The SAN MATEO COUNTY ASTRONOMICAL SOCIETY

November 2016 — 639th General Meeting Notice

EVENT HORIZON

Founded in 1960, the San Mateo County Astronomical Society is a 501(c)(3)non-profit organization for amateur astronomers and interested members of the public. Visitors may attend Society meetings and lectures on the first Friday of each month, September to June, and star parties two Saturdays a month. All events are free for visitors and guests. Family memberships are offered at a nominal annual cost. Detailed info is found at www.smcasastro.com, where those who want can join via Paypal.
Membership includes access to this monthly Event Horizon newsletter, discounted costs and subscriptions to calendars and magazines, monthly star parties of the Society and the College of San Mateo, use of loaner telescopes, field trips, social occasions and general meetings presenting guest speakers and programs. For additional information, please email us at SMCAS@live.com, or call us at (650) 678-2762.

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SMCAS CO-SPONSORED the 2016 Family Science and Astronomy Festival held at the College of San Mateo on October 8, with volunteers participating in many capacities as in past years. Above, "Comet Chef" Ed Pieret drew an enthusiastic crowd with his hands-on demonstration of comet composition. More on page 5.

DATES TO SAVE

Nov 4: General Meeting, Pizza, and Presentation at the CSM Planetarium. Details on page 4.

Dec 2: General Meeting, Pizza, and Presentation at the CSM Planetarium.

Dec 17: Holiday Party at Crystal Springs Methodist Church, San Mateo. Bring a dish to share.

More events and details on page 8.

President's Corner

Aloha! I am writing this while on the Big Island of Hawaii, taking a break from the midday sun and activities. The Hawaiians have a long history and deep involvement with astronomy. And on the Big Island it is not difficult to find things of astronomical interest, and I have been trying to take advantage of that to visit astronomy related places and learn more.

Imiloa Astronomy Center

One of the first stops my wife and I made was visiting the Imiloa Astronomy Center of Hawaii at the University (of Hawaii) Research Park in Hilo Hawaii. Imiloa in Hawaiian means “exploration driven by a sense of wonder and imagination” or alternatively, “exploring new knowledge.” The Imiloa Astronomy Center is an astronomy and Hawaiian cultural center, housing exhibits on astronomy, the research going on at Maunakea, Wayfinding, the Hawaiian creation legend, plus a planetarium and more. The Imiloa building itself is a uniquely designed structure clad in Titanium, with cone shaped roof peaks meant to remind you of the Hawaiian volcano mountains. This is must see stop for any visiting astronomers on the Big Island (`www.imiloahawaii.org`).

Hōkūle'a

Imiloa has an extensive exhibit on the Polynesian traditional manner of celestial navigation called Wayfinding. The first Hawaiians arrived using celestial navigational techniques to find their way around the Pacific, indeed the entire Pacific was colonized by the Polynesians using these techniques. The Polynesians were merrily sailing around the entire Pacific, with evidence they reached South America, centuries before Europeans dared to leave sight of land. Wayfinding was once on the verge of being lost, but has been revived starting with the launch of the traditional Polynesian double hulled voyaging canoe Hōkūle'a (named for the Hawaiian Star of Gladness: Arcturus) in 1975. Since launching, Hōkūle'a has navigated approximately 140,000 nautical miles around the Pacific. A sister ship, Hikianalia (named for Hawaiian word for Spica, the sister star to Arcturus because they both break the horizon together at the latitude of Hawaii), was launched in 2012. Together they have almost finished a 60,000 nautical mile circumnavigation of the globe. This Wayfinding activity has inspired a revival of canoe building and voyaging throughout Polynesia (`www.hokulea.com`).

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Imiloa also talks about the tension between the astronomical observatories on top of Maunakea and the native Hawaiian culture, which considers Maunakea a sacred site being desecrated by the facilities being built there. This tension has resulted in stopping progress on the new Thirty Meter Telescope (TMT) planned for the summit of Maunakea. So even though this site is far away from us, we as astronomers are feeling the effects of what goes on there and the resurgence of Hawaiian culture. This same tension is being played out at other mountaintop observatory sites around the world:

Mauna Kea operations center

www.scientificamerican.com/article/
hawaii-s-telescope-controversy-is-the-latest-in-a-long-history-of-land-ownership-battles

Our next stop in the University Research Park was the next street up the hill from Imiloa, where the University Research Park is also home to 5 operations centers for the telescopes and astrophysics research going on at the summit of Maunakea. While the operations centers are not open to the public, it is interesting and fun to drive past them. They are all on the same street, next to each other: Gemini Observatory, Subaru Telescope, UofH Institute for Astronomy Mauna Kea Operations Center, East Asian Observatory, and the Smithsonian Astrophysical Observatory Submillimeter Array.

