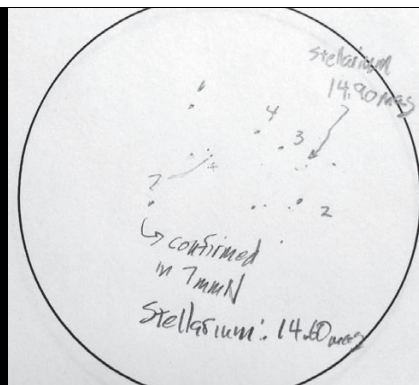


# PRIMEFOCUS

Tri-Valley Stargazers



August 2018



**Meeting Info**  
**What:**  
Summer BBQ

**Who:**  
TVS Family and Friends

**When:**  
August 17, 2018  
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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## August Meeting

### TVS Summer Barbecue

The August 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.



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

## News & Notes

### 2018 TVS Meeting Dates

Below are the TVS meeting dates for 2018. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting (except December\*).

Lecture Meeting	Board Meeting	Prime Focus Deadline
Aug. 17	Aug. 20	
Sep. 21	Sep. 24	Aug. 31
Oct. 19	Oct. 22	Sep. 28
Nov. 16	Nov. 19	Oct. 26
Dec. 21	Dec. 17*	Nov. 30

### Money Matters

As of the last Treasurer's Report on 07/23/18, our club's checking account balance is \$16560.46.

### Outreach Star Parties

Sunday, 08/12/18: Outreach Party (Perseids) at Del Valle ridge near park entrance; 8:15

Saturday, 09/15/18: Outreach Party at Del Valle Arroyo staging area; 8:15pm

Friday-Sunday, 08/31/18-:09/02/18 Yosemite Star Party (Note: TVS will make email and website notifications in case of cancellation due to the fire): Every year TVS does an outreach star party at Glacier Point in Yosemite National Park. In return for setting up our telescopes and binoculars at Glacier Point, we get free admission to the park, and free camping at the nearby Bridal Veil Creek campground.

This year's Glacier Point Star Party will be Friday-Sunday nights. The Moon is near last quarter this weekend, with moonrise occurring from 10:47pm to 00:08am.

We will have the usual Saturday evening pot luck, and TVS will provide hamburgers, hot dogs and veggie burgers. If you are planning to join us this year, please contact Eric Dueltgen as soon as possible, indicating how many people, how many tents, and for how many days you and your group plan to attend.

Please contact Eric Dueltgen for further information about the Outreach Star Parties.

### TVS Baseball Caps Available for Purchase

TVS Baseball Caps are available for purchase at a cost of \$15 each. The caps are Navy Blue with an embroidered club logo. The size is adjustable with a high quality strap and buckle-no plastic here! Purchase a cap to support the club and amateur astronomy. The cap will easily identify you as a TVS member at club outreach star parties, and they will even keep your head warm. Contact Club Treasurer Roland Albers if you are interested in purchasing a cap.

## Astronomical League Award



Image Caption: Congratulations to Roland Albers on his Astronomical League Award for having completed the Binocular Messier List. The award was presented by Dennis Beckley, who is the club's Astronomical League Representative. Image Credit: Ken Sperber

## Calendar of Events

### August 13, 7:30pm

What: Emerging Pictures of Distant Worlds  
Who: Prof. Bruce Macintosh, Stanford University  
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.

In less than three decades, more than three thousand planets have been discovered orbiting other stars. As we realize our solar system is not alone, we still don't know if our solar system is rare or unique. The indirect techniques that detect extrasolar planets are still too insensitive to detect planets equivalent to those in our solar system.

An alternative is to block out the light of the bright star to reveal the faint planet nearby. This is extremely challenging, as for example the Earth is ten billion times fainter than the Sun. Macintosh will discuss the first-ever images of other solar systems and the technology that has allowed us to discover them. New instruments, such as the Gemini Planet Imager, promise to find dozens more, including the equivalent of our own Jupiter. We will also learn about the prospects for the future, including the 30-meter ground-based telescopes and the WFIRST-AFTA space mission that could potentially image a "super-Earth." The ultimate goal is detection of a second 'pale blue dot'—an Earth twin where we could even see the

Header Image: Drawing by Ken Sperber of the Pluto region on Aug. 5, 2018 at about 12:30am using 11mm and 7mm eyepieces in his 20" f/5 telescope. Pluto, denoted by an "X," was 14.2mag, and dimmer 14.6 and 14.9mag stars were also seen. The drawing is rotated about 150° CCW compared to Roland's image on p.5.

