

# PrimeFocus



## WHEN:

April 21, 2023  
 Doors open at 7:00pm  
 Meeting at 7:30pm  
 Lecture at 8:00pm

## WHERE:

Unitarian Church  
 1893 North Vasco Rd.  
 Livermore, CA 94551  
 and via Zoom

## TVS QR Code



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## Mankind's "Wright-Brothers-Moment" on Mars Ted Blank, NASA/JPL Solar System Ambassador

This presentation is a fun and in-depth look at the design, deployment, and flights of the Mars Ingenuity helicopter, the first aircraft to ever fly on another planet. One of the many challenges was designing a craft that could even take off on a planet where the air is only one percent as dense as we have on Earth! After hitching a six-month ride to Mars underneath the Perseverance rover, this twin-blade rotorcraft has flown 49 times and is proving itself an able "scout" for the rover drivers back on Earth, exploring areas unreachable by the wheeled robot.



Caption: NASA's [Ingenuity Mars Helicopter](#) acquired this image of its shadow using its navigation camera. This camera is mounted in the helicopter's fuselage and is pointed directly downward to track the ground during flight. This image was acquired on April 19, 2021 (Sol 58 of the Perseverance rover mission) at the local mean solar time of 12:33:49. This was the date of Ingenuity's first flight. Image Credit: NASA/JPL-Caltech

Ted Blank began to be passionate about amateur astronomy when he first saw the moons of Jupiter through a telescope from the high, clear air of the Sierra Nevada mountains in the 1990's. He is past President of the New Hampshire Astronomical Society and has been a NASA/JPL Solar System Ambassador since 2010. He is very active in public outreach and moonlights as an Astronomy enrichment speaker on cruise ships.

# News and Notes

## 2023 Meeting Dates

Lecture Meeting	Board Meeting	PrimeFocus Deadline
Apr. 21	Apr. 24	
May 19	May 22	May 5
Jun. 16	Jun. 19	Jun. 2
Jul. 21	Jul. 24	Jul. 7
Aug. 18	Aug. 21	Aug. 4
Sep. 15	Sep. 18	Sep. 1
Oct. 20	Oct. 23	Oct. 6
Nov. 17	Nov. 20	Nov. 3
Dec. 15	Dec. 18	Dec. 1

## Money Matters

As of the last Treasurer's Report on 03/20/23, our club's account balance is \$73,361.19. This includes \$43,139.47 in the H2O Rebuild fund.

## TVS New Volunteer Members

TVS welcomes Swaroop Shere as the new *Webmaster* for TVS, and Saanika Kulkarni as a *Contributing Editor* for the TVS Newsletter.

As seen in the Officer's Block on p.4, there are numerous open positions for volunteers to assist in the smooth operation of the club. The *Publicity and Fundraising Coordinator* promotes club activities in local newspapers and magazines. The *Historian* records the evolution of the club activities, which are posted on the club website. The *Potluck Coordinator* is responsible for shopping (at club expense) for the main courses for the June BBQ and the December Holiday party. The *Refreshment Coordinator* shops (at club expense) for snacks and non-alcoholic drinks (coffee, soda, etc.) for the monthly meeting. He/she attends the monthly meeting to prepare, put out, and clean up the snacks and drinks.

Contact any club officer if you wish to take on one of the open volunteer positions. Additionally, consider running for one of the Officer positions (President, Vice President, Secretary, Treasurer) at the annual November election. This is your opportunity to influence the future direction of the club.

## TVS Welcomes New Members

TVS welcomes new members Jaime Barraza, Matthew Cheng, Tri Do, Manjot Grewal, Samuel Lee, Thanh Quach, Michael Uyttersprot, and Robert Webster. Please say hello and chat with them during our meetings.

## 2023 Club Star Party Schedule

Save the dates for the 2023 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 Vintner's 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 observers can preserve their night vision.

April 22: Tesla Vintner's Star Party, 5143 Tesla Rd., Livermore. Set-up at 7:30pm, Observing 8:15-Midnight.

May 13: H2O Star Party, at 6pm the caravan to H2O PROMPTLY leaves the corner of Mines and Tesla Rds., Livermore. Observing until 11:30pm.

## TVS Observatory Update

TVS Observatory Director Chuck Grant reports that negotiations are in the final stage for the commencement of construction at H2O. Work for building the Imaging Observatory foundation, pier, and concrete block building has been contracted. The board is considering an additional expenditure for an Imaging Control Room concrete pad, a concrete pad for the Visual Observatory, an isolated pier for the Visual Observatory, trenching for wiring between the Imaging Observatory and the Control Room, and digging holes for 2 new pit toilets.