Lastly, we made it to the Onizuka Center for International Astronomy Visitor Information Station, up at the 9.200 foot level on the road to the summit of Maunakea. We lucked out in that it was a beautiful evening to watch the sunset from there. The evening we were there (Oct 15) was also the evening of the Hunter's Supermoon—so from the crest of the hill a short hike above the visitor center we were able to watch a spectacular sunset to the west, and then the supermoon rise to the east! And every evening, weather permitting, there is a great star party at the visitor center. Unfortunately, the brightness of the supermoon that evening made it difficult to see much beyond Venus, Saturn, Mars and the moon. Add this to your list of activities to do when on Hawaii! Hint: arrive early, it can get crowded around sunset. (www.ifa.hawaii.edu/info/vis).

Lastly, I sadly report the passing of Lloyd Brownell on October 22, at age 95. Lloyd was a member of SMCAS from 1981 through 2007. He was Vice President for two years from 1982 to 1984, and President for the term 1986–7.

See you at the November meeting (maybe)!

Aloha,

Marion Weiler
President, San Mateo County Astronomical Society

SMCAS General Meeting and Presentation on Friday November 4, 2016

Dr Ross Beyer

Research Scientist
Carl Sagan Center at the SETI Institute

Exploration of the Pluto System
Updates from the New Horizons Mission

Friday, November 4, 2016 , College of San Mateo, Building 36
SMCAS General meeting at 7:00 p.m. ISC Room, room 110
Presentation at 8:00 p.m. in the CSM Planetarium
Free and open to the public, free parking.

In the summer of 2015, Pluto went from a distant point of light to a full-fledged world in human understanding. Join us as we discuss the interesting fractured geology of Pluto and its moons, particularly Charon, as revealed by the New Horizons Mission. Dr. Ross Beyer, member of the New Horizons team and a Research Scientist at the SETI Institute, will take you on a tour of the canyons, faults, craters, smooth plains, enigmatic mountains, and all manner of terrains that New Horizons observed as it flew through the Pluto system.

Ross is currently a Principal Investigator and Research Scientist with the Carl Sagan Center at the SETI Institute. He carries out his research in the Space Science and Astrobiology Division (Planetary Systems Branch, SST) and the Intelligent Robotics Group (part of the Intelligent Systems Division, TI) at the NASA Ames Research Center. He studies surface geomorphology, surface processes, remote sensing and photogrammetry of the solid bodies in our Solar System—if you can stand on it, he's interested in what it's like and how it got that way.

Ross works on planetary surface studies. He has performed geophysical modeling of diapirism on Mars and other terrestrial planets. He works on ways to quantitatively analyze the meter-scale topography and surface roughness of planetary surfaces via remote sensing. This work has been used to help plan landing sites on Mars. Ross has worked to gain a better understanding of the stratigraphy and layering on Mars, particularly in the slopes of the chasmata and the interior mesas in order to learn more about the geologic history of Mars. Ross has also worked with images from Pluto and Charon to better understand their geology and tectonic history.

The Family Science and Astronomy Festival of October 8, 2016

By Marion Weiler

On Saturday, October 8, we co-sponsored another successful annual Family Science and Astronomy Festival at the College of San Mateo. Work on planning the event had been going on since last summer by the festival planning committee, with representatives from CSM, the Astronomical Society of the Pacific, and SMCAS. The format was similar to previous years: activities in the science building,, Sun Plaza and Planetarium from 2–6pm; keynote speaker at 7pm in the CSM Theatre; and a Jazz Under the Stars Star party from 9–11pm at the CSM rooftop Observatory.

Estimates are that we hosted around 1,000 attendees. We can't put on great events like these without a lot of volunteer help. I would like to thank all the awesome SMCAS volunteers who helped out: Ed Pieret (Comet Chef), Ken Lum (Solar Scope), John Fiske (How a Telescope Works), Rachel Freed (solar telescopes), Mike Ryan (membership table), Edwin Ching and Bob Black (planispheres) , Ted Jones (Star Party), Karen Boyer (reception), Mary Ann McKay (cake for the volunteers!).