## Calendar of Events (continued)

biosignatures of extrasolar life.

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

### August 14, 7:00pm-8:00pm

**What:** Inspiring the Next Generation of Explorers  
**Who:** Pamela Harman, SETI Institute  
**Where:** SRI Conference Center, 333 Ravenswood Ave., Menlo Park, CA 94205 (Enter from Middlefield Rd.)  
**Cost:** Free, Registration is suggested.

The SETI Institute is known for its world-class, cutting edge scientific research but we also have a passion as science ambassadors to inspire young STEM learners and engage the general public. Education and public outreach are part of our mission and that's why the Center for Education is one of the three centers of the SETI Institute. The SETI Institute's Center for Education promotes STEM education through NASA- and NSF-funded, as well as privately funded programs aimed at educating and inspiring children, young adults and educators with emphasis on space sciences and astrobiology.

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

### August 18, 8:00pm

**What:** The Modern Origins Story  
**Who:** Prof. Eliot Quataert, UC Berkeley  
**Where:** Mt. Tamalpais State Park, Cushing Memorial Amphitheater, more commonly known as the Mountain Theater, Rock Spring parking area  
**Cost:** Free

Come learn how the universe has evolved to its current state

from simple beginnings: how gravity reigns supreme and builds up the planets, stars, and galaxies required for biological evolution to proceed.

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

### August 25, 7:30pm-9:30pm

**What:** Looking for the First Stars with Satellite TV  
**Who:** Deepthi Gorthi, Grad Student, UC Berkeley  
**Where:** Hogue Park, 3972 Twilight Drive, San Jose, CA  
**Cost:** Free

The Big Bang theory explains that the universe originated from a hot singularity and cooled over time. There is still a missing piece in this puzzle though- the formation of the first stars! Our current theories predict that the first ever stars in the universe should have formed at a very specific time and over a relatively short period of time (by the universe standards at least). Is this true?

Looking for these very first stars is tricky. I will explain why this is difficult and how, finally, we are the brink of discovering them. I will talk about the telescope being built by the Astronomy Department at UC, Berkeley- how it is different from the other experiments underway and why I am betting my money on this one.

For more information see: <https://www.meetup.com/SJ-Astronomy/events/251460921/> and <https://www.sjaa.net/calendar/> for other events.

### September 9, 10:00am-500pm

**What:** Grandparents Day  
**Who:** You and Your Grandparents

continued on p. 4

#### Officers

**President:**  
 Rich Combs  
[president@trivalleystargazers.org](mailto:president@trivalleystargazers.org)

**Vice-President:**  
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#### Volunteer Positions

**Astronomical League Rep.:**  
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**Del Valle Coordinator:**  
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**Historian:**  
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**Internat. Dark-Sky Assoc. Rep.:**  
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**Librarian:**  
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**Loaner Scope Manager:**  
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**Newsletter Editor:**  
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 925-361-7435

**Observatory Director/Key Master:**  
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**Outreach Coordinator:**  
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**Potluck Coordinator:**  
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[potluck@trivalleystargazers.org](mailto:potluck@trivalleystargazers.org)

**Program Coordinator:**  
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**Publicity Coordinator:**  
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**Refreshment Coordinator:**  
 Laurie Grefsheim

**Webmaster:**  
 Hilary Jones  
[webmaster@trivalleystargazers.org](mailto:webmaster@trivalleystargazers.org)

**Web & E-mail**  
[www.trivalleystargazers.org](http://www.trivalleystargazers.org)  
[info@trivalleystargazers.org](mailto:info@trivalleystargazers.org)

**TVS E-Group**  
 To join the TVS e-group just send an e-mail message to the TVS e-mail address ([info@trivalleystargazers.org](mailto: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.

## Club Member Astrophoto



Image Caption: Andy Coutant imaged the western Veil Nebula at Panoche Hills, CA on May 13, 2018. At the top is NGC6960, aka the Witch's Broom, and below is Pickering's Triangular Wisp. Andy used a Canon T6i, full spectrum modified camera on a Celestron EdgeHD 11 using a HyperStar. The exposure time was 1 hour and 28 minutes. The Veil Nebula is the remnant of a supernova that was estimated to have exploded 5,000-8,000 years ago.

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

Cost: Grandparents \$9, Adults \$18, Seniors (65+) and Students 13-18 or college ID) \$15, Youth (3-12) \$14, Members Free

Grandparents are truly special! In honor of Grandparents Day, Chabot welcomes grandparents to visit the Center for half off. Enjoy live music on our observation deck, and special hands-on activities that the whole family will enjoy!

