Tri-Valley Stargazers

June 2022

PrimeFocus

The TVS Barbeque is Back!!!

The annual TVS barbecue returns this June 17 at the Unitarian Church. TVS will supply beef and veggie burgers, and drinks in cans. Families are asked to bring their own side dishes that are not to be shared. The event will be held in the outdoor courtyard behind the church.

WHEN:

June 17, 2022
Set-up at 6:30pm
Dinner at 7:00pm

WHERE:

Unitarian Church
1893 North Vasco Rd.
Livermore, CA 94551

TVS QR Code

INSIDE THIS ISSUE:

NOTE: As per the Unitarian Church Policy, the following guidelines for the in-person meeting are as follows:

1) In-person will require we not come if we are not feeling well or if there was recent contact with a person with COVID

2) Masks are required in the church

3) Inside the church distancing is required - 2 seats between those not of the same household - this is to protect those who maybe didn't get a vaccination

4) We will have a sign-in sheet for those attending at the church (name and email) so we can track anyone who does get sick

News and Notes

2022 Meeting Dates

Lecture Meeting	Board Meeting	PrimeFocus Deadline
Jun. 17	Jun. 20	
Jul. 15	Jul. 18	Jul. 1
Aug. 19	Aug. 22	Aug. 5
Sep. 16	Sep.19	Sep. 2
Oct. 21	Oct. 24	Oct. 7
Nov. 18	Nov. 21	Nov. 4
Dec. 16	Dec. 19	Dec. 2

Money Matters

As of the last Treasurer's Report on 05/23/22, our club's account balance is $67,493.65. This includes $43.120.90 in the H2O Rebuild fund.

TVS Welcomes New Members

TVS welcomes new members Keith Cloward, Mike Sandy, Sushhil Sapre, and Balaji Thirugnanam. Please say hello and chat with them during our meetings.

2022 Club Star Party Schedule

Save the dates for the 2022 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 Open House 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. No gas stations are available on the route, so be prepared. Admission is $3/car-bring exact change. H2O is a primitive site with two porta-potties. Bring water, food, and warm clothing, as needed. Red flashlights are to be used so observer's can preserve their night vision.

June 18: H2O Open House with caravan departing promptly at 6:30pm from Mines and Tesla Roads.
June 22: Outreach Star Party for Camp Go Beyond, 8:30pm
August 20: H2O Open House with caravan departing promptly at 6:30pm from Mines and Tesla Roads.

Barcroft High Altitude Star Party

Reservations for the Eastbay Astronomical Society's Barcroft High-Altitude Star Party are now open to members of both the EAS and Tri-Valley Stargazer's clubs. This year's event will be held from Saturday, August 27 through Friday, September 2nd (with departure by noon of Friday, September 2nd). That's six nights. Space at Barcroft is limited to a maximum of 12 people per day, so to ensure you get the days you want, make your reservations early.

Before sending payments for reservations ($65 per night, per person), even if you've been there before, please contact Don Saito FIRST (barcroft@eastbayastro.org) to ensure the dates you wish to attend are available. You will also be asked to read the Barcroft Writeup, as it provides the information you'll need to have a safe, comfortable stay, and what is expected of guests to this University of California research facility.

For more details on making a reservation, see:
https://eastbayastro.org/events/

Calendar of Events

June 17, 18, 24, 25, July 1, 2, 7:30pm-10:30pm

What: Free Telescope Viewing
Who: Chabot Staff
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619
Cost: Free

Join Chabot astronomers on the Observatory Deck for a free telescope viewing (weather permitting). Chabot's historic telescopes offer breathtaking views 1,500 feet above the Bay. Three observatory domes house the Center's 8-inch (Leah, 1883) and 20-inch (Rachel, 1916) refracting telescopes, along with a 36-inch reflecting telescope (Nellie, 2003).

