

PrimeFocus



WHEN:

July 15, 2022
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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Visual Comet Hunting Don Machholz

In this talk, given remotely, I will discuss what a comet is, how they orbit the sun and why that is important to comet hunters. I talk about how comets are named and I will show how visual comet hunters sweep the sky and a study on comet discovery positions. I will then talk about the sky surveys which now find most of the comets we used to find visually and the end of the visual comet hunting era.

Next, I talk about the 260-year history of comet hunting and highlight everyone who has found seven or more named comets. The second half of the talk is about my own comet hunting program, how and why I got started in 1975, and each of the 12 comets that I have visually discovered.



Caption: Don Machholz observes nearly 120 nights per year!

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Washedlikeadish, CC BY-SA 4.0 via Wikimedia Commons

Don Machholz has been an amateur astronomer for 60 years and was born in Portsmouth Virginia. He became interested in astronomy at age 8 and received his first telescope in 1965, a 2-inch refractor. Later he received a 6-inch Criterion Dynascope and found all the Messier Objects in one year (1968-9). Then he spent some time with astrophotography (1972-4), having a few photos published in small astronomy magazines. Don decided to attempt a comet hunting program, which he began on Jan. 1, 1975 and found his first comet on Sept. 12, 1978, after 1700 hours of searching. He has now spent over 9,000 hours searching for comets, discovering twelve that bear his name. He is the world's number one visual comet discoverer.

Don is now semi-retired and living in Arizona with his wife Michele. He has a weekly Podcast ("Looking Up With Don") which stargazers worldwide depend upon for the latest astronomy news, receive guidance for finding astronomical objects with the unaided eye, binoculars and telescopes, and are entertained by stories from Don's years of observing. "Looking Up With Don" can be found on most popular podcast sites or downloaded each week from Don's website: Donmachholz.com. Don also writes for EarthSky.

NOTE: As per the Unitarian Church Policy:

- 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) 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
Jul. 15	Jul. 18	
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 06/20/22, our club's account balance is \$66,749.25. This includes \$43,120.90 in the H2O Rebuild fund.

TVS Welcomes New Members

TVS welcomes new members Hannah Blair, Andrew Moshova, Jason Patent, and Ashwin Philar. 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 22: Outreach Star Party for Camp Go Beyond, 8:30pm

July 23: Tesla Vintner's Member Star Party. 8:30-11:30pm

August 6: Del Valle Public Outreach Star Party, 7:30-11:30pm

August 20: H2O Open House with caravan departing promptly at 6:00pm 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/>

H2O Rebuild Update

The membership of the Tri-Valley Stargazers approved the construction of observatory facilities at H2O, including the initial \$14,900 for concrete work, and further expenses as approved by the Board of Directors advised by the Observatory Rebuilding Committee.

The TVS Board accepted the bid from Awesome Concrete Inc. for concrete related construction of the new observatory. The work includes pier foundation construction and wall construction to support the observatory dome. It is hoped that the work will begin in August.

Calendar of Events

July 16, 22, 23, 29, 30, Aug. 5, 6, 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://chabot.space.org/visit/plan-your-visit/>

For more information, see:

<https://chabot.space.org/events/events-listing/>

July 16, 10:00am-4:00pm

What: Investigating Space: Apollo 11 Throwback

Who: Maxwell Edmonds-Drati, Chabot Museum Educator

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

Cost: General Admission

Calendar of Events (con't)

As NASA plans Artemis, our next mission to the Moon, we are remembering the 1969 landing that changed everything 53 years ago, the first humans landed on the Moon as part of NASA's Apollo 11 mission. We look back at the story and impact of the Moon landing during this anniversary. We will look back at this historic accomplishment and look forward to humans' upcoming return to the Moon.

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

For COVID-19 Restrictions, see:

<https://chabot.space.org/visit/plan-your-visit/>

For more information, see:

<https://chabot.space.org/events/events-listing/>

July 20, 3:00pm-4:00pm

What: Planets, Exoplanets and More with JWST
Who: Dr. Christine Chen and Dr. John Stansberry (STScI)
Sponsor: SETI Institute
Online: REGISTRATION REQUIRED [JWST SETI Talk](#)

On July 12, NASA will reveal the first images of the James Webb Space Telescope (JWST), often called the successor of the Hubble Space Telescope. JWST will look farther back in time and space than ever before. But the giant telescope could also be turned to targets in our cosmic backyard, like planets and

asteroids in our solar system, and nearby stars, to detect planetary systems in formation and exoplanets.

Bigger and more potent in the infrared than any space observatory ever launched, JWST will see the very first stars and galaxies, answering critical questions about the formation and structure of our universe. However, more importantly for astrobiology, its powerful eyes will also scan exoplanets in the search for building blocks of life beyond our doorstep, revealing the way planetary systems form and uncover secrets hidden within our solar system. For more information, see: <https://www.seti.org/talks>

July 31, 6:30pm-9:30pm

What: Sunset Science: Searching For Planets
Who: Chabot Staff
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619
Cost: Advance purchase only. \$15 Adult, \$5 Youth, Members Free

Enjoy a warm summer evening of activities and stargazing on Chabot's stunning Observation Deck! Learn about stellar concepts with special demonstrations, activities and more. When the Sun goes down, the stars come out for exploring the cosmos through historic telescopes.

