

PRIMEFOCUS

Tri-Valley Stargazers



December 2016



Meeting Info

What:

Holiday Potluck Dinner

Who:

You, Family, and Friends

When:

December 16, 2016
Doors open 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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December Meeting

Holiday Potluck Dinner

This month is our Holiday dinner. The doors will be opened at 6:30 to set up the tables and chairs, and then the feast will begin at 7pm. TVS will provide the drinks and paper/plasticware. Jill Evanko will prepare the main course that will consist of turkey, tri-tip roast, stuffing, and mash potatoes. Members are asked to bring a side dish 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 Appetizers; K-O Dessert; P-Z Macaroni or Potato Salad.

President's Letter 2017

Welcome to a new year with a new President. TVS President that is! First off, a big congratulation to Chuck Grant on his new title, Past President. Chuck has been guiding TVS for the past 10 or more years, and if it wasn't for his perseverance, we wouldn't be 100+ members and growing today. Chuck is staying on as Observatory Director, and helping the board as past president. When you see him don't forget to say Thanks!

Things have changed since I was TVS president about 20 years ago, but one thing is still the same. For the club to be vibrant, we need member participation. A few examples include: Eric Dueltgen, our outreach coordinator (and new vice-president), has done a fantastic job lining up opportunities for us to reach out to the public at a variety of venues. Our recent star party at the Livermore Library with over 150 people is just one example. It was however the participation of a large number of TVS volunteers that made it a success. We have volunteers that coordinate the Yosemite Star Party, help with refreshments, create our newsletter, husband the website, and line up speakers for our general meeting, to name just a few of the volunteer positions.

In the coming year we plan to increase our publicity, continue our loaner scope and library programs, participate in state-wide star parties, and perhaps delve into amateur telescope making once again. All the above activities can only succeed if the members are willing to pick up some slack, and pull with the other volunteers. There is a great deal of truth in the statement that the best way to benefit from an organization is to put into it. Whether you are just starting in astronomy, are delving into astrophotography, or just want to get to know the other members of TVS, I encourage you to volunteer for any of the positions. And it's ok to be an "assistant" doer of something, it is a great way to learn. So contact a board member at a general meeting, and join in the excitement.

This coming year will be a great one for amateur astronomy, in particular the flurry of preparation has already begun for the total solar eclipse in August. We have outreach and club starparties, Yosemite, White Mountain, and many other observing and public education opportunities. I look forward to seeing you in the dark. Rich Combs, President, Tri-Valley Stargazers

News & Notes

2016/2017 TVS Meeting Dates

The following lists the TVS meeting dates for 2016 and 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
Dec. 16	Dec. 19	
Jan. 20	Jan. 23	Dec. 30
Feb. 17	Feb. 20	Jan. 27
Mar. 17	Mar. 20	Feb. 24
Apr. 21	Apr. 24	Mar. 31
May 19	May 22	Apr. 28
Jun. 16	Jun. 19	May 26
Jul. 21	Jul. 24	Jun. 30
Aug. 18	Aug. 21	Jul. 28
Sep. 15	Sep. 18	Aug. 25
Oct. 20	Oct. 23	Sep. 29
Nov. 17	Nov. 20	Oct. 27
Dec. 15	Dec. 18	Nov. 24

TVS Board

The 2017 TVS Board will have 7 members: Rich Combs, President; Eric Dueltgen, Vice President; Roland Albers, Treasurer; Joy Milsom, Secretary; Chuck Grant, Immediate Past President; and two At Large Members.

Money Matters

As of the last Treasurer's Report on 11/21/16, our club's checking account balance is \$13,877.41. This includes \$1300.00 realized from the sale of the Stultz 6-inch Newtonian and G11S mount at last month's SJAA Swap Meet!

The club now has 102 paid members (over 100 for the first time since 2004)! In total there are 109 members: 7 lifetime, 3 Patron, 97 regular, and 2 student.

Dues are Due

TVS membership is open to anyone with an interest in astronomy. Amateurs and professionals are equally welcome; skilled amateurs comprise the majority of the membership. You do not have to own a telescope in order to be a member. The term of membership is one calendar year - January through December. Note: As an option, Patron Membership, which grants use of the club's 17.5" reflector at H2O, is available at the annual rate of \$100.00.

You can join TVS or renew your membership online at:

<http://www.trivalleystargazers.org/membership.shtml> After filling out the application form you are connected to the PayPal payment form. You do not need to have a PayPal account to pay online, since PayPal will accept credit cards. Everyone is encouraged to use the online application.

Alternatively, you can mail in the Membership Application on the last page of this newsletter along with a check to the Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551-2476. Note that TVS will not share your information with anyone. We only use the e-mail address to notify you when the newsletter becomes available.

