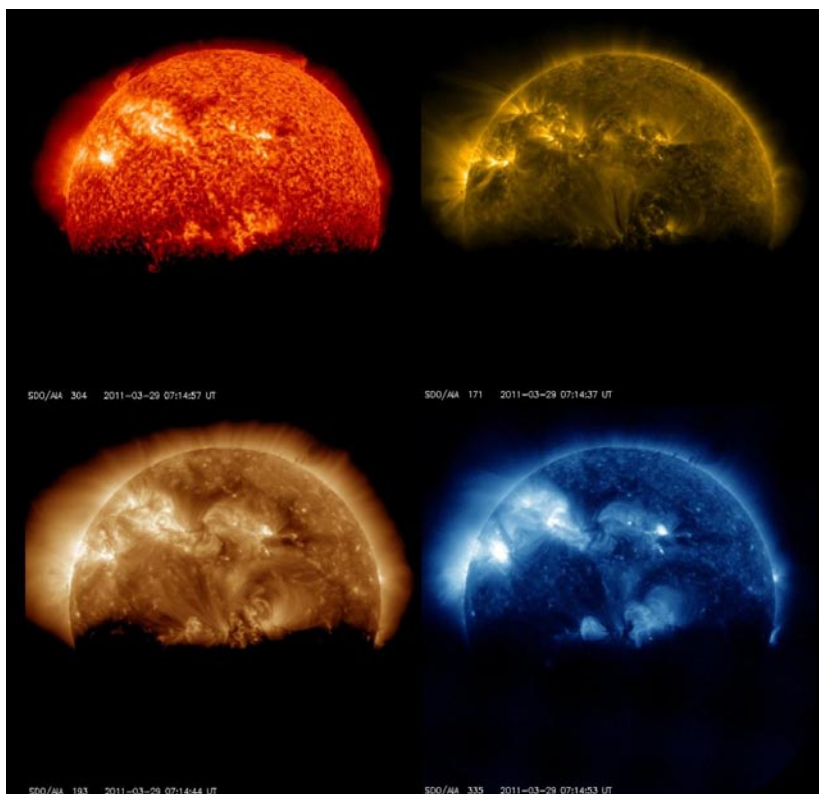
## April Meeting

An Update on the SDO (Solar Dynamics Observatory) Mission

Prof. Phil Scherrer

When last we heard from Prof. Phil Scherrer, the Solar Dynamics Observatory had just been launched. Come to this month's TVS meeting to hear the latest developments in solar research thanks to the high-resolution multi-spectral data returned by SDO. With the 11-year solar activity on the increase, SDO is poised to provide the data that will enable an improved understanding of sunspot activity, solar acoustical oscillations and convection. The results from SDO will potentially enable improved predictions of solar weather that affects the Earth's environment.

Phil Scherrer is a professor of physics at Stanford University. He is the Principal Investigator of SDO/HMI and SOHO/MDI, and fortunately for us he is also a long-time member of TVS! More information on the interests of his research group can be found at: <http://sun.stanford.edu/>



Caption: Images of the Sun taken at four different wavelength (304, 171, 193, and 335nm) by SDO on March 29, 2011. Image credit: NASA.

## News & Notes

### 2011 TVS Meeting Dates

The following lists the TVS meeting dates for 2011. 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
Apr. 15	Apr. 18	
May 20	May 23	Apr. 29
Jun. 17	Jun. 20	May 27
Jul. 15	Jul. 18	Jun. 24
Aug. 19	Aug. 22	Jul. 29
Sep. 16	Sep. 19	Aug. 26
Oct. 21	Oct. 24	Sep. 30
Nov. 18	Nov. 21	Oct. 28
Dec. 16	Dec. 19	Nov. 25

### Money Matters

Treasurer David Feindel indicates that as of February 12, 2011 the TVS account balances are:

Checking	\$5,823.09
CD #1	\$3,763.79 rolled over 2/17/2011
CD #2	\$2,656.35 rolled over 11/27/2010

### TVS Positions Available

We still need people to fill the positions of Vice-President and Secretary, and to serve on the Board of Directors. Please consider offering some of your time to influence the future direction of TVS. If you wish to help with any of these positions, please contact any officer or board member.

