

PRIMEFOCUS

Tri-Valley Stargazers



August 2019



Meeting Info Apollo 13 Rescue

Who:
David Rodrigues

When:
August 16, 2019
Doors open at 7:00 p.m.
Meeting at 7:30 p.m.
Lecture at 8:00 p.m.

Where:
Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

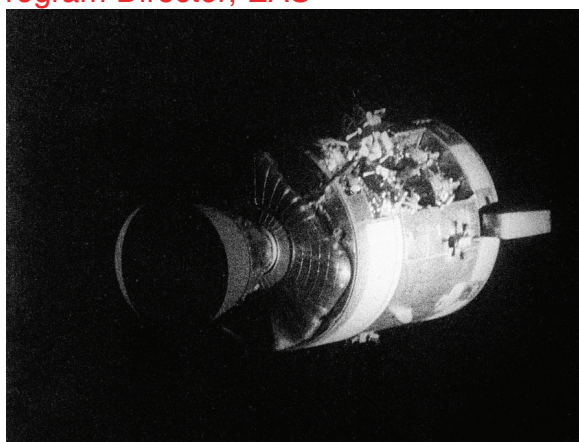
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August Meeting

Chabot Observatory's Role in the Rescue of Apollo 13 By David Rodrigues, Program Director, EAS

In April 1970, an explosion occurred aboard the Apollo 13 spacecraft as it neared the Moon. All around the world people leapt into action to help save the astronauts' lives. One of the most unusual examples of this occurred at Chabot Observatory, where young high school and college kids tracked the Apollo 13 capsule with several of large telescopes. It was my very great privilege to be one of those kids. Under the leadership of Dr. Terry Galloway, we provided information that helped confirm that Apollo 13 was on the correct trajectory to safely return to Earth.



Caption: Apollo 13 Service Module showing the effects of the oxygen tank explosion. The Service Module was jettisoned just prior to Command Module reentry into the Earth's atmosphere. Image Credit: NASA

In my talk, using images, charts, old newspapers, the Apollo 13 accident report, and videos from various documentaries about Apollo 13, I will detail the profile of a "normal" Apollo mission, why and how the Apollo 13 accident occurred, and how the accident lead to a deviation from normal navigational procedures that made Chabot's and other observatories optical observations more important, especially the night before reentry.

Dave Rodrigues (also known as the "AstroWizard") is a former lecturer at Morrison Planetarium and the California Academy of Sciences in San Francisco. He is the Program Director of the East Bay Astronomical Society at Chabot Space and Science Center in Oakland. His is a graduate of Stanford University and received his masters degree from UCLA.

David was the winner of the 2007 "Clifford W. Holmes Astronomy for America Award", given to an Amateur or Professional Astronomer who has made a "Major Contribution to Popularizing Astronomy." Previous winners of this award include John Dobson, Ed Krupp (Director of Griffith Park Observatory), David Levy (the co-discoverer of Comet Shoemaker Levy 9), and Clyde Tombaugh (the discoverer of Pluto). Asteroid 24626 "Astrowizard" was named after him for his innovative contributions to science education.

News & Notes

2019 TVS Meeting Dates

Below are the TVS meeting dates for 2019. 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
Aug. 16	Aug. 19	
Sep. 20	Sep. 23	Aug. 30
Oct. 18	Oct. 21	Sep. 27
Nov. 15	Nov. 18	Oct. 25
Dec. 20	Dec. 23	Nov. 29

Money Matters

As of the last Treasurer's Report on 7/15/19, our club's checking account balance is \$13,797.91.

TVS Welcome to New Members

TVS would like to welcome new members Richard Hays and Saanika Kulkarni. Please say hello and chat with them at upcoming club meetings.

Outreach Star Parties

Sunday, September 8: Bankhead Theater, TVS Booth in Lobby and Solar Observing, set-up at 3:30pm

2019 Club Star Parties

Save the dates for the 2019 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 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.

August 24: H2O Open House, Caravan departs from Mines and Tesla Roads at 6:00pm, sharp!

September 21: Tesla Vintners, set-up at 6:30pm

October 5: Del Valle (Arroyo Staging Area), set-up at 6:00pm

CalStar Star Party

The CalStar Star Party will be held on September 25-28. The location is only 3 hours away at Lake San Antonio in southern Monterey County. CalStar, a loosely organized party with no registration and no structure, is held at the County park. Just show up and pay the camping fee and join the group of about 100 star gazers in a section of the park reserved for us. For more information see: <https://calstar.observers.org/>

Calendar of Events

August 17, 11:00am

What: Black Holes, Big and Small-A Laser-guided Adaptive Optics View

Who: Dr. Jessica Lu, UC Berkeley

Where: UC Berkeley, 131 Campbell Hall (Upper-Campus)

Cost: Free, limited hourly pay parking on/nearby campus. The venue is 15-20 minute walking distance from BART and bus lines.

