

PRIMEFOCUS

Tri-Valley Stargazers



January 2015



Meeting Info

What:

The Search for ET

Who:

Dr. Seth Shostak, Senior Astronomer and Director, Center for SETI Research

When:

January 16, 2015
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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January Meeting

The Search for ET

Dr. Seth Shostak

It's been more than a half-century since the first SETI experiment – a short effort to eavesdrop on radio signals that might be coming from two nearby star systems. Despite this work, we still haven't heard any confirmed signals suggesting that someone is out there. So what are the current thoughts on why this work has failed to turn up the aliens, and where is it going next? Also ... what would happen if scientists actually picked up a broadcast from another world?



Image Caption: The Westerbork Synthesis Radio Telescope is located in The Netherlands. It consists of fourteen 25 meter diameter, 4 of which can be moved on rails. It measures wavelengths of 3.6cm to 2.5m. Image Credit: Chris Sciacca (IBM; see www.astron.nl/about-astron/press-public/pictures/pictures#Pictures_WSRT)

Seth is the Senior Astronomer at the SETI Institute, in Mountain View, California. For much of his career, Seth conducted radio astronomy research on galaxies, including studies conducted using the Westerbork Synthesis Radio Telescope.

Seth developed an interest in extraterrestrial life at the tender age of ten, when he first picked up a book about the solar system. Seth is an enthusiastic participant in the Institute's SETI observing programs. He also heads the International Academy of Astronautics' SETI Permanent Committee. In addition, Seth is keen on outreach activities in science in general, and astrobiology in particular. Seth has written, edited and contributed to a half dozen books, most recently *Confessions of an Alien Hunter: A Scientist's Search for Extraterrestrial Intelligence*, and has published over 400 articles on astronomy and other topics. He hosts the SETI Institute's weekly science radio show, "Big Picture Science." For more information see: <http://www.seti.org/>

News & Notes

2015 TVS Meeting Dates

The following lists the TVS meeting dates for 2015. 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
Jan. 16	Jan. 19	
Feb. 20	Feb. 23	Jan. 30
Mar. 20	Mar. 23	Feb. 27
Apr. 17	Apr. 20	Mar. 27
May 15	May 18	Apr. 24
Jun. 19	Jun. 22	May 29
Jul. 17	Jul. 20	Jun. 26
Aug. 21	Aug. 24	Jul. 31
Sep. 18	Sep. 21	Aug. 28
Oct. 16	Oct. 19	Sep. 25
Nov. 20	Nov. 23	Oct. 30
Dec. 18	Dec. 21	Nov. 27

Money Matters

Treasurer Roland Albers indicates that as of January 6, 2015 the TVS checking account balance is: \$13,652.75. The board reports that the club is in excellent shape financially, and it is now considering using some of our savings for purchasing new telescopes for our outreach and loaner telescope programs (such as an H-alpha solar scope) and for making repairs on the club's observatory equipment. Suggestions and inputs from club members are always welcome and can be sent to Roland.

New Volunteer Position: Publicity Coordinator

The TVS Board has appointed Andy Coutant as the club's new Publicity Coordinator, responsible for getting club meetings and events advertised through the local media. He will also be helping Jill as needed with her secretarial duties. Please welcome Andy to the TVS leadership team!

2015 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.

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.

Speakers, Speakers, Speakers

In case you haven't noticed, the Stargazers has a new Program Coordinator-me! I'm Rich Combs, a longtime member of the club, jumping back into the fray. Being the lazy sort, I'd like to put a little of the burden for the programs on the shoulders of all the members of the club. I would appreciate hearing about any presentations you might have attended outside our club. Also let me know if there is a topic that you want to hear more about. I do have a list of likely candidates for speakers, and will attempt to cater to our members interests as much as possible.

