

# PrimeFocus



## Discarded Worlds: Astronomical ideas that were *almost* correct... Brother Guy Consolmagno, Director of the Vatican Observatory

Astronomy is more than just observing; it's making sense of those observations. A good theorist needs to blend a knowledge of what's been observed, with a good imagination... and no fear of being wrong. Ptolemy in ancient Rome, the medieval bishops Oresme and Cusa, the 19th century astronomers Schiaparelli and Pickering, all rose to the challenge; and they were all *almost* correct. Which is to say, they were wrong... sometimes hilariously, sometimes heartbreakingly so. What lessons can 21st century astronomers take from these discarded images of the universe?

### WHEN:

August 18, 2023  
Doors open at 7:00pm  
Meeting at 7:30pm  
Lecture at 8:00pm

### WHERE:

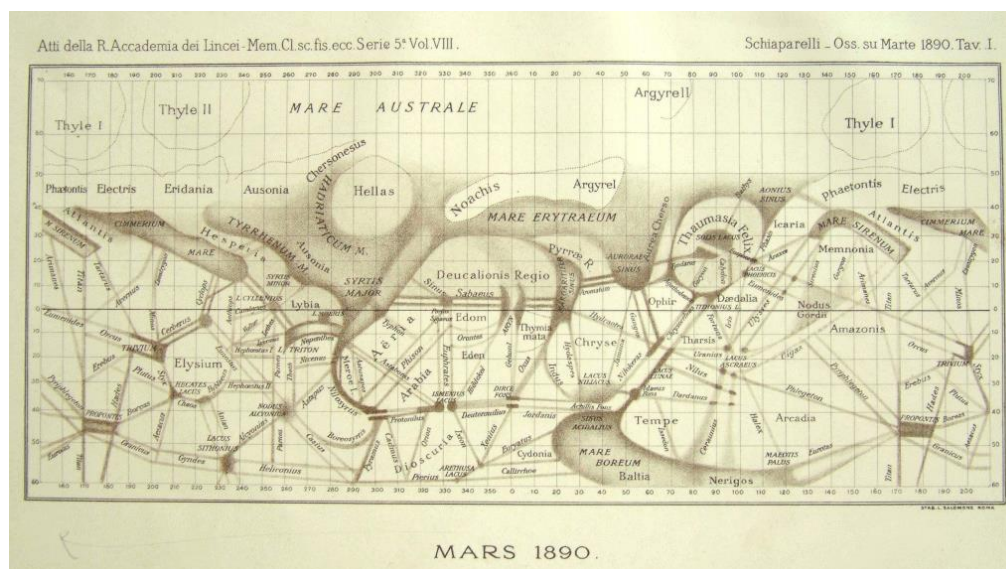
Unitarian Church  
1893 North Vasco Rd.  
Livermore, CA 94551  
and via Zoom

### TVS QR Code



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Caption: 1890 drawing of canali-channels (mistranslated as canals) on Mars by Giovanni Schiaparelli. This work is in the [public domain](#) in its country of origin and other countries and areas where the [copyright term](#) is the author's **life plus 100 years or fewer**.

Brother Guy Consolmagno SJ is the director of the Vatican Observatory. A native of Detroit, Michigan, he received BS and MS degrees from MIT, and his PhD in Planetary Sciences from the University of Arizona. He was a research fellow at Harvard and MIT and taught university physics before entering the Jesuits in 1989. At the Vatican Observatory since 1993, he was appointed director by Pope Francis in 2015.

Br. Guy's research explores connections between meteorites, asteroids, and the evolution of small solar system bodies. Along with nearly 300 scientific publications, he is the author of a number of popular books including *Turn Left at Orion* (with Dan Davis), and *Would You Baptize an Extraterrestrial?* (with Paul Mueller). In 2014 he received the Carl Sagan Medal from the American Astronomical Society Division for Planetary Sciences for excellence in public communication in planetary sciences.

## News and Notes

### 2023 Meeting Dates

Lecture Meeting	Board Meeting	PrimeFocus Deadline
Aug. 18	Aug. 21	
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 07/24/23, our club's account balance is \$61,926.66. This includes \$33,144.47 in the H2O Rebuild fund.

### TVS Welcomes New Member

TVS welcomes new members Francois Gaudin, Mahesh Hooli, Praveen Nandhi, Anumodh Narayanankutty, Aaron Weiss, Marcia West, and Rick Wilson. 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 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 only club members and their guests. 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.