The construction schedule begins April 21: Surveying and marking; April 24: Excavation and material delivery; April 26: Start mixing and pouring concrete; 1<sup>st</sup> or 2<sup>nd</sup> week of May: Masonry build of the imaging observatory.

## Barcroft High Altitude Star Party

Reservations for the Eastbay Astronomical Society's Barcroft High-Altitude Star Party are now open to members of the EAS, the Tri-Valley Stargazers, and the Mount Diablo Astronomical Society clubs. This year's event will be held from Sunday, August 13 through noon on Saturday, August 19 (with departure by noon on Saturday). That's six nights!

Before sending payments for reservations (\$90 per night, per person), even if you've been there before, please FIRST contact Don Saito (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.

Please visit: [East Bay Astronomical Society - Barcroft High Altitude Star Party](#)

# Calendar of Events

## April 17, 7:30pm

**What:** The Caves of Mars: Preparing for a Mission to a Lava Tube  
**Who:** Dr. Jennifer Blank (Blue Marble Space Institute of Science)  
**Where:** Golden Gate Park, 55 Music Concourse Drive, San Francisco  
**Cost:** Members and Seniors \$12, Guests \$15

Biologic and Resource Analog Investigations in Low Light Environments (BRAILLE) is a multi-year, NASA-funded Mars analog project centered around fieldwork in volcanic caves at Lava Beds National Monument in Northern California. We are motivated to search for evidence of life on Mars beneath its surface—and one way to gain access there is through a volcanic cave!

We have identified many such "lava tubes" in images from Mars orbiters, and by visiting similar environments on Earth with the right technology, we hope to quantify the microbial life living there (and find out what it eats), to characterize mineral features that could be signatures of life, and to gain experience using robots to detect life and to map below-ground regions.

These efforts will help NASA prepare for a future life-detection mission to a Martian lava tube! Our project has evolved to include new autonomous and AI technologies that show much promise for developing future missions to Mars—or the Moon! This presentation will provide an overview of BRAILLE, showcasing its most significant accomplishments and taking audiences inside these remarkable caves.

For more information, see: [Benjamin Dean Astronomy Lecture](#)

## April 19, 7:00pm-8:00pm

**What:** Do ETs Watch Us? What Do They See?  
**Who:** Seth Shostak (SETI Institute), Paul Dalba (SETI Institute)  
**Sponsor:** SETI Institute  
**Online:** REGISTRATION REQUIRED  
[www.eventbrite.com/e/do-ets-watch-us](http://www.eventbrite.com/e/do-ets-watch-us)

Let's assume that extra-terrestrial civilizations exist in our galaxy. Like us, they are conducting their own SETI research to find us, see us and study us. What would they see? What methods could they use to learn about us? What technologies have they invented to see and listen to us. And finally, what information will they get from our civilization.

Join us for a thought-provoking discussion on the possibility of extraterrestrial civilizations observing our own planet. Our panel of experts, Seth Shostak, Senior researcher at the SETI Institute, and Paul Dalba, research scientist at the SETI Institute, and 51 Pegasi b Fellow of the Heising-Simons Foundation, will present the latest research and theories on this fascinating topic.

For more information, see: <https://www.seti.org/talks>

## April 22, 28, 29, May 5, 6, 12, 13 7:30pm-10:30pm

**What:** Free Telescope Viewing  
**Who:** Chabot Staff  
**Where:** Chabot Space and Science Center, 10000 Skyline

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### **Officers**

#### **President**

Ron Kane  
president@trivalleystargazers.org

#### **Vice-President**

Eric Dueltgen  
vice\_president@trivalleystargazers.org

#### **Treasurer**

John Forrest  
treasurer@trivalleystargazers.org

#### **Secretary**

David Lackey  
secretary@trivalleystargazers.org

#### **Past President**

Roland Albers  
past\_president@trivalleystargazers.org

### **Volunteer Positions**

#### **Astronomical League Rep.**

Don Dossa  
alrep@trivalleystargazers.org

#### **Club Star Party Coordinator**

Eric Dueltgen  
coordinator@trivalleystargazers.org

#### **Del Valle Coordinator**

David Wright  
delvalle@trivalleystargazers.org

#### **Historian**

**OPEN**  
historian@trivalleystargazers.org

#### **Librarian**

Ron Kane  
librarian@trivalleystargazers.org

#### **Loaner Scope Manager**

Ron Kane  
telescopes@trivalleystargazers.org

#### **Newsletter**

Ken Sperber (Editor)  
Saanika Kulkarni (Contributing Editor)  
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**