All members agree to hold the 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.

Outreach Star Party: Request for Assistance

Eric Dueltgen is looking for volunteers to bring telescopes and/or binoculars to the following Outreach Star Parties:

Wednesday, December 14 at Dougherty School, 5301 Hibernia Drive, Dublin. Set up 5:30, star party 6:00 to 7:30

Wednesday, December 21 at Marylin Avenue School, 800 Marylin Avenue, Livermore. Set up at 6:00, star party 6:30 to 8:00

Mentoring

TVS will purchase 6 copies of the Astronomical League *Universe Sampler* books and sell them to any interested club members at cost at general meetings. The *Universe Sampler* is an ideal starting point, being a learn by doing project (no telescope needed) that takes one year to complete. If you submit your observations following the Astronomical League Program rules you will receive a certificate and pin. For more information see: <https://www.astroleague.org/al/obsclubs/univsamp/univsamp.html>

TVS will also purchase 2 copies of *Nightwatch* by Terence Dickinson, that will be lent out to club members.

Calendar of Events

Daily

What: One Giant Leap: A Moon Odyssey
Who: Chabot Exhibit
Where: Chabot Space and Science Center, 10000 Skyline Blvd., Oakland, CA 94619
Cost: Chabot Admission \$18 Adults, \$14 Youth, \$15 Seniors, Free for Members

Want to GET BEHIND THE CONTROLS of the original space roadster (a Mercury space capsule), see just how much rocket it took to put three men on the Moon and TRY YOUR HAND

Header Image: TVS President Chuck Grant (center) posing with the telescope that Clyde Tombaugh used to discover Pluto at Lowell Observatory. Image Credit: Gert Gottschalk

Calendar of Events (continued)

AT LANDING there just as it was done the first time? You must be at least this tall to go on this ride...

And what a ride it was! Neil Armstrong admitted to taking a tiny step as a man, but acknowledged that for humankind together, it was a huge advance.

We didn't just go to the Moon, we brought some of it back to Earth - Chabot has a piece of it! - A MOON ROCK FROM THE APOLLO 15 MISSION, 3.3 billion years old and still looking like it did when it was born.

See <http://www.chabotspace.org/exhibits.htm> for more information, or call (510) 336-7373.

December 13, 12:00pm

What: Unlocking the Secrets of Nearby Exoplanets with the TESS Mission
Who: George Ricker, MIT
Where: SETI Institute Colloquium, Microsoft Silicon Valley Campus (Galileo Room), 1065 La Avenida St., Mountain View, CA
Cost: Free

The Transiting Exoplanet Survey Satellite (TESS) will discover thousands of exoplanets in orbit around the brightest stars in the sky. In its two-year prime survey mission, TESS will monitor more than 200,000 bright stars in the solar neighborhood for temporary drops in brightness caused by planetary transits. This first-ever spaceborne all-sky transit survey will identify planets ranging from Earth-sized to gas giants, around a wide range of stellar types and orbital distances.

TESS stars will typically be 30-100 times brighter than those surveyed by the Kepler satellite; thus, TESS planets will be far easier to characterize with follow-up observations. For the first time it will be possible to study the masses, sizes, densi-

ties, orbits, and atmospheres of a large cohort of small planets, including a sample of rocky worlds in the habitable zones of their host stars.

An additional data product from the TESS mission will be full frame images (FFI) with a cadence of 30 minutes. These FFI will provide precise photometric information for every object within the 2300 square degree instantaneous field of view of the TESS cameras. These objects will include more than 1 million stars and bright galaxies observed during sessions of several weeks. In total, more than 30 million objects brighter than magnitude $I=16$ will be precisely photometered during the two-year prime mission.

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

December 17, 11:00am

What: Cosmic Microwave Background
Who: Adrian Lee,
Where: UC Berkeley, Genetics and Plant Biology Building, Room 100 (northwest corner of campus)
Cost: Free, limited hourly pay parking on/nearby campus. The venue is within walking distance of BART and bus lines.

No details available.

For more information see: <http://scienceatcal.berkeley.edu/the-sciencecal-lecture-series/>

December 17, 4:45-9:45pm

What: Astrolmaging Workshop
Who: San Jose Astronomical Association
Where: Coyote Valley Open Space Preserve (Secret Spring Entrance; past the paved lot, halfway down the gravel lot, facing 101), 550 Palm Ave, San Jose, CA

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Officers

President:
Rich Combs
president@trivalleystargazers.org

Vice-President:
Eric Dueltgen
vice_president@trivalleystargazers.org

Treasurer:
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treasurer@trivalleystargazers.org

Secretary:
Joy Milsom
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Volunteer Positions

Astronomical League Representative:
Dennis Beckley
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Club Star Party Coordinator:
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Refreshment Coordinator:
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Webmaster:
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Web & E-mail

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info@trivalleystargazers.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 (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 (continued)

Cost: Free

NOTE: YOU MUST ARRIVE BEFORE SUNSET!!!