Black holes come in at least two varieties. Supermassive black holes lay at the centers of galaxies and, while not theoretically predicted, have been definitively proven to exist using observations of stars' orbits at the heart of the Milky Way. Stellar mass black holes are predicted to exist in large numbers — 100 million in our Galaxy alone — but only two dozen have been found, all in binaries. Prof. Lu will present past, current, and upcoming experiments to hunt for the invisible stellar mass black holes and study how the supermassive black hole at the Galactic Center impacts its environment. These experiments utilize the power of the world's largest telescopes equipped with laser-guide star adaptive optics to correct image blurring from the Earth's turbulent atmosphere. Prof. Lu will also discuss how advances in adaptive optics will sharpen our view of the Universe for black hole research and beyond.

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

August 23, 7:30pm-8:30pm

What: Astronomy 101: Sights of the Cosmos, Intro to Astronomy

Who: Wolf Witt

Where: Hogue Park, 3972 Twilight Drive, San Jose, CA

Cost: Free

This event provides a different introduction to astronomy than our Intro to the Night Sky talks. During this hour, you'll gain an appreciation for the size and scale of the cosmos and our place within it. You'll see many examples of the beautiful objects visible in the night sky, learn something about how we see them through our telescopes and what we can deduce about them through the light they send us. And then you can make your own prediction of whether we're alone in the universe. After the talk, you can check out telescopes that will be set up as part of our In-Town Star Party.

For more information, see: <https://www.meetup.com/SJ-Astronomy/events/262541810/>

August 27, 7:15pm

What: Charon, Pluto's Moon

Who: Dr. Ross Beyer

Where: Mt. Diablo Astronomical Society, Lindsay Wildlife Experience, Community Room, 1931 First St., Walnut Creek, CA 94597

Header Image: Planet Jenny by Craig Siders. This is a composite of 9 fisheye exposures from the TVS Vintners Star Party. The images were processed using PTGui and Luminar 2018.

Calendar of Events (continued)

Cost: Free.

No details available.

For more information see: https://nightsky.jpl.nasa.gov/event-view.cfm?Event_ID=95250

September 6, 6:00pm - 10:00pm

What: First Friday: The Great Outdoors
 Who: Staff, Astronomer Gerald McKeegan (1:30pm)
 Where: Chabot Space and Science Center, 10000 Skyline Blvd., Oakland, CA 94619
 Cost: \$5

Nature is our favorite classroom. Join us for a First Friday all about outdoor appreciation! Learn all about Bay Area ecology and how you can participate in science when you're outside. Here at Chabot, we love to talk about how space exploration helps us learn about other planets, but what about how it helps us learn about our own planet? All of that and more at The Great Outdoors First Friday!

For more information see: <https://chabot.space.org/calendar/first-friday-the-great-outdoors/> or call (510) 336-7373.

September 7, 7:30pm

What: Mission: Mars
 Who: Dr. Pascal Lee, Planetary Scientist, Mars & SETI Institutes
 Where: Mt. Tamalpais State Park, Cushing Memorial Amphitheater, more commonly known as the Mountain Theater, Rock Spring parking area
 Cost: Free.

We are making progress globally—from the Arctic to Ant-

arctica, from underground labs to the International Space Station—to achieve the first human voyage to Mars. Come explore the what, why, how, when, and who of our first journey to the Red Planet.

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

September 9, 7:30pm

What: Mapping the Universe: The Sloan Digital Sky Survey
 Who: Juna Kollmeier, Carnegie Institution for Science
 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.

The Sloan Digital Sky Survey is an unprecedented all-sky spectroscopic survey of over six million objects. It is designed to decode the history of the Milky Way galaxy, trace the emergence of the chemical elements, reveal the inner workings of stars, and investigate the origin of planets. SDSS will also create a contiguous spectroscopic map of the interstellar gas in the Milky Way and nearby galaxies that is 1,000 times larger than the state of the art.

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

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TVS E-Group

To join the TVS e-group 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.

TVS Outreach and Club Star Parties



Image Caption: Craig Siders captured the action at the August 3, 2019 TVS Outreach Star Party at Del Valle. Using a Fuji X-T1 camera and Rokinon 12-mm f/2 Lens with Hoya Red filter, nine frames were combined using Capture One, PTGui, and Luminar 2018.