**OPEN**  
publicity@trivalleystargazers.org

#### **Refreshment Coordinator**

**OPEN**

#### **Webmaster**

Swaroop Shere  
webmaster@trivalleystargazers.org

#### **Web & E-mail**

www.trivalleystargazers.org  
info@trivalleystargazers.org

#### **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)

Blvd. Oakland, CA 94619

Cost: Free

Join Chabot astronomers on the Observatory Deck for a free telescope viewing! Weather permitting, this is a chance to explore stars, planets and more through Chabot's historic telescopes. Chabot's three large historic telescopes offer a unique way to experience the awe and wonder of the Universe. 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).

**Are the skies clear for viewing tonight?** Viewing can be impacted by rain, clouds, humidity and other weather conditions. Conditions can be unique to Chabot because of its unique location in Joaquin Miller Park. Before your visit, check out the [Weather Station](#) to see the current conditions at Chabot.

For more information, see:

<https://chabotspace.org/events/events-listing/>

### April 25, 7:15pm-9:00pm

What: JWST – Dust Shells Around Wolf-Rayet Binary WR 140

Who: Prof. Thomas Madura (San Jose State University)

Where: Lindsay Wildlife Experience Community Room, 1931 First Avenue, Walnut Creek, CA 94597

Cost: Lecture: Free, Parking \$3

Prof. Madura will discuss massive colliding-wind binary stars that host a Wolf-Rayet (WR) star, which offer a potentially important source of dust and chemical enrichment in the interstellar medium. In this talk Prof. Madura will present exciting observations from the new James Webb Space Telescope that reveal the spectral and spatial signatures of nested circumstellar dust shells around WR 140.

For more information, see: [www.meetup.com/A-A-N-C/events/292818542](http://www.meetup.com/A-A-N-C/events/292818542)

### May 5, 6:00pm-10:00pm

What: First Friday: Climate Series: What is Weather?

Who: Chabot Staff

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

Cost: \$15 Adults, \$10 kids/seniors, \$5 members

Ever wonder what happens in our atmosphere that can make it cold and rainy one day and hot and dry the next? Weather is a series of events that result in some amazing and downright fascinating effects. But how does this all work? Come learn from meteorologists and scientists how weather works and what researchers do to track its changes. Learn about our own microclimates in the Bay Area, make a real cloud,

and learn all about lightning. Expand your understanding of what weather is in this fun filled First Friday.

For more information, see:

<https://chabotspace.org/events/events-listing/>

### May 8, 7:30pm

What: A Star is Born

Who: Dr. Nia Imara (UC Santa Cruz)

Where: Golden Gate Park, 55 Music Concourse Drive, San Francisco

Cost: Members and Seniors \$12, Guests \$15

The birth of stars is one of the most complex problems challenging modern astrophysics. Understanding their origins is of fundamental importance to many areas of astronomy, from exoplanet studies to cosmology. While the study of the initial conditions of star formation in molecular clouds has accelerated during the past couple of decades, at the same time, new data and discoveries have exposed new mysteries regarding the birth of stars. In this talk, Dr. Imara will outline the current state of our understanding of stellar nurseries and present some innovative approaches toward advancing our knowledge of these environments in the Milky Way Galaxy and beyond. With an eye toward the future, she will highlight some breakthroughs that have been achieved—as well as those we would like to achieve—in our journey to unravel the mysteries of star birth.

For more information, see: [Benjamin Dean Astronomy Lecture](#)

### May 10, 7:00pm

What: The Eclipse Double-Header: Two U.S. Eclipses of the Sun in 2023-2024

Who: Dr. Andrew Fraknoi (Foothill College, Retired)

Where: Foothill College, Smithwick Theater, 12345 El Monte Rd, Los Altos Hills, CA 94022

Cost: Free, Parking is Free during the 2023 Spring Quarter

No details available.