You can contact me through the TVS website, at meetings, or at: programs@trivalleystargazers.org And don't forget to consider stepping up yourself for a little show and tell. How about that neat gadget or book you got for Christmas? We also are looking for volunteers for a short "What's Up" segment to be part of the regular meetings. This would be a brief review of objects of interest in a currently visible constellation. Weather permitting, after the meeting we can go outside and check out a few of the objects, naked eye or with scopes. A great way for the presenter, and the members, to gain a bit more familiarity with the night sky. I look forward to hearing from you. ...Rich Combs

Everyone Loves a Parade

If any of you attended the Christmas parade and tree lighting this year in downtown Livermore you know it was an amazing event. The streets were packed, and the parade had everything from marching bands, dance clubs, scout troops, politicians, and of course Santa Claus. It is a great opportunity to strut your stuff if you are a local organization. With only 11 months until Christmas, TVS is planning to have a float in the parade this coming year. The main ingredient is a flatbed truck, or flatbed trailer with a towing vehicle. A string of lights, some garlands, a few scopes, and "When You Wish Upon A Star" playing in the background, and we are in business. If you have, or know of someone willing to loan the flatbed truck or trailer please let a club officer know, and we'll see you in December. A link to the 2014 parade is <http://liver>

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Header Image: This is a four-image mosaic of Comet 67P/Churyumov-Gerasimenko taken on 3 January by the Rosetta spacecraft. The image resolution is 2.4 m/pixel and the mosaic measures 4.4 x 4.2 km. Credit: ESA/Rosetta/NAVCAM - CC BY-SA IGO 3.0.

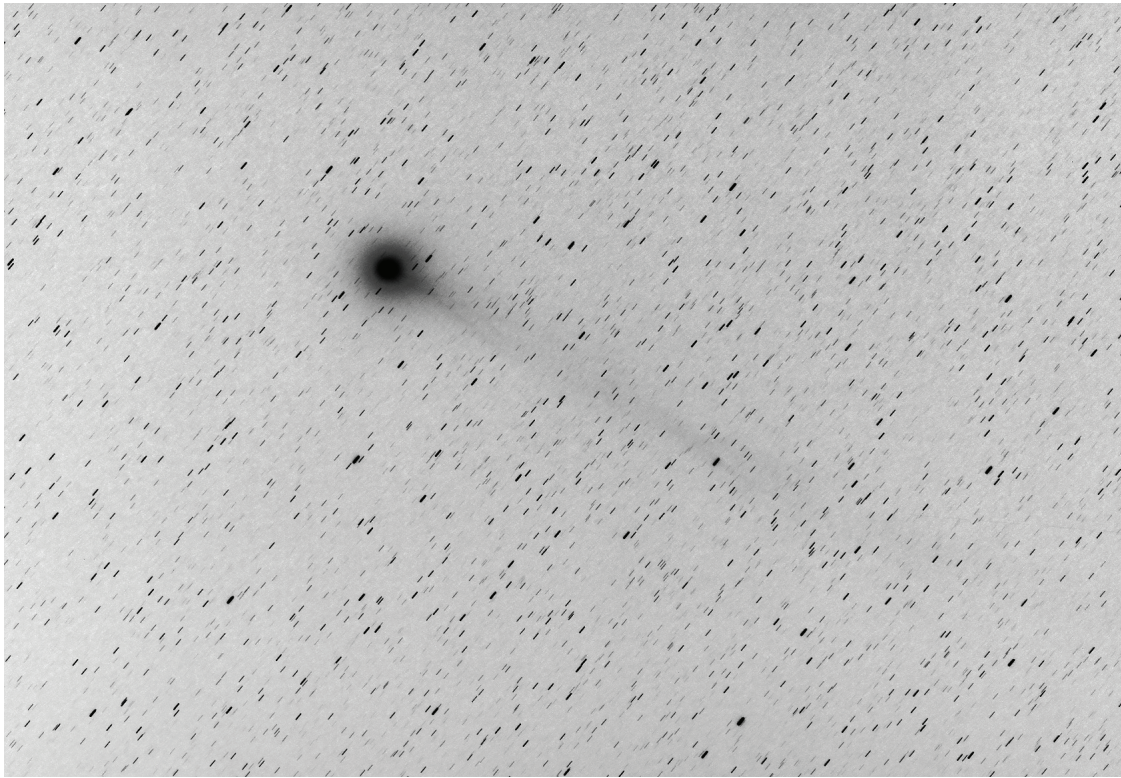


Image Caption: Roland Albers took this photo of Comet Lovejoy on January 8. The photo is the result of combining fifteen 60-second exposures at f/3.5 with a Canon T3i DSLR and a 200mm lens. He processed it with DeepSkyStacker and Photoshop. Roland indicates that the tail is much more visible compared to an image he took on New Year's night, when the bright moonlight washed out the tail