October 7: Tesla Vintners, 5143 Tesla Rd., Livermore. Set-up at 6:30pm, observing until 11:30pm.

October 14: Outreach star party at Las Positas College, 3000 Campus Hill Drive, Livermore to observed the partial solar eclipse. Set-up at 7:30am. The eclipse starts at 8:30am, with maximum eclipse (~90%) at 9:15am.

October 18: Livermore Library, 1188 S. Livermore Ave., Livermore. Set-up at 6:00pm, Introductory Talk at 6:45pm, observing 7:00-9:00pm.

## Calendar of Events

### August 19, 25, 26, September 1, 2, 8, 9 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, 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://chabot.space.org/events/events-listing/>

### August 22, 7:15pm-9:00pm

What: The History and Science of James Lick and His Observatory  
Who: Prof. Paul Lynam, (UC Santa Cruz, Lick Observatory)  
Where: Lindsay Wildlife Experience Community Room, 1931 First Avenue, Walnut Creek, CA 94597  
Cost: Lecture: Free, see link below for parking info

No details available.

For more information, see: [nightsky.jpl.nasa.gov/event-view.cfm?Event\\_ID=125701](https://nightsky.jpl.nasa.gov/event-view.cfm?Event_ID=125701)

### August 25, 6:00pm-9:00pm

What: Stars Across Cultures, Native Skies Star Stories  
Who: Chabot Staff  
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619  
Cost: \$15 Adults, \$5 Youth, Members Free

The night sky has had a major impact on humans throughout our existence. Often different cultures and countries adopt their own interpretation of the night sky that could change through time. Stars, constellations, the sun, and the moon have inspired stories, helped us navigate our world and let us understand our place in the universe. In this month's Sunset Science, we'll explore various unique stories, myths, and practices from around the globe connected to the cosmos through presentations, demonstrations, music, and activities.

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## Calendar of Events (con't)

Spend time on our Observation Deck as speakers and astronomers take you on a tour of the cosmos and enjoy our Native Skies Star Stories program.

For more information, see:

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

### August 28, 5:30pm

**What:** Two Eclipses of the Sun  
**Who:** Prof. Andrew Fraknoi, (Emeritus, Foothill College)  
**Where:** Commonwealth Club, 110 The Embarcadero, Toni Rembe Rock Auditorium, San Francisco  
**Cost:** \$20 In-Person, \$10 Online

Two eclipses of the sun are coming to North America during the 2023–24 school year—an annular (“ring of fire”) eclipse on October 14, 2023 and a total eclipse on April 8, 2024. People in two narrow paths will have the full eclipse experience each time. Everyone else (an estimated 500 million people, including all of us in the Bay Area) will see a nice partial eclipse, where the moon covers a good part of the sun.

Dr. Andrew Fraknoi will describe how eclipses come to be (and why they are total only on Earth), what scientists learn during eclipses, exactly when and where the eclipses of 2023 and 2024 will be best visible, and how to observe the eclipses and the sun safely.

For more information, see: [Andrew Fraknoi: Two Eclipses](#)

### September 1, 6:00pm-10:00pm

**What:** First Friday: Stellar Ending, Death of Stars

**Who:** Chabot Staff  
**Where:** Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619  
**Cost:** \$15 Adults, \$10 kids/seniors, \$5 Members

Just like people, every star has a distinct life cycle, but not every star’s story ends the same. Head to Chabot Space & Science Center’s First Friday for a journey on how stars die and all the factors that lead up to their fate. From white dwarfs to supernovae and black holes, discover the science behind each of these exciting endings to the universe’s most iconic objects.

For more information, see:

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

### September 6, 5:00pm

**What:** Trailblazers in Conversation  
**Who:** Astronauts Anna Fisher, Rhea Seddon, and Kathy Sullivan; Moderated by Pamela Melroy  
**Sponsor:** Smithsonian Air & Space Museum  
**Online:** [Registration: Trailblazers](#)

To mark the 45th anniversary of NASA's historic 1978 astronaut candidate class, which included the first six women candidates amongst its "Thirty-Five New Guys," the Museum's 2023 John H. Glenn Lecture in Space History will celebrate those women. Astronauts Rhea Seddon, Kathy Sullivan, and Anna Fisher will share their stories as some of the first American women astronauts.