For more information, see: <https://foothill.edu/astronomy/>

### May 13, 10:00am-11:00am

What: Suit Up: From the SR-71 Blackbird to the Space Shuttle

Who: Sharon Caples McDougale (NASA)

Sponsor: Smithsonian Air & Space Museum

Online: <http://youtube.com/airandspace>

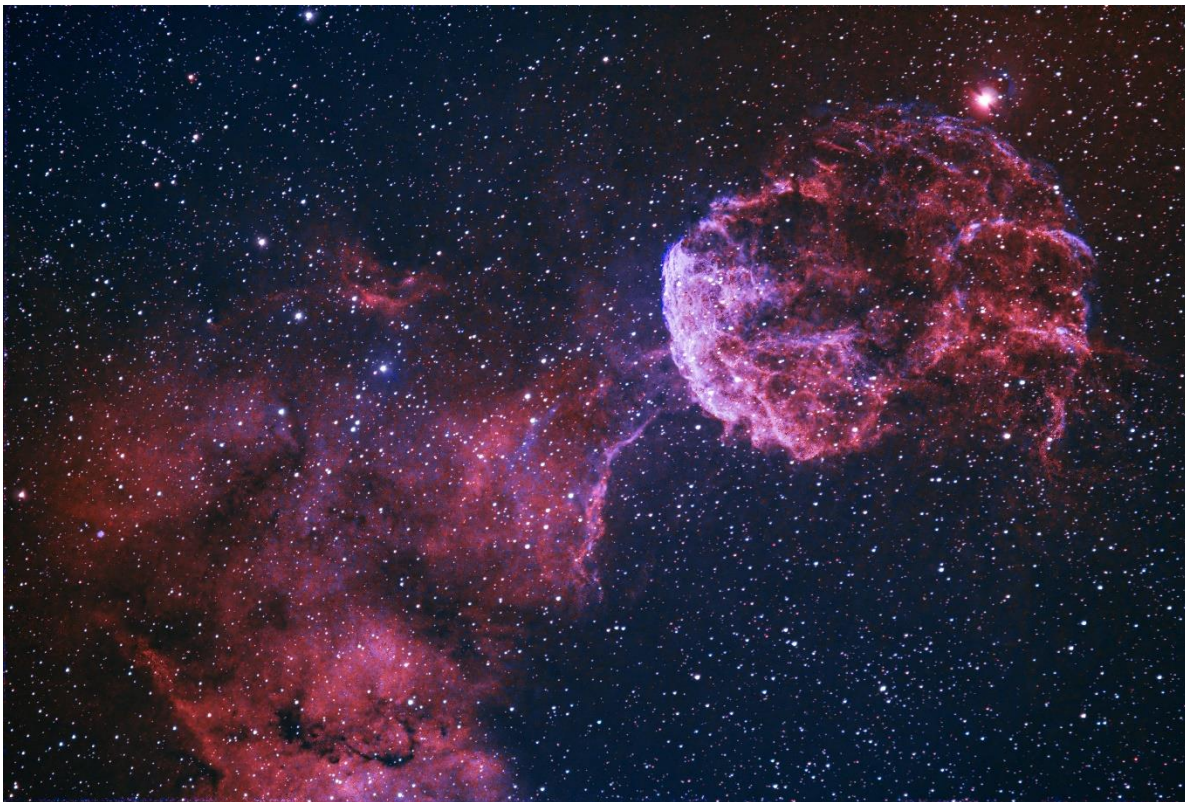
Sharon Caples McDougale joined the US Air Force in 1982, where she specialized in working with pressure suits for the SR-71 and U-2 missions. She fitted suits for individual pilots and suited them up for training flights and missions. In 1990 she transferred her skills to NASA where she was the first Black

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## TVS Astrophotos



Caption: On March 26, 2023, Ron Kane imaged the passage of the Asteroid Ceres in front of the galaxy M100. Ceres is the bright trail adjacent to the lower arm of the galaxy. He used a Celestron 9.25" Edge telescope with a ZWO ASI183MC Pro camera. Fifty-one of ninety-five 30sec exposures were processed using Deep Sky Stacker and Affinity.