SJAA is proud to sponsor this outdoor workshop where we help those folks who are interested in learning about the mechanics of AstroPhotography and Imaging.

Bring your questions, and/or your Canon or Nikon DSLR to connect to a working rig, and/or your complete astrophotography rig (battery powered).

For more information see: <https://www.meetup.com/SJ-Astronomy/events/225111455/>

December 20, 12:00pm

What: Sustainable Energy Now and in a Livable Future
Who: Dan Kammen, UC Berkeley
Where: SETI Institute Colloquium, Microsoft Silicon Valley Campus (Galileo Room), 1065 La Avenida St., Mountain View, CA
Cost: Free

It has been scientifically clear for some time that the global community must decarbonize the energy and material system entirely by mid-century. In additional recent energy future scenarios have highlighted the pathways to reach this dramatic decarbonization objective on household to village to national and regional levels. The short -- few decade -- time needed for this transition demands a rapid scale-up on current and near-term technologies, while the long-term complete energy sector transition opens the door for an innovation and industrial transformation program. In this talk both the near- and long-term energy vision will be explored in the context of a clean energy economy, and the social and equity implications.

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

January 10, 12:00pm

What: The Late Veneer and Earth's habitability
Who: Norm Sleep, Stanford University
Where: SETI Institute Colloquium, Microsoft Silicon Valley Campus (Galileo Room), 1065 La Avenida St., Mountain View, CA
Cost: Free

No details available.

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

January 9, 7:30pm

What: Earth in Human Hands: A Cosmic View of our Planet's Past, Present and Future

Who: David Grinspoon, Planetary Science Institute
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.

What are we doing here on this planet? Can a deep-time and deep-space viewpoint help us gain the perspective to create a sustainable civilization? Informed by comparative planetology and a survey of the major transitions in Earth history, David Grinspoon will describe a taxonomy of planetary catastrophes meant to illuminate the unusual nature of the "Anthropocene," our current time of human-driven planetary changes, and reframe our environmental predicaments as part of a larger narrative of planetary evolution. This saga has now reached the pivotal moment when humans have become a major agent of global change, and geological and human history are becoming irreversibly conjoined. Is this a likely or even inevitable challenge facing other complex life in the universe? Possible implications for SETI (the search for extraterrestrial intelligence) will be considered, as well as the choices our civilization faces in seeking to foster a wisely managed Earth.

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

Member Astrophotos



Hilary Jones imaged IC 5146, the Cocoon Nebula, over the course of two nights (October 5th and 6th). The total imaging time was just under ten hours (300:100:95:100 minutes respectively for LRGB). This object is also known as Caldwell 19 and Collinder 470. It is located about 4000 light years away in the constellation Cygnus.



Gert Gottschalk imaged the Supermoon at 22:58 on November 13, 2016 using a 130mm f/6.5 APO with a 1.4x teleconverter, a Canon 600D at 1/500 sec using ISO-100. As the Full Moon was still 7 hours in the future, there is some nice relief and shadowing of craters on the northeast of the disk. For more of his images and his movie of the rising Supermoon see: http://www.trivalleystargazers.org/gert/moon_2016/moon_2016.html

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

All times are Pacific Standard Time.

December

- 12 Mon The dark limb of the Moon occults Aldebaran beginning at ~7:06pm, reappearing at ~8:05pm
- 13-14 Tue- The Geminid meteor shower peaks on the evening of December 13, but the Moon will wash out all but the brightest meteors
- 13 Tue Full Moon (4:05pm)
- 18 Sun Algol at minimum brightness for 2 hours centered at 7:46pm
- 20 Tue Last-Quarter Moon (5:56pm)
- 21 Wed Algol at minimum brightness for 2 hours centered at 7:35pm
- 22 Thu The crescent Moon, Jupiter, and Spica form a line about 9 degrees long in the southeast (~3am)
- 28 Wed New Moon (10:53pm)

January

- 1 Sun Crescent Moon 5 degrees to the lower-right of Venus. Mars 12 degrees to the upper-left of Venus (Evening)
- 5 Thu First-Quarter Moon (11:47am)
- 8-10 Sun- Mercury and Saturn ~7 degrees apart, low in the southeast (Dawn)
- 10 Tue Algol at minimum brightness for 2 hours centered at 6:19pm
- 12 Thu Full Moon (3:34am)
- 14 Sat The Moon shines near Regulus, with their separation increasing throughout the night
- 19 Thu Last-Quarter Moon (2:13pm)
- 19 Thu The Moon, Jupiter, and Spica form a compact triangle in southeast (Predawn)
- 24 Tue Thin crescent Moon ~3 degrees to the upper-left of Saturn in the southeast (Dawn)
- 25 Wed Use binoculars to see the thin crescent Moon, with Mercury ~ 5 degrees below (Dawn)