SMCAS volunteers at the 2016 Family Science and Astronomy Festival.

Left: Mike Ryan mans the SMCAS membership table.

Below: John Fiske explains the optics of a refracting telescope.

Members Forum

Spacecraft Models

By Ken Lum

For the past couple of decades, various manufacturers have been releasing miniature mostly pre-assembled models of spacecraft and aircraft of remarkable quality and accuracy into the consumer market at reasonable prices. Because they are already painted and assembled, there is no need to become a skilled model builder to acquire and have them as excellent decorations on your desk and bookshelves. These are not toys and are, therefore, not recommended for very young children. Really, they are meant for serious adult collectors of decorative artifacts.

I brought some of these models from my personal collection to show and tell about during our Fall Equinox club banquet and used them as a stimulus to talk about the missions and programs the real vehicles were involved in. Most of these models are made to very small scales of 1/700,

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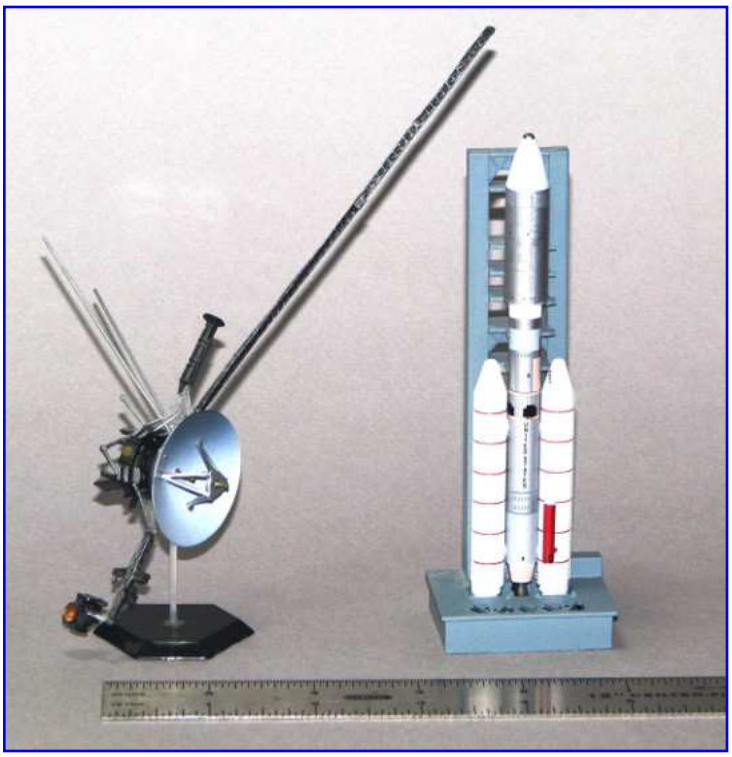
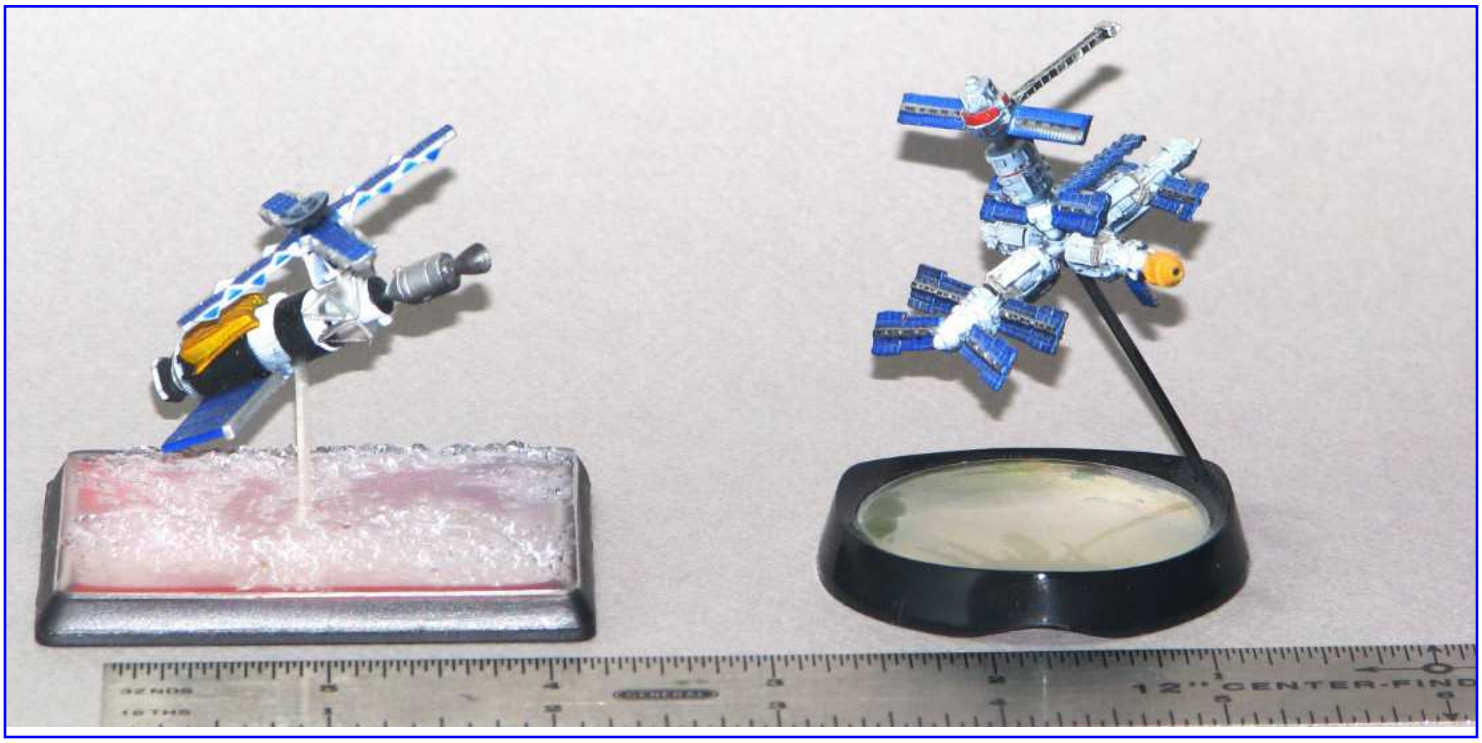