### San Jose Astronomical Association Auction

The SJJA Auction will be held April 17, 2011 from Noon to 5pm. The auction will be held at Houge Park, White Oaks Ave at Twilight Dr, San Jose, CA 95159-8243. Go to <http://www.sjaa.net/> for more information, including signing up for the auction Yahoo user's group. "This group is for posting items you will be offering at the San Jose Astronomical Association Auction/Swap. The SJAA auction is open to all. A 10% donation to the SJAA from the proceeds of sales is suggested, with a maximum \$50 cap. As a seller, you may set a reserve price that must be met before a sale will be recognized."

### H2O Open House Dates

On May 21 and July 23 TVS will hold Open House's to visit the club observing site, H2O. Our Open Houses are meant to give members a guided tour of the site, and an opportunity to observe under dark skies. You will have the opportunity to observe through the club's 17.5-inch equatorially mounted Newtonian telescope, housed in a permanent roll-off roof observatory.

Non-key holding members and the general public must be escorted to, while at, and from the site by key holding members -- NO EXCEPTIONS. For those members who have yet to check out the site, it is about an hour's drive south of Livermore, along a very windy road. It is a primitive site—no water or electricity, with a couple of outhouses. What it lacks in amenities, it makes up for in dark skies.

Those interested should meet at the corner of Mines Road and Tesla Road at 6:45 pm. The caravan will depart at 7:00. There is a \$3 per car fee at H2O, which is part of our rental agreement for the hilltop.

### TVS Yosemite Dates

TVS' annual public star party weekend at Glacier Point will take place on September 2-4, the Labor Day weekend. TVS puts on a star party both nights in exchange for free camping at the Bridalveil Campgrounds. The Moon is close to First-Quarter, setting between ~10:20pm and midnight during this weekend. The public star party ends at about midnight, and then the rest of night is yours to observe/image under the excellent dark skies of Yosemite National Park.

Those interested in participating should contact Dave Feindel at his email address listed in the office block on page 3.

## Calendar of Events

### April 13, Noon - 1:00 pm

What: Mars Odyssey measurements of radiation at Mars  
Who: Cary Zeitlin, SWRI  
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountainview  
Cost: Free

Space radiation poses significant risks to human explorers on extended missions beyond Low-Earth Orbit. Crews cannot be fully shielded against Galactic Cosmic Rays owing to their high energies, and sporadic but intense Solar Particle Events may also be hazardous when shielding is minimal. The physics underlying the transport of these particles through matter is reasonably well understood, but the biological response has large uncertainties. In this talk I will give an overview of these risks and describe NASA's ongoing program to mitigate them.

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

Header Image: SDO image of a huge solar prominence that occurred on December 6, 2010. See <http://sdo.gsfc.nasa.gov/gallery/hotshots.php> for more fantastic SDO image. Credit: NASA/SDO Mission.

## Calendar of Events (con'd)

### April 20, Noon - 1:00 pm

**What:** Origins of the giant planets, their regular satellites and rings: Latest findings and the way forward

**Who:** Ignacio Mosqueira, SETI Institute

**Where:** SETI Headquarters, 189 N. Bernardo Ave., Mountainview

**Cost:** Free

The formation of the regular satellites of giant planets mirrors in profound ways the physical processes leading to the formation of the parent planetary bodies and provides an independent probe of the early history of the solar system. Ongoing results from the Cassini spacecraft are radically changing this field. Dr. Mosqueira will briefly describe combined Jupiter-Saturn models of satellite formation in disks of dust and gas, emphasizing exchange mechanisms taking place between the solar nebula and the subnebulae of the giant planets. He will take us on a tour of the Kronian system starting with captured Phoebe, moving on to home-grown Iapetus, Hyperion and Titan and ending with the close-in moons and rings. Dr. Mosqueira will focus on the implications of Cassini observations for the origins of the rings, moons and planets of the solar system.

