

PRIMEFOCUS

Tri-Valley Stargazers



February 2021



Meeting Info:
**Building an 18" f/4.5
Newtonian on a GEM**

Who:
Dave Childree

When:
February 19, 2021
Meeting at 7:30 p.m.
Lecture at 8:00 p.m.

Where:
Virtual Meeting using: Zoom*
See the April or May 2020 issue
of PrimeFocus for info on getting
connected using Zoom.

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February Virtual Meeting Using "Zoom"*

Building an 18" f/4.5 Newtonian on a GEM Dave Childree, Apple Operations Manager

Dave made an 18" f/4.5 telescope using an "old school" design. It's big, very big. It weighs about 520 pounds on an equatorial mount. It is capable of being a great visual scope as well as an amazing photographic instrument. Despite its size, it is portable and Dave can set it up in about 1 hour. His scope has some unique features that cannot be found on commercially made telescopes.

In this presentation, maybe you'll be inspired to make your own telescope. You'll learn a little about why you might want to make a telescope and some things to consider when making it.



I've been an avid amateur astronomer since I was 15 years old. When I was 15, a friend of mine got a small 60 mm refractor for Christmas. We found Saturn. I was amazed and hooked. My first telescope was a 60 mm refractor. Later, I wanted a bigger scope and bought a Starliner 8" f/7. After becoming a TVS club member in 1988 or so, and later, I became a patron member to use the big Marling scope. After using it for 2 or 3 years, I decided I wanted a big scope. At first, I wanted to buy a big scope, but I could not find what I wanted. So, I decided to build one.

I'm a Materials engineer by degree and did that for about 20 years. Now, I'm an operations manager in Apple. I've been doing that for 12 years and counting. My goal is to stop in 3-4 years and enjoy what I want for a change.

News & Notes

2021 TVS Meeting Dates

Below are the TVS meeting dates. 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
Feb. 19	Feb. 22	
Mar. 19	Mar. 22	Mar. 05
Apr. 16	Apr. 19	Apr. 02
May 21	May 24	May 07
Jun. 18	Jun. 21	Jun. 04
Jul. 16	Jul. 19	Jul. 02
Aug. 20	Aug. 23	Aug. 06
Sep. 17	Sep. 20	Sep. 03
Oct. 15	Oct. 18	Oct. 01
Nov. 19	Nov. 22	Nov. 05
Dec. 17	Dec. 20	Dec. 03

Money Matters

As of the last Treasurer's Report on 1/18/21, our club's account balance is \$63,854.39. This includes contributions of \$ 43,975.52 to the H2O Rebuild fund.

TVS Welcomes New Members

TVS welcomes new members Shankar Chittoor, Doug Homoelle, Matt Horsley, Rahul Kaw (past member, rejoining), Deborah McQueen, Nate Moore, Tamara Muhler, and Matthew Skinner. Please say hello and chat with them during our Zoom meetings.

Time to Renew Club Membership for 2021

Now is a great time to become part of 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.

Those renewing their club membership are encouraged to do so by using the online application before the end of December. Normally our memberships are only good for the calendar year, but anyone joining after October 1st will be given a membership for the remainder of 2020 and all of 2021. The regular club membership remains a bargain at \$30. Student membership (full-time High School or College student) is only \$10! To become a key holder to H2O, you must be 18 or older. There is a one-time \$20 Key deposit and a \$10 annual access fee.

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.

H2O and Del Valle Observing Sites Reopened

The club is happy to announce that the Del Valle and Hidden Hill Observatory sites have reopened for observing by those who have paid their 2021 TVS Membership dues and are approved keyholders.

Note: The outhouses at H2O blew over in the recent wind storm. On Feb. 10 it is expected that they will be set upright. An email will be sent to confirm whether they have been returned to working status.