Left, a Takara Voyager spacecraft model; right, a 1/400 model of the Titan IIIE Voyager launch vehicle from Dragon models.



1/700 scale models by Takara of the US Skylab space station (left) and the Russian Mir space station.

Models, continued from p. 6

1/400, 1/200, and 1/144 size so they do not occupy much space.

The models shown were mostly purchased online from various vendors including Amazon and Ebay. Perhaps the best vendor of preassembled aerospace models is `www.flyingmule.com`, which also offers airplane and science fiction models as well.

A good series to consider that is very small, very accurate for their size, and modestly priced are the Takara Science Museum Space Exploration Models mostly found on Ebay and typically priced around $13 each. The Voyager spacecraft model pictured on the previous page is an example of what is offered.

For those wanting to tackle an assembly kit and having the tools, time, and skills to do so, the best vendor is `www.realspacemodels.com`. These models are typically larger at scales of 1/72 and 1/144. They offer the persistent and creative modeler opportunities to build models of incredible detail. But these are not the only model offerings out there, and an internet search will reveal many more vendors.

A 1/400 scale model of the Russian Soyuz launch vehicle by Dragon models.

A local hobby shop that occasionally offers these models is Talbots Toyland at 445 South B Street in downtown San Mateo. A local club that fosters related model building activities along with an opportunity to learn about techniques, tools and accessories is the Silicon Valley branch of the International Plastic Modelers Society (IPMS) (No, not the International Pest Management Society!) They meet in Milpitas each month on the 3rd Friday at 7:30pm, Milpitas Police Department, 1275 North Milpitas Blvd. They have a website at:

`calendar.ipmsusa3.org/chapter/ipmssilicon-valley-scale-modelers`

They also have an exhibition convention each spring at 770 Montague Expy in San Jose where the members' handiwork on many kinds of models can be admired.

Event Update

Upcoming Holiday Party, Star Parties, and Monthly Meetings, for SCMAS this Year and Beyond!

We have many fun and interesting activities planned in the coming months. See the web site (www.smcasastro.com) or contact Marion Weiler (mgwe@pacbell.net) for more information or to volunteer at any of these events. Please contact Ed Pieret (epieret@comcast.net) if you are available to help out with Star Parties at Crestview Park and other locations.