For more information see: <http://www.chabot.space.org/grandparents-day.htm> or for more information, call (510) 336-7373.

### September 10, 7:30pm

What: Our Journey Toward Mars

Who: J.R. Skok, Planetary Scientist, SETI Institute

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.

Our journey toward Mars and beyond will be humanity's greatest adventure. It will determine the fate of our species and the extent of our legacy. This journey is already underway. Humans have walked on the Moon and have survived long-duration spaceflight and our spacecraft have explored the solar system. We are on the verge of a revolution in space exploration as nations, corporations, and people like you are working to overcome the challenges that have held us back.

Planetary scientist J. R. Skok of the SETI Institute discusses how scientists and engineers are using the most alien places on Earth to develop the technology, resources, and experience that we will need to become a multi-planetary species. We will see how places like the polar deserts of Antarctica, the volcanoes of Hawaii, and the thermal fields of Iceland are providing the insight and experience that will prepare us for the journey toward Mars and beyond.

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

## Outreach and Club Star Party Photos



Image Caption: The July 21, 2018 outreach star party at the Del Valle staging area was a great success. Here, club members set up their telescopes while the interested public awaits the end of twilight. Image Credit: Rich Combs.

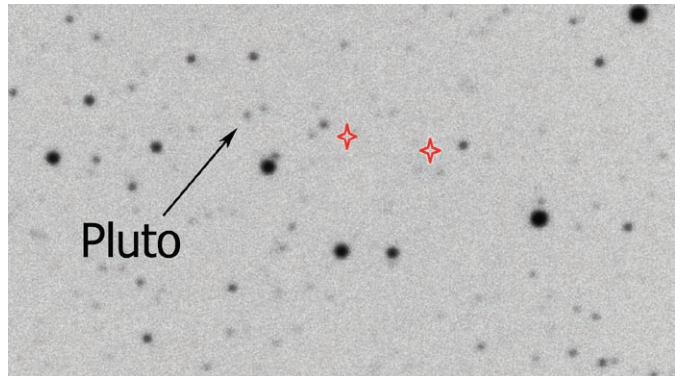


Image Caption: Left: A ghostly astronomer at work at his telescope at the August 4, 2018 TVS Open House at H2O. Image Credit: Gert Gottschalck. Above: Image (cropped) of Pluto and its surroundings, spanning about 16 arc minutes, taken by Roland Albers on August 2, 2018 from his home in Pleasanton. This image was key to visual identification of Pluto using 20" and 24" telescopes at H2O. The red symbols show the positions of Pluto on August 3 and August 4, 2018. Pluto, at 14.2 magnitude, was seen by about 10 TVS members on August 3, which was a practice session to ensure that we could share the experience with other club members and their guests at the August 4 TVS Open House. Though just a dim point of light, there was great satisfaction in seeing Pluto, which required patience at the eyepiece, it being a test of ones visual acuity in conjunction with good seeing and access to large aperture telescopes to even attempt the feat. Seeing it change position from one night to the next was an added bonus!

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

All times are Pacific Daylight Time

### August

- 11 Sat **New Moon (2:58am)**
- 12- Sun- The Perseid Meteor shower peaks on the morning of August 13
- 14 Tue Venus and the Crescent Moon about  $6^{\circ}$  apart (Evening)
- 16 Thu Jupiter  $0.5^{\circ}$  from Alpha Librae with the Moon about  $7^{\circ}$  to the west
- 18 Sat **First-Quarter Moon (00:48am)**
- 20 Mon Saturn  $4^{\circ}$  to the east of the waxing gibbous Moon
- 22- Wed- On the night of the 22-23 the Moon traces an arc from west to east  $8-9^{\circ}$  above Mars
- 26 Sun **Full Moon (4:56am)**
- 26 Sun As the Moon sets, Mercury reaches greatest western elongation in the east-northeast (Dawn)
- 31 Fri Venus and Spica less than  $1^{\circ}$  apart as they set toward the west (Evening)