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

### April 21, 7:00pm

**What:** NASA Missions Update

**Who:** Eric Norris, NASA/JPL

**Where:** Milpitas Public Library, 160 N. Main Street, Milpitas, CA 95035

**Cost:** Free

NASA/JPL Solar System Ambassador Eric Norris will give a

popular multimedia presentation on NASA Missions to the Solar System, including updates on the Mars missions and the new Mars rover Curiosity being launched in 2011.

For more information call (408) 262-1171 ext. 3611 or email: [ltaber@library.sccgov.org](mailto:ltaber@library.sccgov.org)

### April 21, 7:00-8:30pm

**What:** A Scientist Looks at "Doomsday 2012" & The Rise of Cosmophobia

**Who:** David Morrison, Ph.D., NASA AMES

**Where:** Foothill College, Smithwick Theater, El Monte Road and Freeway 280, in Los Altos Hills, CA

**Cost:** Free, \$2 parking (bring change for meters)

Many people have heard the rumors through the media, on the Internet, seeing the big-budget movie, or from friends that the world will end in 2012--and that some astronomical event or alignment is to blame. According to some versions, this "doomsday" scenario was predicted by ancient civilizations and we are just waking up to "the truth." Is there scientific basis to these rumors? Dr. Morrison runs Ask an Astrobiologist, a Web site through which the public can ask NASA questions about life in the universe, and for the past two years he has found himself overwhelmed by questions on the "2012 doomsday" topic. He has now tracked down many of the stories that gave rise to a new fear of the heavens--what he calls "cosmophobia". At the April 21 lecture, he will discuss the scientific perspective on the chances that we won't be around after 2012. There are lessons here about the way a scientifically unsophisticated segment of the public can be manipulated by hoaxers out to make a buck by frightening people.

See: <http://www.foothill.edu/news/newsfmt>.

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#### **Officers**

##### **President:**

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##### **Vice-President:**

unfilled

##### **Treasurer:**

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##### **Secretary:**

unfilled

#### **Volunteer Positions**

##### **Librarian:**

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##### **Observatory Director/**

##### **Key Master:**

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#### **Historian:**

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#### **Mentor:**

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#### **Refreshment Coordinator:**

Laurie Grefsheim

#### **Web & E-mail**

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[tvs@trivalleystargazers.org](mailto:tvs@trivalleystargazers.org)

#### **Eyes on the Skies**

Eyes on the Skies is a robotic solar telescope run by Mike Rushford ([rushford@eyes-on-the-skies.org](mailto:rushford@eyes-on-the-skies.org)). You may access it by visiting [www.eyes-on-the-skies.org](http://www.eyes-on-the-skies.org).

#### **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 ([trivalleystargazers@gmail.com](mailto:trivalleystargazers@gmail.com)) 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 (continued)

php?words=astronomy for more information, or call (650) 949-7888.

### April 27, 7:30 pm

**What:** Microbes and the four basic strategies for life on Earth: What we can learn from what we know (and how to look for what we don't know)  
**Who:** Felisa Wolfe-Simon, USGS  
**Where:** SETI Headquarters, 189 N. Bernardo Ave., Mountainview  
**Cost:** Free

Life on Earth is metabolically diverse and yet maintains a biochemical unity. That is, all known biology is composed of essentially identical components such as DNA/RNA, proteins and lipids made of carbon, hydrogen, nitrogen, oxygen, sulfur and phosphorus; while the physiology of organisms can be highly varied. Interdisciplinary tools will be used to probe for variations of microbial metabolic flexibility and alternative biochemistry that may help us gain a deeper understanding of the life-we-do-know and suggest the possibilities to find or synthesize alternatives here on Earth or elsewhere in the Universe.