Due to the ongoing COVID-19 emergency, the following restrictions must be followed:

- *The sites are open for individual use only by club members and immediate family; no guests or group events allowed

- *You use each observing site at your own risk and agree to hold the club and the landowners free of all liability

- *Do not use either observing site if you are not feeling well or suspect you were recently exposed to the virus

- *Announce your intention to use either site on our groups.io group

- *While at either site maintain social distancing of at least 15 feet (about a car's length)

- *Bring hand sanitizer and use it before and after touching any locks or facilities

- *Club members should not touch or look through each other's equipment. Focuser knobs and eyepieces can potentially spread the virus.

- *H2O keyholders who wish to use the Quick Dome should first contact Ross Gaunt (secretary@trivalleystargazers.org) to reserve it for individual use for the day

- *Note that these restrictions do not replace or negate any Alameda or Santa Clara County health orders in place at this time.

Ross Gaunt, our club secretary, emailed the updated lock combinations and usage instructions for each site to all H2O keyholders and all Del Valle registered users. If you are a H2O

News and Notes (continued)

keyholder or Del Valle registered user and didn't get Ross's email, please let Ron (president"at"trivalleystargazers.org) or Ross know and we'll straighten it out.

H2O orientations will be scheduled as soon as reasonably possible for those who have paid the annual access fee but have not received their key.

Outreach Star Party Schedule

Cancelled through February.

Contact Eric Dueltgen if you are interested in participating in future events (outreach"at"trivalleystargazers.org).

Calendar of Events

February 17, 7:00pm

What: Strange and Intriguing Exoplanets

Who: Dr. A. Vanderburg (U. Wisconsin-Madison) and Dr. J. Christiansen (Caltech)

Sponsor: SETI Institute

Online: REGISTRATION REQUIRED; <https://www.eventbrite.com/e/strange-and-intriguing-exoplanets-tickets-139940374427>

Astronomers estimate 400 billion planets orbiting stars in our galaxy, so the Milky Way is full of exoplanets. In the past two decades, researchers have discovered thousands, most of them with NASA's Kepler Space Telescope and now its successor, the NASA Transiting Exoplanet Survey Satellite (TESS).

Some of them are rocky, some are gaseous, and some are very, very odd. But there's one thing each of these strange new worlds has in common: All have advanced scientific un-

derstanding of our place in the cosmos.

We invited two astronomers who have dedicated their careers to studying exoplanets to share their lists of the top weird exoplanets. Andrew Vanderburg is an assistant professor of astronomy at the University of Wisconsin-Madison. His research has led to the recent discovery of a Jupiter-sized exoplanet around a White Dwarf star. Andrew will describe this incredible discovery and its consequences for the search for life beyond Earth. Jessie Christiansen, an astrophysicist with the NASA Exoplanet Science Institute at Caltech, works on NASA's TESS to find the nearest planetary systems to Earth.

For more information, see: <https://www.seti.org/event/seti-talks-strange-and-intriguing-exoplanets>

February 23, 7:00pm

What: Searching With NASA's SOFIA

Who: Dr. Dana Backman, SETI Institute

Sponsor: Chabot Space and Science Center

Online: Check the website below for the as yet TBD link

Get to know SOFIA, the Stratospheric Observatory for Infrared Astronomy, which recently helped scientists find water on the Moon. SOFIA is a specially-modified Boeing 747SP aircraft that carries a very powerful 106-inch reflecting telescope.

Soaring above 40,000 feet allows astronomers to study the Universe in ways that are not possible from the ground. What have scientists discovered from SOFIA's views beyond Earth's atmosphere? Learn more about this unique telescope and its role in research from NASA's Dr. Backman.