For more information, see: [Air and Space Museum: Trailblazers](#)

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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.

# Citizen Science with a Digital Telescope in My Backyard

## By Jenny Siders

On May 18, 2023 I was in my backyard with a Unistellar Equinox digital telescope (frequently referred to as eVscopes for enhanced vision) and took an image of the Pinwheel Galaxy, Figure 1. The next night I saw the Unistellar facebook group light up with news of a supernova (SN2023ixf) in the Pinwheel Galaxy, so I quickly took the eVscope outside and observed Pinwheel again (Figure 2). I could see the supernova and comparing my image from the night before, I found that I had actually caught the supernova just as it was beginning to brighten on the night it was discovered!



Figure 1: Jenny Siders image of M101 taken on May 18, 2023 before the official reported discovery of SN2023ixf. This image captured the early brightening of SN2023ixf.

Unistellar has a network of citizen scientists, which includes backyard astronomers like myself and others from all over the world. One of their programs, Cosmic Cataclysms, is designed specifically to look at things like supernova. People in the network started taking images and then science mode observations of the supernova as soon as it was announced. Science mode is a 20-minute recording with a dark frame calibration recording at the end. Lauren A. Sgro and Tom Esposito, who work on the citizen science programs at the SETI Institute and Unistellar, pulled together the supernova data from the Unistellar network of observers and created a light curve of SN2023ixf (Figure 3), which was published in Research Notes of the American Astronomical Society ([Lauren A. Sgro et al 2023 Res. Notes AAS 7 141](#)). Everyone that contributed data was listed as a co-author, including myself! The image that I

just happened to take on the evening of May 18th is one of the earliest data points on the graph in Figure 3. The network continues to take data on the supernova and will continue to do so until it is no longer detectable.



Figure 2: Jenny Siders image of M101 taken on May 19, 2023, the day after the discovery of SN2023ixf.

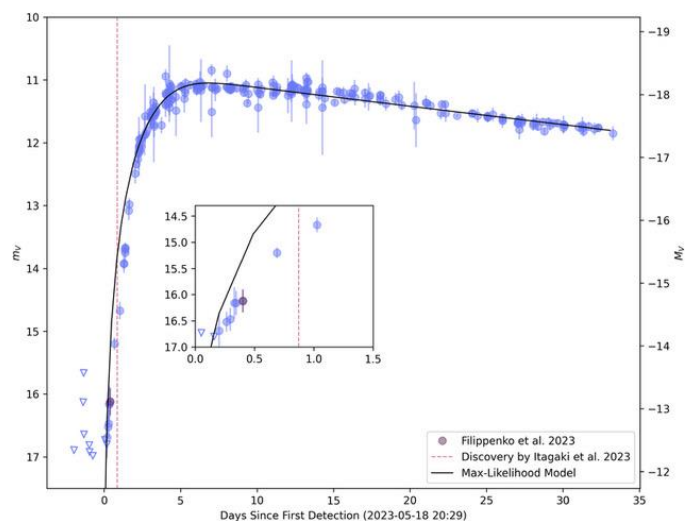


Figure 3: Light curve for SN2023ixf generated with data from the Unistellar citizen science network. [Lauren A. Sgro et al 2023 Res. Notes AAS 7 141](#))

Unistellar eVscopes are incredibly easy to use. They make use of Autonomous Field Detection (basically it looks at the sky and

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## Citizen Science with a Digital Telescope (con't)

figures out where its pointed) so there is no alignment procedure beyond tilting the telescope and hitting the orientation button, all of which is done with an app on your phone or tablet.

The citizen science programs are also easy to use. On the Unistellar website there are tutorials for each type of program; currently there are 5 different programs: Asteroids, Exoplanets, Planetary Defense, Cosmic Cataclysms, and Comets. Once a month I go to the Unistellar website and scroll through the list of possible exoplanet transits and mark the ones that I can view from my location in Livermore. I check off the ones that I'm interested in and then download the relevant dates/times into my calendar, a feature on the website. A link is included in the calendar file and on the website, that when clicked opens the Unistellar app and uploads all the coordinates of the target and the parameters for the recording. The only thing you need to do before hitting record, is turn on the telescope, perform an orientation, check your focus, go to the object, and click record. At the end of the data run, which is usually 4-6 hours for an exoplanet transit, the program will prompt you to put on the lens cap and take a dark frame, which takes about 2 minutes. Comets and supernova have much shorter observation times.