For COVID-19 Restrictions, see:
https://chabotspace.org/visit/plan-your-visit/

For more information, see:
https://chabotspace.org/events/events-listing/

June 18, 1:00pm

What: Investigating Space: The Peregrine Has Landed
Who: Maxwell Edmonds-Drati, Chabot Museum Educator
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619
Cost: General Admission

You might have heard of the Peregrine Falcon, but have you met its robotic counterpart? Inspired by the fastest animal on Earth, the lunar lander code-named "Mission Peregrine" will experiment on the Moon this summer and deposit the remains of science fiction legend Arthur C. Clarke, the author of 2001: A Space Odyssey. Hang out with the Peregrine team as you learn more about this exciting mission!

Join us every third Saturday of the month for Investigating Space as we explore and discuss the big topics in space exploration with some of the leading scientists and researchers in the Bay Area. In this new series Chabot Space &

Calendar of Events (con't)

Science Center highlights the latest discoveries, science research and space missions.

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For more information, see:
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June 24, 6:00pm-June 25, 9:00am

What: Annual Father's Day Slumber With The Stars
Who: Chabot Staff
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619
Cost: $100, $95 members

Spend this Father's Day with dad on this unique, out-of-this-world camping experience at Chabot. Your sleepover includes hands-on activities, exclusive after-hours time in the exhibits, planetarium shows and telescope viewing amidst the backdrop of the redwood forest. Enjoy hot chocolate while gazing at the stars, then camp out outside or in one of our exclusive indoor exhibitions.

Dinner and breakfast are included with dairy free and vegetarian options. All minors must be accompanied by a ticketed adult at a ratio of 5-1.

For COVID-19 Restrictions, see:
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For more information, see:
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June 30, 6:00pm-8:30pm

What: Virtual Asteroid Day Celebration
Who: Expert Scientists
Sponsor: Chabot Space and Science Center
Online: www.youtube.com/user/ChabotSpace

Join us for a celebration all about asteroids. Learn about global efforts to highlight asteroid detection, cutting-edge asteroid research, as well as the current and future missions to explore them. Expert scientists will explore the latest asteroid science and answer your biggest questions and dig in and try asteroid experiments and become an asteroid detective.

This year we will focus on NASA's up and coming Psyche mission, scheduled to launch this summer. The Psyche mission is a journey to a unique metal-rich asteroid orbiting the Sun between Mars and Jupiter. Find out what we can expect to learn about this unique asteroid.

July 1, 6:00pm-10:00pm

What: First Friday: It's Rocket Science
Who: Chabot Staff
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619
Cost: $15 Adults, $10 kids/seniors, $5 members

3, 2, 1...Blast off! From fireworks to space exploration, rockets have propelled our imagination for centuries. We're reaching new heights with an evening of uplifting conversations and activities for all ages. Get ready for launch!

continued on p.4

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TVS E-Group
To join the TVS e-group just send an email message to TVS at: 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 (con't)

First Fridays at Chabot Space & Science Center bring the Oakland community together to play and discover, highlight diverse voices in S.T.E.A.M. and inspire explorers of all ages.

Chabot's First Fridays open the doors for discovery with planetarium shows, telescope viewings and after-hours access to exhibits. Embedded in Redwood Regional Park, the Center is a space for our community to get together, learn, and explore in Oakland's backyard.

For COVID-19 Restrictions, see:
https://chabotspace.org/visit/plan-your-visit/

For more information, see:
https://chabotspace.org/events/events-listing/

July 8, 9, 6:30pm-9:30pm

What: Hike and Sip
Who: Chabot Staff
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619
Cost: $30, $25 members

This event is for adults 21+. A perfect evening for a date night or fun with friends!

The journey begins at sunset from the Center into the beautiful surrounding redwood forest. We'll moderately hike 3-4.25 miles (90-120 minutes) along some of the most popular trails as you learn about the history of Oakland, local plants, and the majestic Redwood trees.

We'll stop to watch the first few planets and stars appear and constellation storytelling before heading back to Chabot.

Upon return, hikers will enjoy a charcuterie board and two complimentary glasses of wine, beer, or non-alcoholic beverages. The night will end with stargazing and telescope viewing (weather permitting). Advanced tickets required.