Fri, Nov 4	7:00 pm	**General Meeting, Pizza Social and Presentation**
Sat, Nov 26	5:00 pm	**Crestview Park Star Party**
Fri, Dec 2	7:00 pm	**General Meeting, Pizza Social and Presentation**
Sat, Dec 3	5:00 pm	**Crestview Park Star Party**
Tue, Dec 13	Midnight+	**Geminids Meteor Shower Peaks — King of meteor showers (unfortunately also full moon this year)**
Sat, Dec 17	6:00 pm	**Holiday Party, Crystal Springs Methodist Church, San Mateo**
Fri, Jan 6		**No General Meeting in January**
Sat, Jan 21	5:00 pm	**Crestview Park Star Party**
Sat, Jan 28	5:30 pm	**Crestview Park Star Party**
Fri, Feb 3	7:00 pm	**General Meeting, Pizza Social and Presentation**
Sat, Feb 18	5:45 pm	**Crestview Park Star Party**
Sat, Feb 25	5:45 pm	**Crestview Park Star Party**
Fri, Mar 3	7:00 pm	**General Meeting, Pizza Social and Presentation**
Sat, Mar 18	7:00 pm	**Crestview Park Star Party**
Sat, Mar 25	7:15 pm	**Crestview Park Star Party**

Is Proxima Centauri's ‘Earth-like’ planet actually like Earth at all?

By Ethan Siegel

Just 25 years ago, scientists didn’t know if any stars—other than our own sun, of course—had planets orbiting around them. Yet they knew with certainty that gravity from massive planets caused the sun to move around our solar system’s center of mass. Therefore, they reasoned that other stars would have periodic changes to their motions if they, too, had planets.

This change in motion first led to the detection of planets around pulsars in 1991, thanks to the change in pulsar timing it caused. Then, finally, in 1995 the first exoplanet around a normal star, 51 Pegasi b, was discovered via the “stellar wobble” of its parent star. Since that time, over 3000 exoplanets have been confirmed, most of which were first discovered by NASA's Kepler mission using the transit method. These transits only work if a solar system is fortuitously aligned to our perspective; nevertheless, we now know that planets—even rocky planets at the right distance for liquid water on their surface—are quite common in the Milky Way.

On August 24, 2016, scientists announced that the stellar wobble of Proxima Centauri, the closest star to our sun, indicated the existence of an exoplanet. At just 4.24 light years away, this planet orbits its red dwarf star in just 11 days, with a lower limit to its mass of just 1.3 Earths. If verified, this would bring the number of Earth-like planets found in their star's habitable zones up to 22, with ‘Proxima b’ being the closest one. Just based on what we've seen so far, if this planet is real and has 130 percent the mass of Earth, we can already infer the following:

- It receives 70 percent of the sunlight incident on Earth, giving it the right temperature for liquid water on its surface, assuming an Earth-like atmosphere.
- It should have a radius approximately 10 percent larger than our own planet's, assuming it is made of similar elements.
- It is plausible that the planet would be tidally locked to its star, implying a permanent ‘light side’ and a permanent ‘dark side’.
- And if so, then seasons on this world are determined by the orbit's ellipticity, not by axial tilt.

Yet the unknowns are tremendous. Proxima Centauri emits considerably less ultraviolet light than a star like the sun; can life begin without

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An artist's conception of the exoplanet Kepler-452b (R), a possible candidate for Earth 2.0, as compared with Earth (L). Image credit: NASA/Ames/JPL-Caltech/T. Pyle.

November Rise and Set Chart

SMCAS 2016		**Nov 5 Rise**	**Nov 5 Set**	**Nov 26 Rise**	**Nov 26 Set**
Sun		7:39 AM	6:05 PM	7:01 AM	4:52 PM
Moon	Closest on 14th	12:32 PM	10:58 PM	4:17 AM	3:40 PM
Mercury	Very briefly after sunset	8:09 AM	6:20 PM	8:28 AM	5:44 PM
Venus	After sunset	10:54 AM	8:13 PM	10:20 AM	7:42 PM
Mars	In the evening	1:18 PM	10:56 PM	11:44 AM	9:52 PM
Jupiter	Before sunrise	5:03 AM	4:44 PM	3:00 AM	2:32 PM
Jupiter's moons		c g lJ e		i gJ e c	
6DT/5ST AM, E on left		J=Jupiter, c=Callisto, e=Europa, g=Ganymede, i=Io			
Saturn	After sunset	10:09 AM	7:55 PM	7:57 AM	5:41 PM
Uranus	Most of the night	5:00 PM	5:57 AM	2:36 PM	3:31 AM
Neptune	Much of the night	3:16 PM	2:29 AM	12:54 PM	12:06 AM
Pluto	In the evening	12:20 PM	10:05 PM	10:00 AM	7:44 PM