Because I have been involved in the exoplanet program, I'm also listed as a co-author on this paper, "The Unistellar Exoplanet Campaign: Citizen Science Results and Inherent Education Opportunities." ([Daniel O'Conner Peluso et al 2023 PASP 135 015001](#)) which discusses the results of using citizen scientists with eVscopes around the world to confirm exoplanet transits.

Over the past year I have successfully detected six exoplanet transits, not with a giant telescope, but with this little telescope that fits in a backpack. And, this data (see Figure 4) is taken in my backyard in Livermore, near Lowes and Safeway,

not even on the edge of town, but in the middle of a suburban neighborhood.

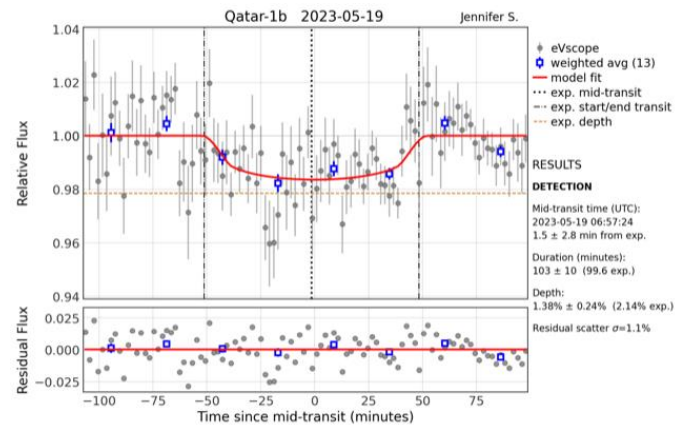
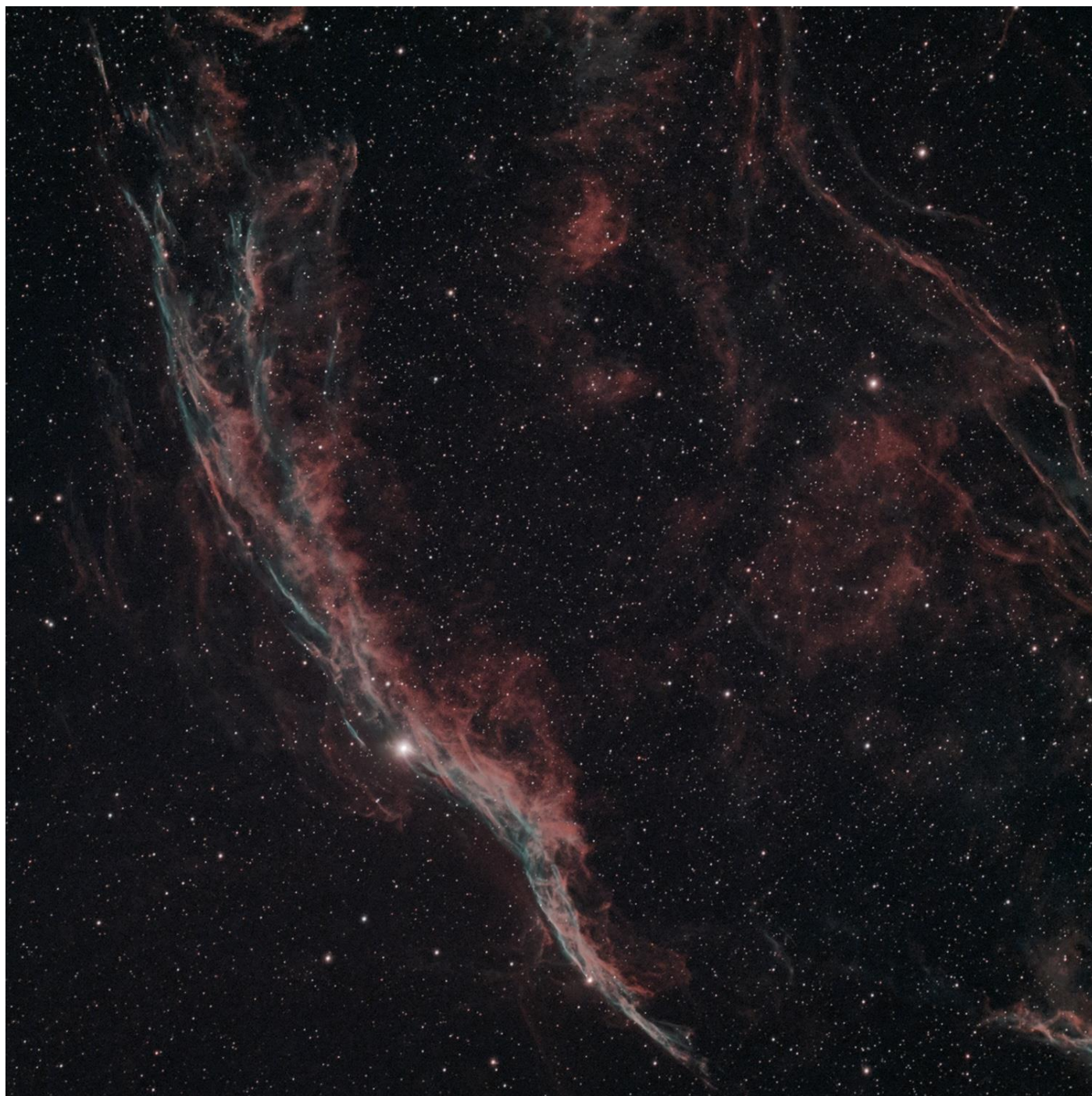