For COVID-19 Restrictions, see:
https://chabotspace.org/visit/plan-your-visit/

For more information, see:
https://chabotspace.org/events/events-listing/

July 9, 7:30-9:30pm

What: Exploring Caves on the Moon and Mars
Who: Dr. Pascal Lee (SETI Institute)
Sponsor: Mt. Tam Astronomy Program
Online: Zoom: Mt Tam

Caves have been discovered on the Moon and Mars. Caves on the Moon might contain ice, while caves on Mars might also harbor life. This talk will discuss how robots and humans could soon explore these mysterious underground alien worlds.

For more information, see:
https://www.mttamastronomy.org/calendar

TVS Tesla Club Star Party a Great Success

The May 21st Tesla Club Star Party was a great success. Observers and imagers came out in droves on a pleasant evening to a share comradery that has been missing since the lockdown began in March 2020. Numerous observers were gathering observations for one of the TVS observing programs (www.trivalleystargazers.org/observing.shtml).

The main attraction of the evening was an astrophotography clinic led by Kai Yung and Ashish Joshi. They and other members of the TVS Astrophotography Group assisted interested members with polar alignment, use of focal reducers, achieving critical focus, and image acquisition.

Jennifer Siders (in red, lower right picture above) brought a Unistellar Telescope, which is a great resource for star parties. Set-up is fully autonomous with object selection and electronic visualization performed using a dedicated app. Up to 10 users can see the selected object, which achieves greater definition, and in some cases color, as image integration proceeds.

June 18th is the H2O Open House, which will provide an opportunity for club members and the public to observe and image from the TVS dark sky site.

What's Up By Ken Sperber (adapted from S&T)

All times are Pacific Daylight Time

June

13	Mon	The Moon is in Scorpius, ~6° from Antares (Evening)
14	**Tue**	**Full Moon (4:52am)**
18	Sat	The Moon is ~6° below Saturn in the south. To the ENE, Mercury, Venus, and The Pleiades form a triangle (Dawn)
20	**Mon**	**Last-Quarter Moon (8:11pm)**
21	Tue	The Moon and Jupiter are separated by ~4° (Dawn)
22	Wed	The Moon is ~4.5° to the right of Mars. Jupiter is located to their upper right and Venus is in the east (Dawn)
24	Fri	All 5 unaided-eye planets line up from low in the ENE to higher in the south. The Moon sits between Venus and Mars (Dawn, see pp. 47-48, June S&T)
25	Sat	The Moon, Venus, and Mercury form a 20° line near the ENE horizon (Dawn)
26	Sun	The Moon is 2.5° from Venus, with Mercury to their lower left (Dawn)
27	Mon	The thin sliver of the Moon, just one day before new, is 3.5° left of Mercury (Dawn)
28	**Tue**	**New Moon (7:52pm)**

July

2	Sat	The crescent Moon and Regulus are separated by 6.5° as they sink toward the horizon (Dusk)
6	**Wed**	**First-Quarter Moon (7:14pm)**
7	Thu	The Moon is in Virgo, ~5° from Spica (Dusk)
10	Sun	The Moon is in Scorpius, ~2° from Antares (Evening, see p. 46, July S&T)
13	**Wed**	**Full Moon (11:38am)**
15	Fri	The Moon trails Saturn by ~6° (Evening)
17	Sun	Venus, Aldebaran, Mars, Jupiter, the Moon, and Saturn stretch from the ENE to the SSW (Dawn)
19	Tue	The Moon and Jupiter are high in the SE, separated by ~3° (Morning)
20	**Wed**	**Last-Quarter Moon (7:19am)**
21	Thu	The Moon and Mars are high in the SE, separated by ~2.5° (Dawn)
23	Sat	The Moon is situated between the Pleiades and the Hyades (Dawn)
24	Sun	Venus, the Moon, Mars, Jupiter, and Saturn form a long line (Dawn)
26	Tue	The Moon is 3.5° from Venus (Dawn)
27	Wed	The Moon, just one day before new, forms a right triangle with Castor and Pollux (Dawn)
28	**Thu**	**New Moon (10:55am)**
29-	Fri-	Southern Delta Aquariid Meteor Shower (All night, see p. 50, July S&T)

NASA Night Sky Notes

Solstice Shadows

By David Prosper

Solstices mark the changing of seasons, occur twice a year, and feature the year's shortest and longest daylight hours - depending on your hemisphere. These extremes in the length of day and night make solstice days more noticeable to many observers than the subtle equality of day and night experienced during equinoxes. Solstices were some of our earliest astronomical observations, celebrated throughout history via many summer and winter celebrations.