Image Caption: Jenny Siders took this image of a young astronomy enthusiast observing the Sun at the August 6, 2019 TVS Outreach Star Party at the Bankhead Theater in Livermore.



Image Caption: Roland Albers took the above two photos at the July 20, 2019 Tesla Vintners Club Star Party. Roland reports: "It was a wonderful evening. We had a record turnout for a Tesla Star Party. I counted 17 telescopes. The skies were clear with excellent seeing. The Great Red Spot on Jupiter was easily visible in my 8-inch SCT. Many of the members participated in hunting down our "12 Must-Know Summer Objects" and enjoyed finding them and sharing views."

TVS Member Astrophotos



Image Caption: Andy Coutant took this image of the Milky Way over Turret Arch at Arches National Park. He used a Full Spectrum modified Canon 6D with a Rokinon 35mm lens. It is a composite of 12 shots of 20 seconds duration each, at ISO-5000.



Image Caption: Mohamad Yassine took this image of M8, the Lagoon Nebula from his driveway in Pleasanton. He used a Canon T3i on his Celestron Edge HD 1100, compositing 72 frames of 30 seconds duration each.

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

All times are Pacific Daylight Time

August

- 11 Sun The Moon and Saturn are about 3° apart (Evening)
- 12-13 Mon The Perseids peak this night until dawn, but the nearly Full Moon washes out all but the brightest meteors
- 15 Thu **Full Moon (5:29am)**
- 23 Fri **Last-Quarter Moon (7:56am)**
- 24-25 Sat- The Moon is about 2° from Aldebaran on the morning of the 24th, and on the morning of the 25th it occults Zeta Tauri (Predawn; see S&T, August 2019, p. 50)
- 27 Tue The crescent Moon is about 7° from Pollux (Predawn)
- 28 Wed The crescent Moon is near M44, the Beehive Cluster (Dawn)
- 30 Fri **New Moon (3:37am)**

September

- 5 Thu **First-Quarter Moon (8:10pm) with Jupiter nearby (Evening)**
- 6-8 Fri- The Moon, Jupiter, and Saturn adorn the Milky Way
- 6 Fri Algol at minimum brightness for ~2 hours centered on 11:05pm (Evening)
- 9 Mon Algol at minimum brightness for ~2 hours centered on 10:54pm (Evening)
- 13 Fri **Full Moon (9:33pm)**
- 20 Fri The Moon is near the Hyades, not far from Aldebaran (Dawn)
- 21 Sat **Last-Quarter Moon (7:41pm)**
- 23 Mon The Moon in Gemini forms a triangle with Castor and Pollux (Morning)
- 24-25 Tue- The Moon is near M44, the Beehive Cluster (Morning)
- 26 Thu The crescent Moon is in Leo, $\sim 3^{\circ}$ from Regulus (Dawn)
- 26- Thu- Over the next 2 weeks the Zodiacal Light is visible in the east beginning ~2 hours before morning twilight
- 28 Sat **New Moon (11:26am)**
- 29 Sun Algol at minimum brightness for ~2 hours centered on 9:34pm (Evening)

NASA Night Sky Notes

Chill Out: Spot an Ice Giant in August

By David Prosper

Is the summer heat getting to you? Cool off overnight while spotting one of the solar system's ice giants: Neptune! It's the perfect way to commemorate the 30th anniversary of Voyager 2's flyby.