Caption: Kevin McLoughlin imaged IC 443 from North Oakland. He used a ZWO ASI2600MC Pro attached to a Sigma 150-600mm f/5-f/6.3 lens with an Optolong L-Ultimate filter. The total exposure time was 3h 20min (40 x 300sec). The image was processed with modified version of Luke Newbould's synthetic SHO workflow. For more information see: [www.astrobin.com/0znivt/](http://www.astrobin.com/0znivt/)

# What's Up

By Ken Sperber (adapted from S&T)

All times are Pacific Daylight Time

## April

### 19 Wed New Moon (9:13pm)

- 22 Sat In the WNW, Venus (The Pleiades) is  $\sim 6^\circ$  ( $\sim 7^\circ$ ) to the upper left (lower right) of the crescent Moon (Dusk)
- 22- Sat- The Lyrid Meteor shower peaks (All Night; see p.50 of the April 2023 S&T)
- 23 Sun The Moon is  $\sim 5^\circ$  to the upper left of Venus (Dusk)
- 25 Tue High in the west, the Moon  $\sim 3^\circ$  right of Mars (Evening)

### 27 Thu First-Quarter Moon (2:20pm)

- 27 Thu High in the SW, the Moon is  $\sim 4^\circ$  above the M44, the Beehive Cluster (Evening)
- 29 Sat High in the South, the Moon is  $\sim 5^\circ$  to the upper left of Regulus (Evening)

## May

- 3 Wed The Moon is high in the SSE,  $\sim 2^\circ$  above left of Spica (Evening)

### 5 Fri Full Moon (10:34am)

- 5- Fri- The Eta Aquariid meteor shower peaks on the morning of the 6<sup>th</sup>. The Full Moon will hamper the display.
- 7 Sun In the SSW, the Moon is  $\sim 2.5^\circ$  from Antares (Morning)
- 9 Tue In the WNW, Mars is  $\sim 5^\circ$  to the lower left of Pollux, with Venus to their lower right (Evening)

### 12 Fri Last-Quarter Moon (7:28am)

- 13 Sat In the ESE, The Moon and Saturn rise in tandem, separated by  $\sim 5^\circ$  (Morning)
- 17 Wed In the east, the Moon occults Jupiter from  $\sim 4:20$ - $5:20$ am (see p.48 of the May 2023 S&T)

### 19 Fri New Moon (8:53am)

- 21 Sun In the west, Venus, Castor, and Pollux form a triangle, with the Moon to their lower right (Dusk)
- 22 Mon In the WNW, the Moon and Venus are separated by  $\sim 5^\circ$  (Evening)
- 23 Tue The Moon is  $\sim 2^\circ$  to the lower left of Pollux, with Venus  $\sim 5.5^\circ$  below the pair (Evening)
- 24 Wed In the west, the Moon is equidistant ( $\sim 4^\circ$ ) from Mars and M44, the Beehive Cluster. Use binoculars (Dusk)
- 26 Fri In the west, the Moon is  $\sim 3.5^\circ$  from Regulus (Evening)

### 27 Sat First-Quarter Moon (8:22am)

- 28-29 Sun- On both nights, in the WNW, Venus is  $\sim 4^\circ$  from Pollux (Dusk)
- 31 Wed The Moon and Spica, separated by  $\sim 4^\circ$ , descend toward the WSW horizon (Morning)
- 31 Wed In the west, Mars hovers on the outskirts of M44, the Beehive Cluster (Evening)

## Calendar of Events (con't)

woman to serve as a spacesuit technician, crew chief, and manager of the Space Shuttle Crew Escape Equipment Processing department. She suited up Mae Jemison, and led the first all-women team of spacesuit technicians in support of Space Shuttle mission STS-78.

In 2021 she self-published *Suit Up for Launch with Shay!*, a children's book that answers important questions about spacesuits. Join curator Dr. Emily Margolis as she hosts Sharon Caples McDougle in our latest live chat from the National Air and Space Museum.

For more information, see: <https://airandspace.si.edu/whats-on/events/suit-sr-71-blackbird-space-shuttle>

# NASA Night Sky Notes



## Solar Eclipses Are Coming!

By David Prosper

Have you ever witnessed a total solar eclipse? What about an annular solar eclipse? If not, then you are in luck if you live in North America: the next twelve months will see two solar eclipses darken the skies for observers in the continental United States, Mexico, and Canada!