more.localplacement.net/sights-sounds-parade-video/2014/
Volunteers, elves, etc., welcome!

Cost: Free

The Giant Impact theory is the leading explanation for the Moon's origin, but mysteries remain in the conditions leading up to the event. Collisions were common during the turbulent infancy of the Solar System and led to a small set of terrestrial planets. Dr. Quarles presents a numerical model that considers the penultimate orbits of the Solar System, when five terrestrial planets are present. From this model, he indicates which starting parameters for Theia (the proto-Moon) result in a late Giant Impact consistent with physical dating constraints. He also finds that the likely semimajor axis of

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Calendar of Events

January 13, 12:00pm

What: Theia's Date With Destiny: Possible Conditions Leading to a Giant Impact
Who: Billy Quarles, NASA Ames
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountain View, CA

Officers

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webmaster@trivalleystargazers.org

Web & E-mail

www.trivalleystargazers.org
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)

Theia, at the epoch when the simulations begin, depends on the assumed mass ratio of the Earth-Moon progenitors (8/1, 4/1, or 1/1). The low eccentricities of the resulting terrestrial planets are most commonly produced when the progenitors have similar semimajor axes at the epoch when the model starts. Additionally, Dr. Quarles will show that perturbations from the giant planets can affect the dynamical evolution of the system leading to a late Moon Forming Giant Impact.

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

January 20, 12:00pm

What: A New Model for the Origin of Life: Coupled Phases and Combinatorial Selection in Fluctuating Hydrothermal Pools

Who: Bruce Damer and Dave Deamer, UC Santa Cruz

Where: SETI Headquarters, 189 N. Bernardo Ave., Mountain View, CA

Cost: Free

Hydrothermal fields on the prebiotic Earth are candidate environments for biogenesis. We propose a model in which molecular systems driven by cycles of hydration and dehydration in such sites undergo chemical evolution and selection in a dehydrated surface phase followed by encapsulation and combinatorial selection in a hydrated phase. This model is partly supported by recent science, and lies partly in the realm of speculation including a hypothesized pathway for the parallel evolution of the functional machinery of life. Complex models like this present challenges for science in the 21st century and we will describe a new technology to enable the simulation of such models.

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

January 23, January 30, 5:00pm

What: Night Hike

Who: You

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

Cost: \$12; Space limited: Reservations: (510) 336-7373

Enjoy a hike through the beautiful redwoods! After the hike, stay and explore other amazing objects in the night sky through our telescopes (weather permitting) or tour the Telescope Makers Workshop. Hike will take place rain or shine.

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

January 27, 12:00pm

What: The Surprising State of the Earth after the Moon-Forming Giant Impact

Who: Sarah Stewart, UC Davis

Where: SETI Headquarters, 189 N. Bernardo Ave., Mountain View, CA

Cost: Free

Abstract pending.

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

January 28, 7:00pm

What: Pluto on the Horizon: Anticipating Our First Encounter with the Double Planet

Who: Dr. Mark Showalter, SETI Institute

Where: Smithwick Theatre, 12345 El Monte Road, Los Altos Hills, CA 94022

Cost: Free, \$3 parking (\$1 dollar bills or coin required)

The more we learn about Pluto, the more interesting it becomes. In the last decade, four tiny moons have been discovered orbiting the central "binary planet," which consists of Pluto and its large moon Charon. Pluto itself has a thin atmosphere and shows signs of seasonal changes. Tantalizing evidence suggests that Charon may have volcanoes. However, even in our most powerful telescopes, Pluto and its moons are just dots in the sky. All of that will change on July 14, 2015, when NASA's New Horizons spacecraft flies past Pluto and provides our first close-up look at these distant worlds. In this free, illustrated public lecture, Dr. Showalter, a co-investigator on the New Horizons mission, will describe how he discovered two of the moons of Pluto and will set the scene for the exploration that is in store.