Figure 4: Exoplanet transit of Qatar-1b taken with an eVscope in Livermore by Jenny Siders. The black vertical dashed lines show the expected time of the transit onset, midpoint, and end. Flux observations from the eVscope are given as gray dots with the associated gray vertical lines being the uncertainty in the flux estimates. The red solid line is a model fit to the flux data.

The data in Figure 4 was taken the same night I just happened to get an image of the supernova. I was sitting outside waiting to start the exoplanet transit and decided to take a picture of the Pinwheel Galaxy. So, in one evening I happened to take one of the first images of a supernova, and I also confirmed an exoplanet transit. I really enjoy the citizen science aspect of the eVscope and there is a great community of citizen scientists on the Slack channel who cheer each other's results and are always willing to help with suggestions on improving data or commiserate with your lack of clear skies. If anyone wants to learn more you can check out [unistellar.com](http://unistellar.com) or reach out to me.

## TVS Astrophotography: The Veil Nebula (NGC6960)



Caption: Alekh Shah, a 16-year-old senior at Amador Valley High School, took this image of NGC6960, the western Veil Nebula using an Orion ED80T-CF 480mm telescope on a HEQ5 Pro mount with a ZWO ASI533mc Pro camera, and an Optolong L-Extreme filter. The total exposure time was 6 hours (90 x 4min).

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

All times are Pacific Daylight Time

### August

**16 Wed New Moon (2:38am)**

18 Fri Near the western horizon, the crescent Moon and Mars are separated by  $1^\circ$ . Use binoculars. (Dusk)

20 Sun In the west, the Moon is  $\sim 6^\circ$  right of Spica (Dusk)

**24 Thu First-Quarter Moon (2:57am)**

24 Thu The Moon Eclipses Antares. Reemergence should be visible for AZ TVS members at  $\sim 7:55$ pm MST (Evening; see the August S&T, p. 49 and <https://is.gd/antaresoccultation>)

**30 Wed Full Moon (6:36pm) and Saturn are separated by  $5^\circ$**

### September

4 Mon In the ENE, the waning gibbous Moon and Jupiter are separated by  $\sim 6^\circ$  (Evening)

5 Tue In the ENE, the Moon trails the Pleiades (M45) by  $\sim 5^\circ$  (Evening)

**6 Wed Last-Quarter Moon (3:21pm)**

10 Sun The Moon and Pollux, separated by  $\sim 4^\circ$ , line up with Castor (Dawn)

11 Mon In the East, the crescent Moon is  $\sim 3.5^\circ$  left of the Beehive Cluster (M44) (Dawn)

12- Tue- In the East, from a dark location, the Zodiacal Light should be visible beginning  $\sim 2$  hours before morning twilight. It will stretch up through Cancer and Gemini, and it should be visible for about the next 2 weeks.