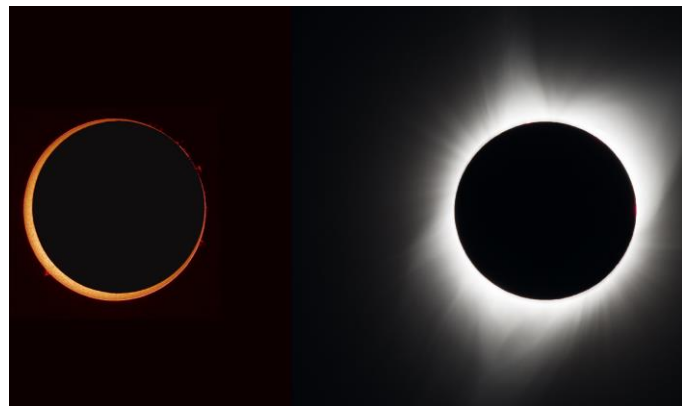
Solar eclipse fans get a chance to witness an annular eclipse this fall. On Saturday, October 14, 2023, the Moon will move exactly in front of the Sun from the point of view of observers along a narrow strip of land stretching across the United States from Oregon to Texas and continuing on to Central and South America. Since the Moon will be at its furthest point in its orbit from Earth at that time (known as *apogee*), it won't completely block the Sun; instead, a dramatic "ring" effect will be seen as the bright edge of the Sun will be visible around the black silhouette of the Moon. The distinct appearance of this style of eclipse is why it's called an annular eclipse, as *annular* means *ring-like*. If you are standing under a tree or behind a screen you will see thousands of ring-like shadows projected everywhere during maximum eclipse, and the light may take on a wan note, but it won't actually get dark outside; it will be similar to the brightness of a cloudy day. This eclipse must only be observed with properly certified eclipse glasses, or other safe observation methods like pinhole projection or shielded solar telescopes. Even during the peak of the eclipse, the tiny bit of the Sun seen via the "ring" can damage your retinas and even blind you.



Caption: This detailed solar eclipse map shows the paths of where and when the Moon's shadow will cross the USA for the upcoming 2023 annular solar eclipse and 2024 total solar eclipse. For larger copy of the image, see: <https://svs.gsfc.nasa.gov/5073> Credits: NASA/Scientific Visualization Studio/Michala Garrison; eclipse calculations by Ernie Wright, NASA Goddard Space Flight Center.

Just six months later, a dramatic **total solar eclipse** will darken the skies from Mexico to northeast Canada, casting its shadow across the USA in a strip approximately 124 miles (200 km) wide, on Monday, April 8, 2024. While protection must be worn to safely observe most of this eclipse, it's not needed to witness totality itself, the brief amount of time when the Moon

blocks the entire surface of the Sun from view. And if you try to view totality through your eclipse viewer, you won't actually be able to see anything! The Moon's shadow will dramatically darken the skies into something resembling early evening, confusing animals and delighting human observers. You will even be able to see bright stars and planets - provided you are able to take your eyes off the majesty of the total eclipse! While the darkness and accompanying chilly breeze will be a thrill, the most spectacular observation of all will be the Sun's magnificent *corona*! Totality is the only time you can observe the corona, which is actually the beautiful outer fringes of the Sun's atmosphere. For observers in the middle of the path, they will get to experience the deepest portion of the eclipse, which will last over four minutes - twice as long as 2017's total solar eclipse over North America.



Caption: Photos of an annular solar eclipse (left) and a total solar eclipse (right). The annular eclipse is shown with a dark background, as it is only safe to view with protection – you can see how a small portion of the Sun is still visible as the ring around the Moon. On the right, you can see the Sun's corona, visible only during totality, when the Moon completely hides the Sun from view. A total solar eclipse is only safe to view without protection during totality; it is absolutely necessary to protect your eyes throughout the rest of the eclipse! Credits: Left, Annular Eclipse: Stefan Seip (Oct 3, 2005). Right, Total Eclipse, NASA/Aubrey Gemignani (August 21, 2017)

While some folks may be lucky enough to witness both eclipses in full – especially the residents of San Antonio, Texas, whose city lies at the crossroads of both paths – everyone off the paths of maximum eclipse can still catch sight of beautiful partial eclipses if the skies are clear. The Eclipse Ambassadors program is recruiting volunteers across the USA to prepare communities off the central paths in advance of this amazing cosmic ballet. Find more information and apply to share the excitement at [eclipseambassadors.org](http://eclipseambassadors.org). NASA has published a fantastic Solar Eclipse Safety Guide which can help you plan your viewing at [bit.ly/nasaclipsesafety](http://bit.ly/nasaclipsesafety). And you can find a large collection of solar eclipse resources, activities, visualizations, photos, and more from NASA at [solarsystem.nasa.gov/eclipses](http://solarsystem.nasa.gov/eclipses)

**This article is distributed by NASA's Night Sky Network (NSN).** The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.gov](http://nightsky.jpl.nasa.gov) to find local clubs, events, and more!



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 (\$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.