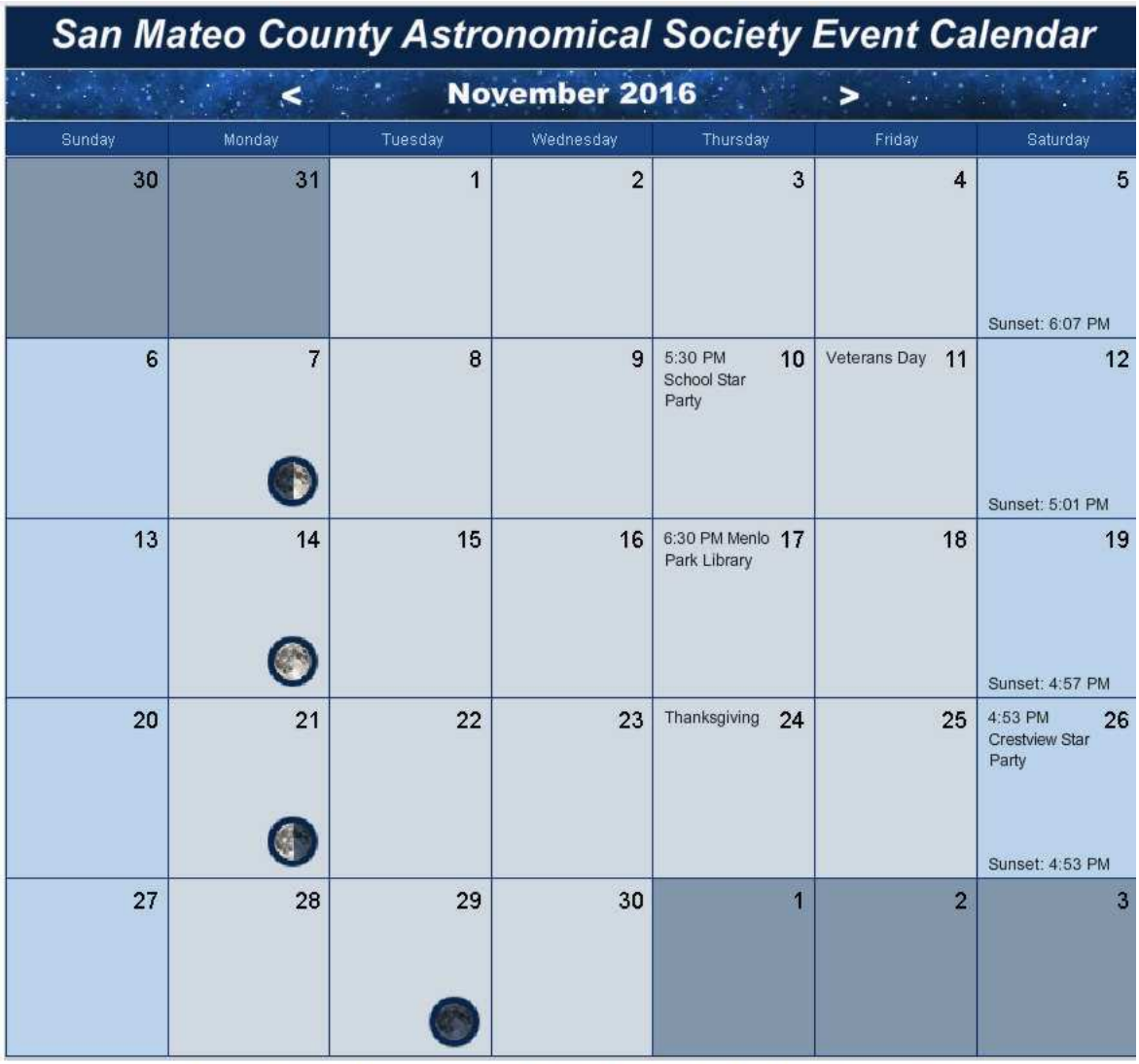
- Nov 5 is PDT. Nov 26 is PST.
- Jazz Under the Stars is at CSM on the 5th.