Learn about planets around other stars in the universe called exoplanets and how scientists use tools to look for them. Enter the Exoplanet zone where you will use your imaging to create your own planet, perform experiments with frozen icy orbs to

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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

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

OPEN
publicity@trivalleystargazers.org

Refreshment Coordinator

OPEN

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 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)

learn why astrobiologists are interested in water worlds and their potential for life. Julia DeMarines will return for an encore performance of *Space in Your Face*, a life science and comedic performance that pushes the boundaries of science futurism and reality. Chabot's Lisa Hoover will thrill audiences with a special performance of *Planet Hunter*.

For COVID-19 Restrictions, see:

<https://chabotspace.org/visit/plan-your-visit/>

For more information, see:

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

August 5, 6:00pm-10:00pm

What: First Friday: Far Out

Who: Expert Scientists

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

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

NASA's James Webb Space Telescope is the most advanced and complex instrument ever in space. How does Webb compare with other space telescopes, including the Hubble Space Telescope, and how will the mission extend our understanding of the Universe? Bring your curiosity for an evening of astronomical exploration.

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TVS Astrophotos



Chris Irwin imaged M16, including the Pillars of Creation, from his backyard in Dublin. He used an Ioptron RC8 and an ASI294mm Pro on an EQ6-R Pro mount. He used ZWO 7nm H-alpha, OIII, and SII filters. For each filter the exposures were 21 x 600s. The image is an SHO combination. A Starguider cam was used on a Svbony 60mm guidescope. SharpCap was used for polar alignment and image sequencing. The data were stacked in Deep-Sky Stacker, and combined and processed in GIMP and MacOS Photos.

TVS Astrophotos (con't)



Moe Yassine processed data from a remote Southern Hemisphere telescope resulting in this image of Dust in Chamaeleon. The telescope was a Takahashi FSQ-106ED with a 0.73x focal reducer on a Paramount MX+ mount. The imaging camera was a FLI PL-16803 CCD camera. The exposure time was 1h 20min. The data were processed using Photoshop CC and PixInsight.

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

All times are Pacific Daylight Time

July

13 Wed Full Moon (11:38am)

15 Fri The Moon trails Saturn by $\sim 6^\circ$ (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 $\sim 3^\circ$ (Morning)

20 Wed Last-Quarter Moon (7:19am)

21 Thu The Moon and Mars are high in the SE, separated by $\sim 2.5^\circ$ (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)

August

1 Mon Venus, Mars, Jupiter, and Saturn stretch from the east to the southwest (Dawn)

3 Wed The Moon is in Virgo, $\sim 3^\circ$ above Spica (Dusk)

5 Fri First-Quarter Moon (4:07am)

6 Sat The Moon is in Scorpius, $\sim 4.5^\circ$ from Antares (Evening)

11 Thu Full Moon (6:36pm) is $\sim 5^\circ$ from Saturn (Evening)

12-13 Fri- Perseid Meteor Shower coincides with the nearly Full Moon (All night, see p. 50, August S&T)

14 Sun Saturn is at opposition (Visible All Night, see p. 48, August S&T)

15 Mon The Moon and Jupiter are high in the south, separated by $\sim 2^\circ$ (Morning)

18 Thu Venus and M44, the Beehive Cluster, rise together in the ENE (Dawn)

18 Thu Last-Quarter Moon (9:36pm)

19 Fri The Moon, Mars, and the Pleiades are high above the eastern horizon, spanning $\sim 6^\circ$ (Morning)

20 Sat The Moon is $\sim 7^\circ$ from Aldebaran, with Mars and the Pleiades to their upper right (Morning)

23 Tue The Moon in Gemini forms a triangle with Castor and Pollux in the ENE (Dawn)

25 Thu The impossibly thin crescent Moon is 6° from Venus in the ENE (Dawn)

27 Sat New Moon (1:17am)

30 Tue Mars is located between Aldebaran and the Pleiades in the east (Morning)

30 Tue The crescent Moon is $\sim 4^\circ$ to the upper right of Spica (Dusk)

Calendar of Events (con't)

For more information, see:

<https://chabot.space.org/events/events-listing/>

September 3, 7:30-9:30pm

What: There is no Planet B

Who: Dr. Carolyn Porco (Visiting Distinguished Scholar, UC Berkeley)

Sponsor: Mt. Tam Astronomy Program

Online: [Zoom: Mt Tam](#)

We have entered the era of New Space, when private interests have been given the green light and are finally making headway into the commercialization of the final frontier. It's

already past the time for tough questions. Will mining asteroids really save the Earth? Can humans avoid extinction by moving our civilization to Earth-orbiting space colonies or terraforming and colonizing Mars? What about the hype over space tourism, or the tens of thousands of internet satellites planned for low Earth orbit? Is any of it even realistic? The speaker will give us her take on the recent developments in space exploration and what it means for all of humanity, now and into the future.