For more information see: http://www.foothill.edu/news/newsfmt.php?sr=2&rec_id=3359 or phone 650-949-7888.

January 30, 10:00am

What: \$5 Fridays

Who: You

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

Cost: \$5; Reservations: (510) 336-7373

Look out for our discounted days! \$5 Fridays are back! On select days, enjoy the entire Center, including planetarium shows, for the price of a lunch value meal.

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

February 2, 7:30pm

What: Frontier Research at UC Berkeley's Lick Observatory

Who: Alex Filippenko, Professor of Astronomy, University of California, Berkeley

Where: California Academy of Science, 55 Music Course Dr., Golden Gate Park, San Francisco, CA

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Cost: Advanced ticketing required. Academy members \$8, Seniors \$10, General \$12. Reserve a space online or call 1-877-227-1831.

Lick Observatory, right here in the Bay Area, is a vibrant research facility and a primary base for the University of California's astronomy education and public-outreach efforts. Cutting-edge fields include stellar explosions, Earth-like planets orbiting other stars, and giant black holes. Many of the studies are long-term and time-intensive, making them difficult or not feasible to conduct with larger telescopes elsewhere. Lick is also used to develop new technology, such as laser guide star adaptive optics, producing very clear images of celestial objects. It is the only UC observatory to which students have direct access. Alex Filippenko joined the UC Berkeley faculty in 1986 and is now one of the world's most highly cited astronomers, and an elected member of the National Academy of Sciences. Filippenko has coauthored about 770 papers and has been given numerous prizes for his research. In 2004, he received the Carl Sagan Prize for Science Popularization. In this talk we will

hear about the frontier research currently being conducted at the Lick Observatory and the risks of losing this important research due to funding challenges at the University.

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

February 10, 12:00pm

What: Paleoenvironmental Reconstruction and the Identification of Habitable Conditions on Ancient Earth and Mars Using Clay Minerals

Who: Tom Bristow, SETI Institute

Where: SETI Headquarters, 189 N. Bernardo Ave., Mountain View, CA

Cost: Free

Abstract pending.

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



Image Caption: The 2014 TVS Holiday Potluck dinner was great success, with lots of good food and even some gifts. Image Credit: Rich Combs

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

All times are Pacific Standard Time.

January

- 8-12 Thu- Mercury and Venus within 1 degree of each other in the southwest (early evening)
- 13 Tue **Last-Quarter Moon (1:46am)**
- 16 Fri Saturn within 2 degrees of waning crescent Moon
- 20 Tue **New Moon (5:14am)**
- 21 Wed Thin crescent Moon forms a triangle with Mercury and Venus (Binoculars needed, Dusk)
- 23 Fri Rare triple shadow transit of Jupiter (10:27-10:52pm; see January S&T, p. 49)
- 26 Mon **First-Quarter Moon (8:48pm)**
- 27 Tue Algol is at minimum for roughly two hours centered on 7:42pm

February

- 3 Tue **Full Moon (3:09pm)**
- 3-4 Tue- Jupiter about 6 degrees away from the Full Moon
- 4-5 Wed- The Moon is about 5 degrees away from Regulus, with Jupiter farther west
- 6-20 Fri- Zodiacal light visible in the west with Venus and Mars at the base (80 minutes after sunset)
- 9 Mon The waning gibbous Moon is about 6 degrees away from Spica (after midnight)
- 11 Wed **Last-Quarter Moon (7:50am)**
- 13 Fri Saturn about 5 degrees away from the waning crescent Moon (predawn)
- 16 Mon Algol is at minimum for roughly two hours centered on 9:12pm
- 18 Wed **New Moon (3:47pm)**
- 20 Fri Algol is at minimum for roughly two hours centered on 6:08pm
- 21 Sat Thin crescent Moon, Venus, and Mars visible in the west (evening)
- 25 Wed **First-Quarter Moon (9:14am)**
- 25 Wed Aldebaran shines close to the Moon



Keeping an Eye on Storms and More

By Kieran Mulvaney

In late July 2013, Tropical Storm Flossie barreled furiously toward Hawaii. The question was not if it would strike, but when and where it might do so.