Dr. Backman's bio: Principal Investigator of NASA's Airborne Astronomy Ambassadors program. B.Sc. in physics from MIT, Ph.D. in astrophysics from the University of Hawai'i. Infrared continued on p.4

Officers

President:

Ron Kane
president@trivalleystargazers.org

Vice-President:

Eric Dueltgen
vice_president@trivalleystargazers.org

Treasurer:

John Forrest
treasurer@trivalleystargazers.org

Secretary:

Ross Gaunt
secretary@trivalleystargazers.org

Past President:

Roland Albers
past_president@trivalleystargazers.org

Volunteer Positions

Astronomical League Rep.:

Dennis Beckley
alrep@trivalleystargazers.org

Club Star Party Coordinator:

Eric Dueltgen
coordinator@trivalleystargazers.org

Del Valle Coordinator:

David Wright
delvalle@trivalleystargazers.org

Historian:

Hilary Jones
historian@trivalleystargazers.org

Librarian:

Ron Kane
librarian@trivalleystargazers.org

Loaner Scope Manager:

Ron Kane
telescopes@trivalleystargazers.org

Newsletter Editor:

Ken Sperber
newsletter@trivalleystargazers.org

Night Sky Network Rep.:

Ross Gaunt
nnsn@trivalleystargazers.org

Observatory Director/Rebuild

Chairman:
Chuck Grant
observatory@trivalleystargazers.org

Observing Program Coordinator:

Ron Kane
awards@trivalleystargazers.org

Outreach Coordinator:

Eric Dueltgen
outreach@trivalleystargazers.org

Potluck Coordinator:

OPEN
potluck@trivalleystargazers.org

Program Coordinator:

Dan Helmer
programs@trivalleystargazers.org

Publicity and Fundraising:

Brian Blau
publicity@trivalleystargazers.org

Refreshment Coordinator:

Laurie Grefsheim

Webmaster:

Hilary Jones
webmaster@trivalleystargazers.org

Web & E-mail

www.trivalleystargazers.org
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) 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 Member Astrophotos



Caption: Scott Neith imaged IC1805, the Heart Nebula, using a Celestron 9.25" SCT with a f/6.3 focal reducer, a Celestron Off-Axis Guider, ASI174mm mini guide cam, ZWO filter spacer, ASI294mc Pro, ASI AIR Pro, and ZWO Electronic Auto Focuser.

Calendar of Events (continued)

astronomy post-doctoral researcher at Kitt Peak National Observatory in Tucson, Arizona and at NASA's Ames Research Center. Professor of physics and astronomy for 12 years at Franklin & Marshall College in Lancaster, Pennsylvania. Employed by the SETI Institute as director of education and public outreach for NASA's Stratospheric Observatory for Infrared Astronomy (SOFIA) at NASA-Ames from 2003 to 2016. Has taught courses on introductory astronomy at Santa Clara University and on global climate change in Stanford University's Continuing Studies Program. Co-author with Michael Seeds of three college introductory astronomy textbooks: "Horizons", "Foundations", and "ASTRO".

For more information, see: <https://chabot.space.org/calendar/searching-with-nasas-sofia/>

February 26, 7:00pm

What: We've Made it to Mars! Now What Comes Next?

Who: Faride Khalaf

Sponsor: Chabot Space and Science Center

Online: <https://www.youtube.com/watch?v=5m3uGRfASW0>

The best part of traveling is when you arrive at your destination. You gather your belongings, freshen up, and then start your trip. The Mars rover goes through a similar process. When a spacecraft approaches the planet Mars, there is an important process that requires extremely reliable technology! Learn more about the advanced techniques that deliver rovers to the Martian surface with incredible precision. This is your chance to ask how it's done.

Faride Khalaf is a retired career aviator with a passion for all things mechanical. His life-long love of science has driven him to studying and sharing the history of space exploration. As an airplane pilot, he's done his fair share of airplane-camping and as an aircraft mechanic, he plans for his travels with safety in mind.

TVS Member Astrophotos (continued)



Caption: Mo Yassine imaged the Orion Molecular Complex using a Rokinin135mm camera lens attached to his ASI1600MM camera. This is a 4 panel mosaic with total exposure time of 15 hours (~1 hour each for H-alpha, and RGB). He recommends that it is best to take all panels for each channel at one time rather than finishing a panel and moving on to the next panel-as he did. The latter procedure made it difficult to balance the broadband data since it was taken on different nights.