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

### May 4, Noon - 1:00 pm

**What:** Tracking and Mitigating Meteoroid Threats to Spacecraft  
**Who:** Sigrid Close, Aeronautics and Astronautics Department, Stanford University  
**Where:** SETI Headquarters, 189 N. Bernardo Ave., Mountainview  
**Cost:** Free

Whether residing in low-earth orbit or traveling through interplanetary space, spacecraft must shield against environmental threats that could result in minor to catastrophic failure. One such threat is an impact by a meteoroid, which is a natural object ranging from 62 microns to meters in diameter that could cause either mechanical or electrical damage. In this presentation, Dr. Close will discuss current research into meteoroid and meteoroid plasma physics and how these tiny particles may offer insight into the formation of life on Earth.

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

### May 7, 8:30pm

**What:** Tiny Moon Around Small Asteroids  
**Who:** Dr. Franck Marchis, SETI Institute  
**Where:** Mt. Tamalpais State Park, Cushing Memorial Amphitheater, more commonly known as the Mountain Theater, Rock Spring parking area

**Cost:** Free

No details of this presentation are available yet. Please see <http://www.mttam.net/astronomy/schedule.html> for the schedule of astronomy talks for this summer.

### May 12, Noon - 1:00 pm

**What:** Planetary Observations with the James Webb Space Telescope  
**Who:** Heidi B. Hammel, Space Science Institute  
**Where:** SETI Headquarters, 189 N. Bernardo Ave., Mountainview  
**Cost:** Free

No details of this talk are available. For more information see <http://www.seti.org/csc/lectures>, e-mail [info@seti.org](mailto:info@seti.org), or phone 650-961-6633.

### May 18, Noon - 1:00 pm

**What:** Construction on the 10,000 Year Clock Begins  
**Who:** Alexander Rose, Executive Director and Clock Project Manager, Long Now Foundation  
**Where:** SETI Headquarters, 189 N. Bernardo Ave., Mountainview  
**Cost:** Free

20 years ago computer scientist Danny Hillis thought up a monument scale slow moving mechanical clock to serve as an icon to long-term thinking. 10 years ago a first prototype was completed and put into the Science Museum of London. 5 years ago the full size clock project began design. A few months ago that project began construction. Project manager Alexander Rose will discuss the process and methods underway in the Clock of the Long Now.

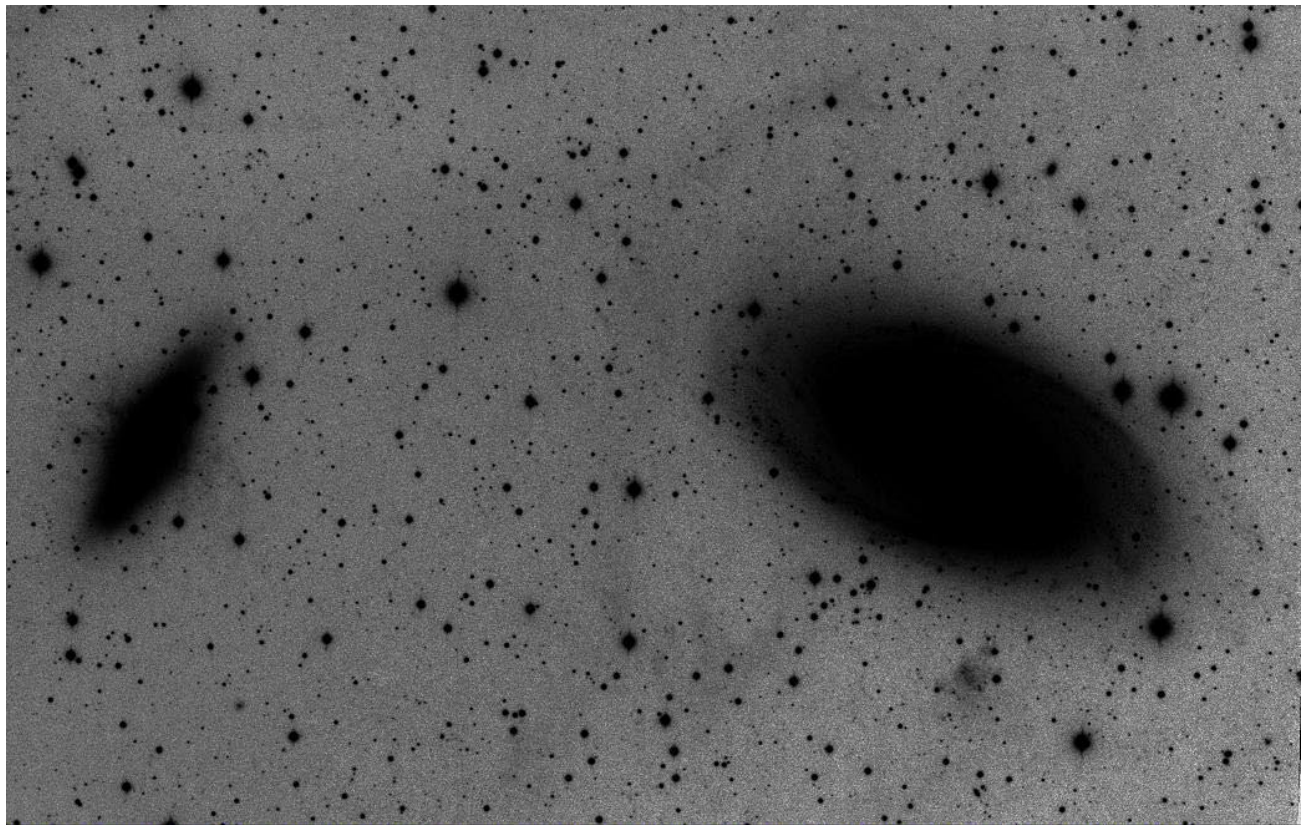
For more information see <http://www.seti.org/csc/lectures>, e-mail [info@seti.org](mailto:info@seti.org), or phone 650-961-6633.