During the afternoon hours of July 29, forecasts predicted landfall later that week on the state's Big Island; however, by the time residents of the 50th state awoke the following morning things had changed. NOAA's Central Pacific Hurricane Center warned that the islands of Oahu, Molokai and Maui were now at a greater risk.

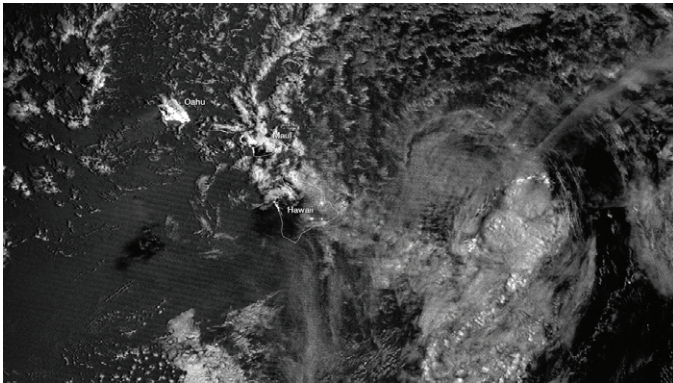


Image credit: S-NPP captured this image of Tropical Storm Flossie heading toward Hawaii using its VIIRS Combined Day-Night Band sensor. Credit: NOAA.

This overnight recalculation was thanks to the Day/Night Band viewing capabilities of the Visible Infrared Imaging Radiometer Suite, or VIIRS, on board the Suomi National Polar-Orbiting Partnership (Suomi NPP) satellite. VIIRS is able to collect visible imagery at night, according to Mitch Goldberg, program scientist for NOAA's Joint Polar Satellite System (JPSS), of which Suomi NPP is a part. That means it was able to spot some high-level circulation further north than expected during the nighttime hours. This was an

important observation which impacted the whole forecast. Without this forecast, said the Hurricane Center's Tom Evans, "we would have basically been guessing on Tropical Storm Flossie's center."

Polar-orbiting satellites, like Suomi NPP and the future JPSS-1 and JPSS-2 (scheduled for launch in 2017 and 2021, respectively), sweep in a longitudinal path over Earth as the planet rotates beneath them—scanning the globe twice a day. VIIRS, the imager that will be aboard all the JPSS satellites, images 3,000 km-wide swaths on each orbit, with each swath overlapping the next by 200 km to ensure uninterrupted global coverage. This high-resolution, rapidly updating coverage allows researchers to see weather patterns change in near real-time.

Instruments on Suomi NPP allow scientists to study such long-term changes too—things like, "the patterns of sea surface temperature, or coral bleaching," says Goldberg. They are even used by the World Bank to determine how much energy is burned off and wasted from natural gas flares on oil drilling platforms.

While scientists are excited by the JPSS series' wide range of capabilities, the ability to address pressing immediate concerns is, for many, the most tangible value. That was certainly the case in July 2013, when thanks to Suomi NPP, authorities had ample time to close ports and facilities, open shelters, activate emergency procedures, and issue flash flood warnings. Despite heavy rains, high surf, and widespread power outages, accidents and injuries were few. By the time the storm passed, Hawaii was soaked.

But it was largely unharmed.

Learn more about JPSS here: <http://www.jpss.noaa.gov>.

Kids can learn all about how hurricanes form at NASA's Space Place: <http://spaceplace.nasa.gov/hurricanes>



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 (\$70). 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.