Caption: Mo Yassine imaged M31, the Andromeda Galaxy, with a William Optics GT81 APO using a ZWO ASI2600MC Pro camera on a Celestron CGEM II Eq Mount. The total exposure time was 4 hours (120 x 120sec exposures).

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

All times are Pacific Standard Time until March 14 at 2am Pacific Daylight Time

February

- 18 Thu Mars Perseverance landing at Jezero Crater. Live coverage starts at 11am (see. p. 7)
- 18 Thu The crescent Moon and Mars are about $\sim 3.5^\circ$ apart (Dusk)
- 19 Fri First-Quarter Moon (10:47am)**
- 19 Fri The Moon is in Taurus, situated between the Hyades and the Pleiades with Mars to their right (Dusk)
- 23 Tue The Moon is in Gemini, $\sim 4^\circ$ from Pollux (Evening)
- 24 Wed The Moon is in Cancer, $\sim 2^\circ$ from the Beehive Cluster, M44 (Evening)
- 25 Thu Jupiter, Mercury, and Saturn form a triangle in the east-southeast (Dawn)
- 26 Fri The Moon is in Leo, $\sim 7^\circ$ from Regulus (Evening)
- 27 Sat Full Moon (12:17am)**
- 27 Sat Algol shines at minimum brightness for 2 hours centered on 11:31pm

March

- 1 Mon The Zodiacal light should be visible above the western horizon from a dark site (Evening)
- 1 Mon Algol shines at minimum brightness for 2 hours centered on 8:21pm
- 2 Tue The Moon is in Virgo, $\sim 5^\circ$ from Spica (Dawn)
- 2 Tue Over the next 3 nights Mars glides past the Pleiades by $\sim 2^\circ$ (Evening, see March S&T, p.46)
- 5 Fri Jupiter and Mercury are separated by $< 20'$, with Saturn to their upper right (Dawn)
- 5 Fri The Moon is $\sim 5^\circ$ from Antares (Dawn)
- 5 Fri Last-Quarter Moon (5:30pm)**
- 13 Sat New Moon (2:21am)**
- 14 Sun Daylight Savings Time begins at 2am
- 18 Thu The crescent Moon, Aldebaran, Mars, and the Pleiades form a parallelogram (Dusk)
- 19 Fri The crescent Moon, Aldebaran, and Mars form a triangle (Dusk)
- 21 Sun First-Quarter Moon (7:40am)**
- 22 Mon The Moon is in Gemini, $\sim 5^\circ$ from Pollux (Dusk)
- 23 Tue The Moon is in Cancer, $\sim 2^\circ$ from the Beehive Cluster, M44 (All Night)
- 24 Wed Algol shines at minimum brightness for 2 hours centered on 7:55pm
- 25 Thu The Moon is in Leo, $\sim 4^\circ$ from Regulus (Evening)
- 28 Sun Full Moon (11:48am)**

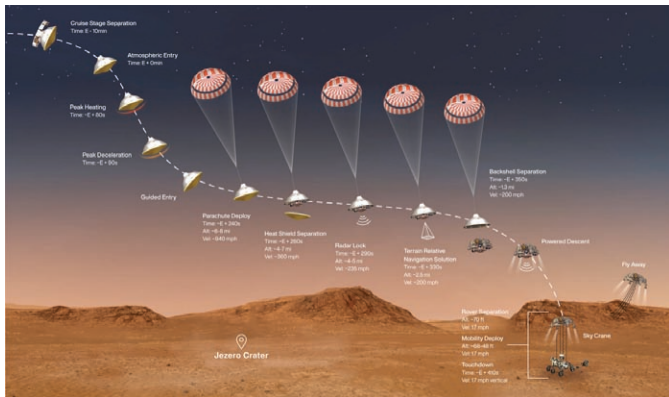


Landing On Mars: A Tricky Feat!