– courtesy of Ron Cardinale

Fundraising for the Group: SMCAS Participates in AmazonSmile and Receives a Percentage of Your Purchase

SMCAS is now enrolled in AmazonSmile, a program that enables certified 501(c)(3) non-profit organizations to receive donations from eligible purchases at Amazon.

To enroll in the program, go to smile.amazon.com. On your first visit to this site, you can select a charitable organization – San Mateo County Astronomical Society (SMCAS) – that will receive 0.5% of the purchase price of eligible items on Amazon. How will you know if an item is eligible? Items are clearly and literally marked on the product detail pages with "Eligible for AmazonSmile donation." For more information, go to smile.amazon.com/about.



San Mateo County Astronomical Society Event Calendar from the Night Sky Network.

Calendar courtesy of Ed Pieret

Proxima b, continued from p. 9

that? Solar flares and winds are much greater around this world; have they stripped away the atmosphere entirely? Is the far side permanently frozen, or do winds allow possible life there? Is the near side baked and barren, leaving only the 'ring' at the edge potentially habitable?

Proxima b is a vastly different world from Earth, and could range anywhere from actually inhabited to completely unsuitable for any form of life. As 30m-class telescopes and the next generation of space observatories come online, we just may find out!

Looking to teach kids about exoplanet discovery? NASA Space Place explains stellar wobble and how this phenomenon can help scientists find exoplanets:

spaceplace.nasa.gov/barycenter/en

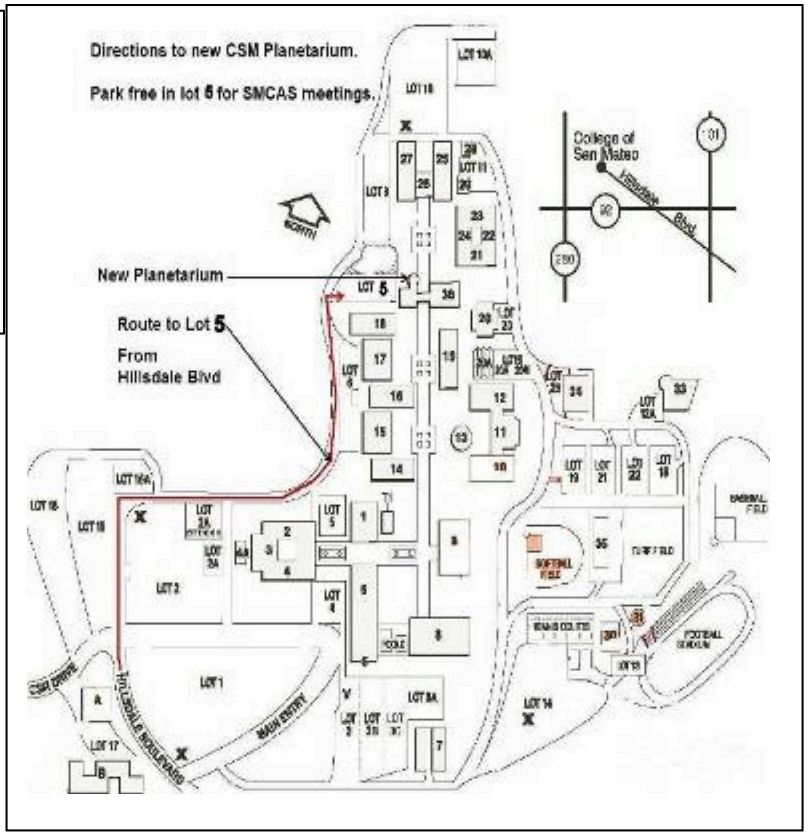
This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!

Directions to SMCAS Meetings at CSM, and to Star Parties

Star Parties are Free to Members and Visitors and are Held Regularly, Weather Permitting

Directions to the CSM Planetarium for Meetings

After exiting Hwy 92 at Hillsdale Blvd, climb the hill towards CSM, passing two traffic lights to the stop sign at the top. Continue straight, bear right then, after the 2nd stop sign, bear left over the rise. Enter the next parking lot on the right, called Lot 5, "Marie Curie'. Science Bldg 36 and the planetarium lie straight ahead. Enter Bldg. 36 thru the door facing the lot, or walk around the dome to the courtyard entrance.