Facing page (page 5): Gert Gottschalck obtained these images of M82 and M81 using exposures taken in March 2009 and April 2011. Gert used his 5-inch Astro-Physics refractor with a field flattener giving an f/6.3 focal ratio. The total exposure time was more than 7.5 hours. In the upper photo bipolar outflows are seen that indicate that M82 is a starburst galaxy. M81 and M82 are located about 12 million light years away from the Milky Way, and they are separated from each other by about 300,000 light years. In the lower image the contrast has been stretched to reveal a dust stream that lies above the plane of the Milky Way.





M82 / M81, 5" F6.3 APO & flattener, RGB 145:145:165min., ST10XME 1x1 -20C, March 2009 & April 2011, Gert Gottschalk



Galactic Cirrus & M82/M81, 5" F6.3 APO & flattener, 7:35hrs., ST10XME 1x1 -20C, March 2009 & April 2011, Gert Gottschalk

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

All times Pacific Daylight Time, unless otherwise noted.

### April

- 11 Mon First-Quarter Moon (5:05am)
- 16 Sat Moon is to the lower right of Saturn
- 17 Sun Full Moon (7:44pm) is below Spica
- 21-22 Thur- Lyrid Meteor Shower
- 22 Fri Venus about 1 degree south of Uranus
- 24 Sun Last-Quarter Moon (7:47pm)
- 27 Wed Neptune about 6 degrees south of Moon
- 30 Sat 4 planets grouped to below and left of crescent Moon (Pre-dawn)

### May

- 2 Mon New Moon (11:51pm)
- 5-6 Thur- Eta Aquarid Meteor Shower
- 7 Sat Mercury at greatest elongation (27 degrees W; Pre-dawn)
- 10 Tue First-Quarter Moon (1:33pm)
- 17 Mon Full Moon (4:09am)



## GOES-R, Zombie Fighter

By Dr. Tony Phillips

On April 5, 2010, something eerie happened to the Galaxy 15 telecommunications satellite: It turned into a zombie.

The day began as usual, with industry-owned Galaxy 15 relaying TV signals to millions of viewers in North America, when suddenly the geosynchronous satellite stopped taking commands from Earth. It was brain dead! Like any good zombie, however, its body continued to function. Within days, Galaxy 15 began to meander among other satellites in geosynchronous orbit, transmitting its own signal on top of the others'. Satellite operators scrambled to deal with the interference, all the while wondering what happened?