By David Prosper

The Perseverance rover and Ingenuity helicopter will land in Mars's Jezero crater on February 18, 2021, NASA's latest mission to explore the red planet. Landing on Mars is an incredibly difficult feat that has challenged engineers for decades: while missions like Curiosity have succeeded, its surface is littered with the wreckage of many failures as well. Why is landing on Mars so difficult?

Mars presents a unique problem to potential landers as it possesses a relatively large mass and a thin, but not insubstantial, atmosphere. The atmosphere is thick enough that spacecraft are stuffed inside a streamlined aeroshell sporting a protective heat shield to prevent burning up upon entry - but that same atmosphere is not thick enough to rely on parachutes alone for a safe landing, since they can't catch sufficient air to slow down quickly enough. This is even worse for larger explorers like Perseverance, weighing in at 2,260 lbs (1,025 kg). Fortunately, engineers have crafted some ingenious landing methods over the decades to allow their spacecraft to survive what is called Entry, Descent, and Landing (EDL).

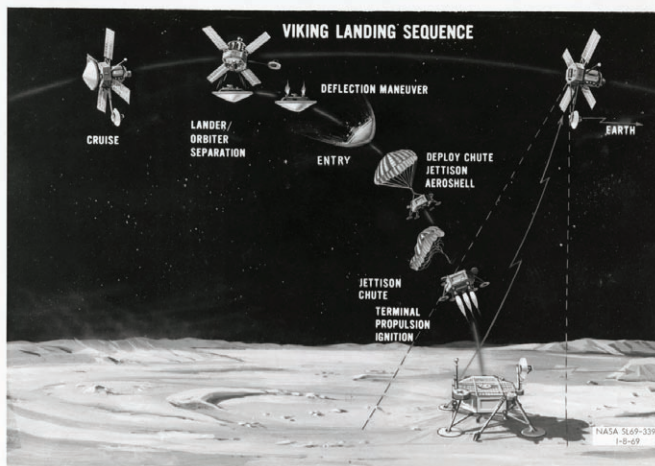


the wide gap between these missions in terms of technology, they both performed their landing maneuvers automatically, since our planets are too far apart to allow Earth-based engineers to control them in real time! (NASA/JPL/Caltech)

The Viking landers touched down on Mars in 1976 using heat shields, parachutes, and retrorockets. Despite using large parachutes, the large Viking landers fired retrorockets at the end to land at a safe speed. This complex combination has been followed by almost every mission since, but subsequent missions have innovated in the landing segment. The 1997 Mars Pathfinder mission added airbags in conjunction with parachutes and retrorockets to safely bounce its way to a landing on the Martian surface. Then three sturdy “petals” ensured the lander was pushed into an upright position after landing on an ancient floodplain. The Opportunity and Spirit missions used a very similar method to place their rovers on the Martian surface in 2004. Phoenix (2008) and Insight (2018) actually utilized Viking-style landings. The large and heavy Curiosity rover required extra power at the end to safely land the car-sized rover, and so the daring “Sky Crane” deployment system was successfully used in 2012. After an initial descent using a massive heat shield and parachute, powerful retrorockets finished slowing down the spacecraft to about 2 miles per hour. The Sky Crane then safely lowered the rover down to the Martian surface using a strong cable. Its job done, the Sky Crane then flew off and crash-landed a safe distance away. Having proved the efficacy of the Sky Crane system, NASA will use this same method to attempt a safe landing for Perseverance this month!

You can watch coverage of the Mars Perseverance landing starting at 11:00 AM PST (2:00 PM EST) on February 18 at nasa.gov/nasalive. Touchdown is expected around 12:55 PM PST (3:55 PM EST). NASA has great resources about the Perseverance Rover and accompanying Ingenuity helicopter on mars.nasa.gov/mars2020. And of course, find out how we plan to land on many different worlds at nasa.gov.

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.



Caption: Illustrations of the Entry, Descent, and Landing (EDL) sequences for Perseverance in 2021 and Viking in 1976. Despite



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.

Note: NEW/Renewal memberships initiated after October 1, 2020 will be good through 2021!!!

_____ 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.