Ken Sperber took a series of images of the Supermoon on November 14, 2016 as it rose behind the hills of Camp Parks in Dublin, CA. He used a Canon 6D at 1/60 sec using ISO-400 and a Tamron zoom lens set to 329mm at f/10 (left). Waiting until after the Moon had moved well out of the field of view, a 4 second exposure was taken to better highlight the towers and the foreground leaves (right). The stacking of the individual component images was performed in PhotoShop CS3 with a routine normally used to create star trails.

Dimming Stars, Erupting Plasma, and Beautiful Nebulae

By Marcus Woo

Boasting intricate patterns and translucent colors, planetary nebulae are among the most beautiful sights in the universe. How they got their shapes is complicated, but astronomers think they've solved part of the mystery—with giant blobs of plasma shooting through space at half a million miles per hour.



Planetary nebulae are shells of gas and dust blown off from a dying, giant star. Most nebulae aren't spherical, but can have multiple lobes extending from opposite sides—possibly generated by powerful jets erupting from the star.

Using the Hubble Space Telescope, astronomers discovered blobs of plasma that could form some of these lobes. "We're quite excited about this," says Raghvendra Sahai, an astronomer at NASA's Jet Propulsion Laboratory. "Nobody has really been able to come up with a good argument for why we have multipolar nebulae."

Sahai and his team discovered blobs launching from a red giant star 1,200 light years away, called V Hydrae. The plasma is 17,000 degrees Fahrenheit and spans 40 astronomical units—roughly the distance between the sun and Pluto. The blobs don't erupt continuously, but once every 8.5 years.

The launching pad of these blobs, the researchers propose, is a smaller, unseen star orbiting V Hydrae. The highly elliptical orbit brings the companion star through the outer layers of the red giant at closest approach. The companion's gravity pulls plasma from the red giant. The material settles into a disk as it spirals into the companion star, whose magnetic field channels the plasma out from its poles, hurling it into space. This happens once per orbit—every 8.5 years—at closest approach.

When the red giant exhausts its fuel, it will shrink and get very hot, producing ultraviolet radiation that will excite the shell of gas blown off from it in the past. This shell, with cavities carved in it by the cannon-balls that continue to be launched every 8.5 years, will thus become visible as a beautiful bipolar or multipolar planetary nebula.

The astronomers also discovered that the companion's disk appears to wobble, flinging the cannonballs in one direction

during one orbit, and a slightly different one in the next. As a result, every other orbit, the flying blobs block starlight from the red giant, which explains why V Hydrae dims every 17 years. For decades, amateur astronomers have been monitoring this variability, making V Hydrae one of the most well-studied stars.

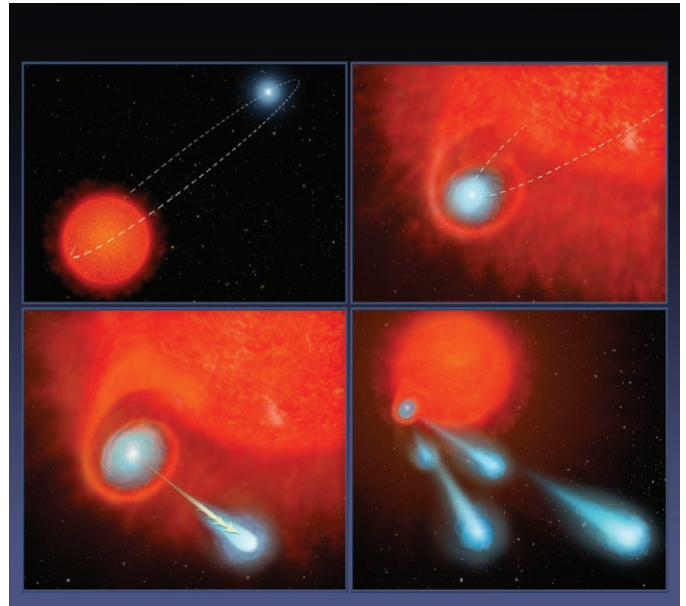


Image caption: This four-panel graphic illustrates how the binary-star system V Hydrae is launching balls of plasma into space. Image credit: NASA/ESA/STScI.

If you'd like to teach kids about how our sun compares to other stars, please visit the NASA Space Place: <http://spaceplace.nasa.gov/sun-compare/en/>

This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!



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.