In horror movies, zombies are usually produced by viruses.

"In this case, the culprit was probably the sun," says Bill Denig of the National Geophysical Data Center in Boulder, Colorado. He and colleague Janet Green of NOAA's Space Weather Prediction Center recently led a study of the Galaxy 15 anomaly, and here are their conclusions:

On April 3rd, a relatively minor solar flare launched a cloud of plasma toward Earth. Galaxy 15 had experienced many such events before, but this time there was a difference.

"Galaxy 15 was just emerging from the shadow of Earth when the cloud arrived and triggered a geomagnetic storm," explains Denig. Suddenly exposed to sunlight and the ongoing storm, "the spacecraft began to heat up and charge [up]."

Electrons swirling around Galaxy 15 stuck to and penetrated the spacecraft's surface. As more and more charged particles accumulated, voltages began to rise, and—zap!—an electrostatic discharge occurred. A zombie was born.

"At least, this is what we suspect happened based on data collected by GOES satellites in the vicinity," he says. "We'll be able to diagnose events like this much better, however, after GOES-R is launched by NASA in 2015."

GOES-R is NOAA's next-generation Geostationary Operational Environmental Satellite. One of the instruments it will carry, a low-energy electron counter, is crucial to "zombie fighting." Low energy-electrons are the ones most likely to stick to a spacecraft's surface and cause brain-frying discharges. By monitoring these particles in Earth orbit, GOES-R will provide better post-mortems for future zombie outbreaks. This could help satellite designers figure out how to build spacecraft less susceptible to discharges. Also, GOES-R will be able to issue alerts when dangerous electrons appear. Satellite operators could then take protective action—for example, putting their birds in "safe mode"—to keep the zombie population at bay.

Meanwhile, Galaxy 15 is a zombie no more. In late December

2010, after 9 months of terrorizing nearby spacecraft, the comsat was re-booted, and began responding to commands from Earth again.

All's well that ends well? True zombie fighters know better than to relax. Says Denig, "we're looking forward to GOES-R."

You and the kids in your life can learn about space weather at <http://scijinks.gov/space-weather-and-us>.

This article was provided courtesy of the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



Caption: Artist's rendering: The Galaxy 15 communication satellite was "brainless" for several months in 2010 after being exposed to a geomagnetic storm. The new GOES-R satellite will warn of such dangers.

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



## PRIMEFOCUS

### Tri-Valley Stargazers Membership Application

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.

Name \_\_\_\_\_ Phone \_\_\_\_\_ e-mail \_\_\_\_\_

Address \_\_\_\_\_

Do not release my: \_\_\_\_\_ address, \_\_\_\_\_ phone, or \_\_\_\_\_ e-mail information to other TVS members.

- Membership category:
- \_\_\_\_\_ \$5 Student.
  - \_\_\_\_\_ \$30 Basic. You will receive e-mail notification when the PDF version of Prime Focus is available for download off the TVS web site.
  - \_\_\_\_\_ \$10 Hidden Hill Observatory (H2O) yearly access fee. You need to be a key holder to access the site.
  - \_\_\_\_\_ \$20 H2O key holder fee. (A refundable key deposit—key property of TVS).
  - \_\_\_\_\_ \$40 Patron Membership. Must be a member for at least a year and a key holder.
  - \_\_\_\_\_ \$34 One year subscription to Astronomy magazine.
  - \_\_\_\_\_ \$60 Two year subscription to Astronomy magazine.
  - \_\_\_\_\_ \$32.95 One year subscription to Sky & Telescope magazine. Note: Subscription to S&T is for new subscribers only. Existing subscribers please renew directly through S&T.
  - \$ \_\_\_\_\_ Tax deductible contribution to Tri-Valley Stargazers.
  - \$ \_\_\_\_\_ TOTAL – Return to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551

Membership information: Term is one calendar year, January through December. Student members must be less than 18 years old or still in high school.