Caption: These images from NASA's DSCOVR mission show the Earth during the December 2018 solstice (left) and June 2019 solstice (right). December's solstice shows all of South America and much of Antarctica and the South Pole. June's solstice, in contrast, shows the North Pole and the entirety of North America.
Credit: NASA/DSCOVR EPIC Source: https://www.nasa.gov/image-feature/goddard/2021/summer-solstice-in-the-northern-hemisphere

Solstices occur twice yearly, and in 2022 they arrive on June 21 at 5:13 am EDT (9:13 UTC), and December 21 at 4:48pm EST (21:48 UTC). The June solstice marks the moment when the Sun is at its northernmost position in relation to Earth's equator, and the December solstice marks its southernmost position. The summer solstice occurs on the day when the Sun reaches its highest point at solar noon for regions outside of the tropics, and those observers experience the longest amount of daylight for the year. Conversely, during the winter solstice, the Sun is at its lowest point at solar noon for the year and observers outside of the tropics experience the least amount of daylight- and the longest night – of the year. The June solstice marks the beginning of summer for folks in the Northern Hemisphere and winter for Southern Hemisphere folks, and in December the opposite is true, as a result of the tilt of Earth's axis of rotation. For example, this means that the Northern Hemisphere receives more direct light from the Sun than the Southern Hemisphere during the June solstice. Earth's tilt is enough that northern polar regions experience 24-hour sunlight during the June solstice, while southern polar regions experience 24-hour night, deep in Earth's shadow. That same tilt means that the Earth's polar regions also experience a reversal of light and shadow half a year later in December, with 24 hours of night in the north and 24 hours of daylight in the south. Depending on how close you are to the poles, these extreme lighting conditions can last for many months, their duration deepening the closer you are to the poles.

While solstice days are very noticeable to observers in mid to high latitudes, that's not the case for observers in the tropics - areas of Earth found between the Tropic of Cancer and the Tropic of Capricorn. Instead, individuals experience two "zero shadow" days per year. On these days, with the sun directly overhead at solar noon, objects cast a minimal shadow compared to the rest of the year. If you want to see your own shadow at that moment, you have to jump! The exact date for zero shadow days depends on latitude; observers on the Tropic of Cancer (23.5° north of the equator) experience a zero shadow day on the June solstice, and observers on the Tropic of Capricorn (23.5° south of the equator) get their zero shadow day on December's solstice. Observers on the equator experience two zero shadow days, being exactly in between these two lines of latitude; equatorial zero shadow days fall on the March and September equinoxes.

There is some serious science that can be done by carefully observing solstice shadows. In approximately 200 BC, Eratosthenes is said to have observed sunlight shining straight down the shaft of a well during high noon on the solstice, near the modern-day Egyptian city of Aswan. Inspired, he compared measurements of solstice shadows between that location and measurements taken north, in the city of Alexandria. By calculating the difference in the lengths of these shadows, along with the distance between the two cities, Eratosthenes calculated a rough early estimate for the circumference of Earth – and also provided further evidence that the Earth is a sphere!

Caption: In Puerto Rico a presenter from the San Antonio Astronomy Club demonstrates "Zero Shadow Day". As Puerto Rico lies a few degrees south of the Tropic of Cancer, their two zero shadow days arrive just a few weeks before and after the June solstice.
Credit & Source: Juan Velázquez / San Antonio Astronomy Club

Are you having difficulty visualizing solstice lighting and geometry? You can build a "Suntrack" model that helps demonstrate the path the Sun takes through the sky during the seasons; find instructions at stanford.io/3FY4mBm.

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 to find local clubs, events, stargazing info and more.

Discover the latest NASA science at nasa.gov.

Tri-Valley Stargazers
P.O. Box 2476
Livermore, CA 94551
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 ($10). Must be a full-time high-school or college student.

_____ Regular member ($30).

Hidden Hill Observatory Access (optional): Must be 18 or older.

_____ 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 (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.