13 Wed The thin crescent Moon and Regulus, separated by  $\sim 4.5^\circ$ , rise together in the East.

**14 Thu New Moon (6:40pm)**

16 Sat Algol shines at minimum brightness for  $\sim 2$  hours centered on 10:12pm PDT (Evening)

20 Wed Sinking toward the horizon in the SW, the crescent Moon is  $\sim 4^\circ$  to the lower right of Antares (Dusk)

22 Fri Autumn begins in the Northern Hemisphere at 11:50pm PDT

**22 Fri First-Quarter Moon (12:32pm)**

26 Tue In the SSE, the waxing gibbous Moon is  $\sim 3^\circ$  below Saturn (Evening)

**30 Sat Full Moon (2:58am)**

## Calendar of Events (con't)

### September 11, 7:30pm

What: Europa: Exploring an Ocean World

Who: Dr. Samantha Trumbo (Cornell University)

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

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

Over two decades ago, NASA's Galileo spacecraft revealed that beneath a frozen ice shell Jupiter's moon Europa likely harbors a deep, salty ocean of liquid water that may present a habitable environment for life. As a result, Europa has become a foremost target for Solar System exploration.

In this talk, Dr. Trumbo will discuss our current state of knowledge about Europa, recent discoveries made using Earth-based observatories, and NASA's upcoming Europa Clipper mission to explore this potentially habitable world.

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



# NASA Night Sky Notes



## Super Blue Sturgeon Moon

By Vivian White

On August 1st, catch a full Moon rising in the east just 30 minutes after sunset. We are seeing the entire sunlit side of the Moon as it is nearly (but not quite) in line with the Sun and Earth. The Farmers' Almanac calls this month's Moon the "Sturgeon Moon", for the time of year when this giant fish was once abundant in the Great Lakes. Cultures around the world give full Moons special names, often related to growing seasons or celebrations.

As the Moon rises later and later each night, the bright sunlit part appears to get smaller or "wane" - we call this a waning gibbous Moon. About a week later, on August 8th, we see only one half of the Moon alight. At this phase, the Moon rises around midnight and sets around noon. Have you ever seen the Moon in the daytime? You may notice this phase towards the southwest in the morning sky. Hold up a ball or egg beside it and see how the Sun lights up the same part.



Caption: Image of waning crescent Moon shown next to a ball on a stick that is lit by the Sun on the same side as the Moon, with trees and a blue sky in the background. Try this with an egg or any round object when you see the Moon during the day! Credit: Vivian White

By August 16th, the Moon has gone through its crescent phase and is now only showing its dark side towards the Earth. Did you know the **dark side** and the **far side** of the Moon are different? The Moon always shows the same face towards Earth due to the gravitational pull of Earth, so the far side of the Moon was only viewed by humans for the first time in 1968 with the Apollo 8 mission. However, the dark side is pointed at us almost all the time. As the Moon orbits the Earth, the sunlit side changes slowly until the full dark side is facing us during a **new Moon**. When the Moon is just a small crescent, you can sometimes even see the light of an **Earthshine** reflecting off Earth and lighting up the dark side of the Moon faintly.

Then as the Moon reappears, making a waxing (or growing) **crescent Moon**, best seen in the afternoons. By the time it reaches the first quarter on August 24th, we see the other half of the Moon lit up. At this point, the Moon passes through

Earth's orbit and marks the spot where the Earth was just 3 hours prior. It takes the Earth about 3 hours to move the distance between the Moon and Earth.



Caption: [Earthshine as seen from the International Space Station](#) with the sun just set - Astronaut Photograph ISS028-E-20073 was taken on July 31, 2011, and is provided by the ISS Crew Earth Observations Facility and the Earth Science and Remote Sensing Unit, Johnson Space Center

The Moon on August 30th is referred to as a blue moon. **Blue moons** are not actually blue in color of course; it refers to the second full Moon in any month. Since it takes 29.5 days to complete the cycle from full to new and back to full, most months will see only one. But occasionally, you'll fit two into one month, hence the phrase "once in a blue moon." We see a blue moon about once every 3 years on average - next in May 2026. In addition, this full Moon appears larger in the sky than any other full Moon this year - an unofficial **supermoon**. A supermoon appears larger than average because it is closer in its slightly elliptical orbit. The difference in apparent size between the smallest and largest full Moon is about the size difference between a quarter and a nickel. Even at its largest, you can always cover the whole Moon with your pinky extended at arm's length.

Follow the Moon with us this month and keep a Moon journal if you like - you may be surprised what you discover!  
[moon.nasa.gov/moon-observation](https://moon.nasa.gov/moon-observation)

**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](https://nightsky.jpl.nasa.gov) to find local clubs, events, and more!





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## 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.