Crestview Park

Come on out, and bring the kids, for a mind-blowing look at the Universe!

Bring your binoculars, telescopes, star guides, and lounge chairs for some informal star gazing at Crestview Park.

Dress warmly and wear a hat. Only visitors with telescopes should drive in. Others should park on the street and walk in, or arrive before dark so that car headlights don't affect the observers' dark adaptation. Bring small flash-lights only, covered with red cellophane or red balloon.

These measures avoid safety issues of maneuvering in the dark, as well as ruining the night vision of the viewers.

Please don't touch a telescope without permission. And, parents, please don't let children run around in the dark.

Directions to Crestview Park for Star Parties

From Hwy 101 or El Camino, take Brittan Avenue in San Carlos, west (to the hills). Follow Brittan 2.3 miles (from El Camino) to Crestview Drive. Turn right on Crestview. In half-a-block, you will see a small blue posted sign with an arrow, indicating the entry road into Crestview Park. It lies between houses with addresses #998 and #1000 Crestview Drive.

From Highway 280, take Edgewood Road exit. Go east (toward the Bay) about 0.8 miles. Turn left at Crestview Drive. Go 0.5 mile uphill to where Crestview meets Brittan. Again, drive the half-block, to the sign on the right, and the entry road on the left.

Note: If bringing a telescope and arriving after dark, please enter the Park with your headlamps and white interior lights off. If you aren't bringing a telescope, whether before or after dark, please park along Crestview Drive, and walk in.

2nd Note: Crestview Park is residential, adjacent to homes and backyards. Before inviting potentially noisy groups, please call Ed Pieret at (650) 595-3691 for advice and advisories. Call Ed also to check the weather and 'sky clock', and to see whether the star party is still scheduled.

Membership Application and Society Information

To join the San Mateo County Astronomical Society or to renew membership, you can pay dues via Pay Pal on our website (www.smcasastro.com), at any monthly meeting, or send your check, payable to SMCAS, to: **SMCAS, PO Box 974, Station A, San Mateo, CA, 94403.**

Dues are currently $30 for a new (family) membership and renewing member and $15 for a student membership.
Please check one of the following boxes: ( ) New member ( ) Membership renewal ( ) Student ( ) Address or info change

NOTE TO RENEWING MEMBERS: Please complete the following form only if you have a change to your membership or contact info.

Name(s) _____

Address/City/Zip: _____

Phone(s) _____Email_____

SMCAS – Society Information

Meetings of the San Mateo County Astronomical Society are held the **first Friday of the month (except in July and August)** in the Planetarium at the College of San Mateo, 1700 West Hillsdale Blvd. in San Mateo. Exit Hwy. 92 at West Hillsdale Blvd. and, proceed uphill through the second and third sets of traffic lights, to the first stop sign at the top of the hill. Continue straight, bearing right then, after the second stop sign, left up over a rise.After the third stop sign, enter the first parking lot on the right with a sign 'Lot 5, Marie Curie', identifying the top level plus those below.

Science Bldg. 36 adjoins the lot, with the geodesic planetarium dome to its left. Circle the planetarium, or enter Bldg 36 thru the door facing Lot 5. For the 4th floor observatory, use the elevator just inside on the right. The planetarium corridor is ahead on the left. Turn left at the restroom sign.

Officers: President: Marion Weiler; **Vice-President:** Ed Pieret; **Treasurer:** Karen Boyer; **Secretary:** Vacant.
Board Directors-At-Large: Ed Ching, Bob Franklin, Ken Lum, Mary Ann McKay, Mike Ryan, and Frank Seminaro.

Event Horizon Editor: Ted Jones. **NOTE**: Newsletter is posted by the beginning of each month (except for July and August). Submissions and photos are welcome by the 15th of the month before publication.

SMCAS Contact Information
Website: www.smcas.net
The CSM Astronomy Department schedule is at www.collegeofsanmateo.edu/astronomy/events.
Email: SMCAS@live.com
Society Yahoo group: http://groups.yahoo.com/group/smcas.
Yahoo Group Subscription: email smcas-subscribe@yahoogroups.com to subscribe.
Event Horizon: To submit articles or photos, please contact Ed Pieret — epieret@comcast.net or 650.862.9602.