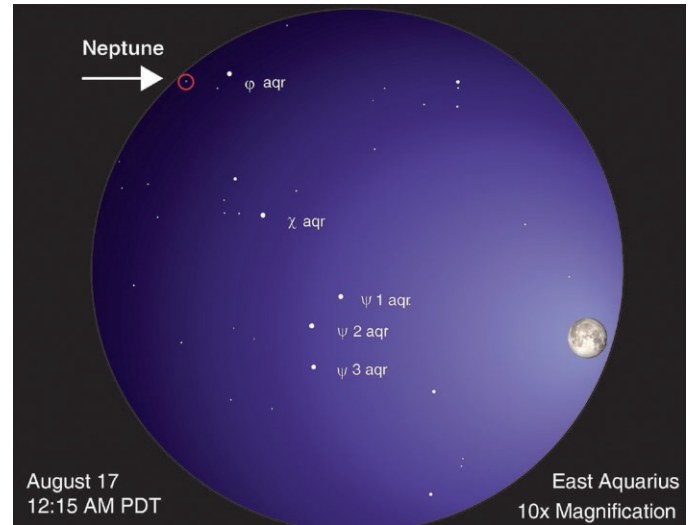


Neptune is too dim to see with your unaided eye so you'll need a telescope to find it. Neptune is at opposition in September, but its brightness and apparent size won't change dramatically as it's so distant; the planet is usually just under 8th magnitude and 4.5 billion kilometers away. You can see Neptune with binoculars but a telescope is recommended if you want to discern its disc; the distant world reveals a very small but discernible disc at high magnification. Neptune currently appears in Aquarius, a constellation lacking in bright stars, which adds difficulty to pinpointing its exact location. Fortunately, the Moon travels past Neptune the night of August 16th, passing less than six degrees apart (or about 12 Moon widths) at their closest. If the Moon's glare overwhelms Neptune's dim light, you can still use the its location that evening to mark the general area to search on a darker night. Another Neptune-spotting tip: Draw an imaginary line from bright southern star Fomalhaut up to the Great Square of Pegasus, then mark a point roughly in the middle and search there, in the eastern edge of Aquarius. If you spot a blue-ish star, swap your telescope's eyepiece to zoom in as much as possible. Is the suspect blue "star" now a tiny disc, while the surrounding stars remain points of white light? You've found Neptune!

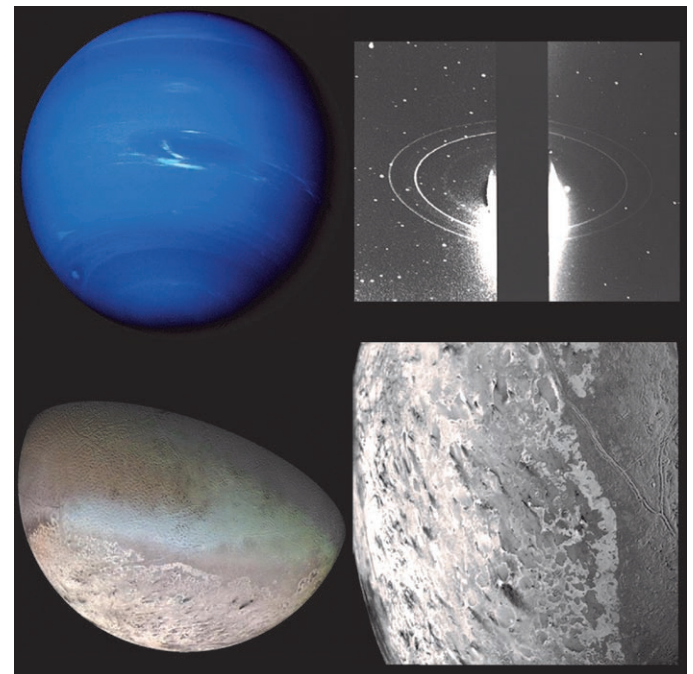
Neptune and Uranus are ice giant planets. These worlds are larger than terrestrial worlds like Earth but smaller than gas giants like Jupiter. Neptune's atmosphere contains hydrogen and helium like a gas giant, but also methane, which gives it a striking blue color. The "ice" in "ice giant" refers to the mix of ammonia, methane, and water that makes up most of Neptune's mass, located in the planet's large, dense, hot mantle. This mantle surrounds an Earth-size rocky core. Neptune possesses a faint ring system and 13 confirmed moons. NASA's Voyager 2 mission made a very close flyby on August 25, 1989. It revealed a dynamic, stormy world streaked by the fastest winds in the solar system, their ferocity fueled by the planet's surprisingly strong internal heating. Triton, Neptune's largest moon, was discovered to be geologically active, with cryovolcanoes erupting nitrogen gas and dust dotting its surface, and a mottled "cantaloupe" terrain made up of hard water ice. Triton is similar to Pluto in size and

composition, and orbits Neptune in the opposite direction of the planet's rotation, unlike every other large moon in the solar system. These clues lead scientists to conclude that this unusual moon is likely a captured Kuiper Belt object.

Discover more about Voyager 2, along with all of NASA's past, present, and future missions, at nasa.gov



Caption: This is a simulated view through 10x50 binoculars (10x magnification). The sizes of stars in this chart indicate their brightness, not their actual size. Moon image courtesy NASA Scientific Visualization Studio; chart created with assistance from Stellarium.



Caption: Clockwise from top left: Neptune and the Great Dark Spot traced by white clouds; Neptune's rings; Triton and its famed icy cantaloupe surface; close of up Triton's surface, with dark streaks indicating possible cryovolcano activity. Find more images and science from Voyager 2's flyby at bit.ly/NeptuneVoyager2 Image Credit: NASA/JPL



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 (\$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).

Mail this completed form along with a check to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551.