### September

- 1 Sat Venus and Spica about  $1^{\circ}$  apart, with Jupiter, Saturn, and Mars visible to their east
- 2 Sun **Last-Quarter Moon (7:37pm)**
- 5- Wed- Over the next 2 weeks the Zodiacal Light is visible in the east from a dark site beginning about 2 hours before sunrise
- 5-6 Wed- Mercury about  $1.5^{\circ}$  from Regulus in the east (Dawn)
- 9 Sun **New Moon (11:01am)**
- 13 Thu The crescent Moon, Jupiter, and Alpha Librae form an equilateral triangle with sides about  $4^{\circ}$  long (Dusk)
- 15 Sat In the southwest the Moon and Antares are flanked by Jupiter and Saturn (Evening)
- 16 Sun **First-Quarter Moon (4:15pm)**
- 16-17 Sun- On Sunday night the Moon is  $8^{\circ}$  to the right of Saturn, and  $4^{\circ}$  to its left on Monday night
- 19 Wed The Moon is  $4^{\circ}$  above Mars
- 24 Mon **Full Moon (7:52pm)**
- 27 Thu Algol at minimum brightness for 2 hours centered on 9:09pm PDT
- 30 Sun The Moon and Aldebaran are separated by about  $1^{\circ}$

## The Best Meteor Shower of the Year

By Jane Houston Jones and  
Jessica Stoller-Conrad

If you're a fan of meteor showers, August is going to be an exciting month! The Perseid meteor shower is the best of the year, and in 2018, the peak viewing time for the shower is on a dark, moonless night—perfect for spotting meteors.



The best time to look for meteors during this year's Perseid shower is at the peak, from 4 p.m. EDT on Aug. 12 until 4 a.m. EDT on the Aug. 13. Because the new Moon falls on the peak night, the days before and after the peak will also provide very dark skies for viewing meteors. On the days surrounding the peak, the best time to view the showers is from a few hours after twilight until dawn.

Meteors come from leftover comet particles and bits from broken asteroids. When comets come around the Sun, they leave a dusty trail behind them. Every year Earth passes through these debris trails, which allows the bits to collide with our atmosphere and disintegrate to create fiery and colorful streaks in the sky—called meteors.

The comet that creates the Perseid meteor shower—a comet called Swift-Tuttle—has a very wide trail of cometary dust.

It's so wide that it takes Earth more than three weeks to plow all the way through. Because of this wide trail, the Perseids have a longer peak viewing window than many other meteor showers throughout the year.

In fact, this year you should be able to see some meteors from July 17 to Aug. 24. The rates of meteors will increase during the weeks before Aug. 12 and decrease after Aug. 13. Observers should be able to see between 60 and 70 meteors per hour at the shower's peak.

The Perseids appear to radiate from the constellation Perseus, which is where we get the name for this shower. Perseus is visible in the northern sky soon after sunset this time of year. Observers in mid-northern latitudes will have the best views.

However, you don't have to look directly at the constellation Perseus to see meteors. You can look anywhere you want to; 90 degrees left or right of Perseus, or even directly overhead, are all good choices.

While you're watching the sky for meteors this month, you'll also see a parade of the planets Venus, Mars, Jupiter and Saturn—and the Milky Way also continues to grace the evening sky. In next month's article, we'll take a late summer stroll through the Milky Way. No telescope or binoculars required!

Catch up on all of NASA's current—and future—missions at [www.nasa.gov](http://www.nasa.gov)

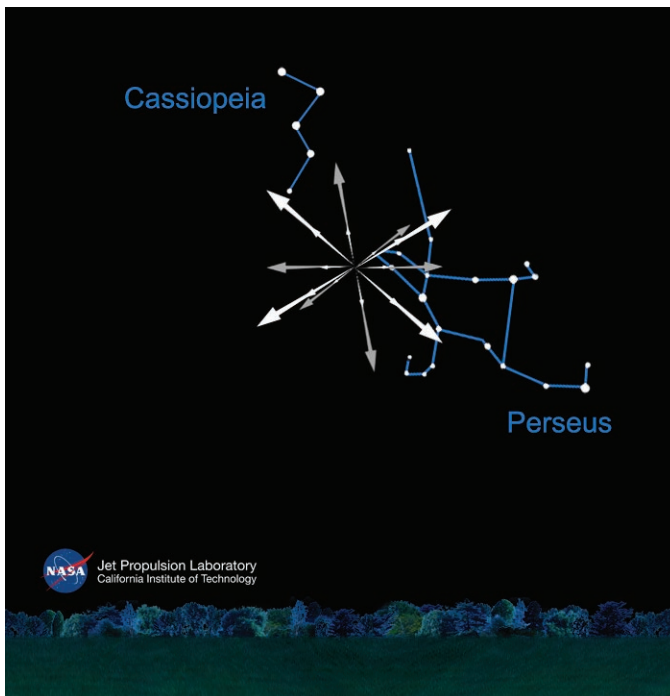


Image Caption: The Perseid meteor showers appear to radiate from the constellation Perseus. Perseus is visible in the northern sky soon after sunset this time of year. Credit: NASA/JPL-Caltech



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.