For more information, see:

<https://www.mttamastronomy.org/calendar>

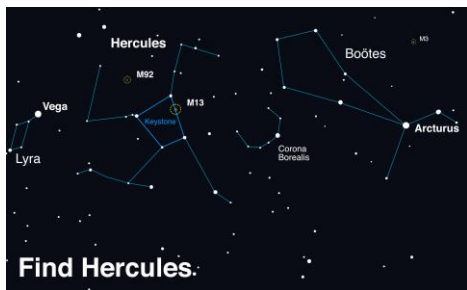


Find Hercules and His Mighty Globular Clusters

By David Prosper

Hercules is one of the standout heroes of Greek mythology, but his namesake constellation can be surprisingly hard to find - despite being one of the largest star patterns in our night skies! Once you find the stars of Hercules, look deeper; barely hidden in the space around his massive limbs and “Keystone” asterism are two beautiful globular star clusters: M13 and M92!

Since the constellation itself is relatively dim but bordered by brighter constellations, you can find the stars of Hercules by looking between the bright stars Vega and Arcturus. They are fairly easy to identify, and we have tips on how to do so in previous articles. Vega is the brightest star in the constellation Lyra and one of the three stars that make up the Summer Triangle (June 2020: Summer Triangle Corner: Vega). Arcturus is the brightest star in the constellation Boötes, and can be found by “arcing to Arcturus” from the handle of the Big Dipper (May 2021: Virgo’s Galactic Harvest). You may be able to Hercules’s “Keystone” asterism first; this distinct pattern of four stars is traditionally shown as the torso of the great hero, though some illustrators prefer marking the Keystone as the head of Hercules. What pattern do you see in the stars of Hercules?



Caption: Look up after sunset during summer months to find Hercules! Scan between Vega and Arcturus, near the distinct pattern of Corona Borealis. Once you find its stars, use binoculars or a telescope to hunt down the globular clusters M13 and M92. If you enjoy your views of these globular clusters, you’re in luck - look for another great globular, M3, in the nearby constellation of Boötes. Image created with assistance from Stellarium: stellarium.org

Globular star clusters appear “fluffy,” round, and dense with stars, similar to a dandelion gone to seed, in contrast to the more scattered and decentralized patterns of open clusters. Open clusters are generally made up of young stars that are gradually spreading apart and found inside our Milky Way galaxy, while globular clusters are ancient clusters of stars that are compact, billions of years old, bound to each other and orbit around our galaxy. Due to their considerable distance, globular clusters are usually only visible in telescopes, but one notable exception is M13, also known as the Great Cluster or Hercules Cluster. During very clear dark nights, skilled

observers may be able to spot M13 without optical aid along the border of the Keystone, in between the stars Zeta and Eta Herculis - and a bit closer to Eta. Readily visible as a fuzzy “star” in binoculars, in telescopes M13 explodes with stars and can fill up an eyepiece view with its sparkling stars, measuring a little over half the diameter of a full Moon in appearance! When viewed through small telescopes, globular clusters can appear orblike and without discernable member stars, similar in appearance to the fuzzy comae of distant comets. That’s why comet hunters Edmund Halley and Charles Messier discovered and then catalogued M13, in 1714 and 1764 respectively, marking this faint fuzzy as a “not-comet” so as to avoid future confusion.



Caption: Composite image of the dense starry core of M92 imaged in multiple wavelengths. While your own views of these globular clusters won’t be nearly as crisp and detailed, you might be able to count some of its member stars. How far into their dense cores can you count individual stars? Credits: ESA/Hubble & NASA; Acknowledgment: Gilles Chapdelaine.

Source: www.nasa.gov/feature/goddard/2017/messier-92

While enjoying your view of M13, don’t forget to also look for M92! This is another bright and bold globular cluster, and if M13 wasn’t so spectacular, M92 would be known as the top celestial sight in Hercules. M92 also lies on the edge of naked-eye visibility, but again, binoculars and especially a telescope are needed to really make it “pop.” Even though M92 and M13 appear fairly close together in the sky, in actuality they are rather far apart: M13’s distance is estimated at about 25,000 light years from Earth, and M92’s at approximately 27,000 light years distant. Since M13 and M92 appear so close together in our skies and relatively easy to spot, switching between these two clusters in your scope makes for excellent star-hopping practice. Can you observe any differences between these two ancient clusters of stars?

Globular clusters are closely studied by astronomers for hints about the formation of stars and galaxies. The clusters of Hercules have even been studied by NASA’s space telescopes to reveal the secrets of their dense cores of hundreds of thousands of stars. Find their latest observations of globular clusters - and the universe - 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.



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.