

# The SAN MATEO COUNTY ASTRONOMICAL SOCIETY

January 2017 — NO GENERAL MEETING THIS MONTH



# 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](http://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](mailto:SMCAS@live.com), or call us at (650) 678-2762.



*THE FIRST HALF of 2017 will bring several bright comets, perhaps the most promising opportunities for casual amateurs and the general public since the very bright C2014/Q2 (Lovejoy) in 2014–2015 (above, photo by Terry Lovejoy). See page 6 for a short review.*

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## DATES TO SAVE

**Feb 3:** General Meeting, Pizza, and Presentation at the CSM Planetarium.

**Mar 3:** General Meeting, Pizza, and Presentation at the CSM Planetarium.

More events on page 5.

Don't forget to renew your membership for 2017! Online, go to [www.smcasastro.com/renewal.html](http://www.smcasastro.com/renewal.html) or use the form on page 11.

## President's Corner

Happy New Year! I hope you and your friends and family had a great 2016, and that 2017 will be an outstanding year for you all.

SMCAS is looking forward to a busy 2017. We'll have our normal complement of meetings, presentations, star parties and socials, plus we have number of astronomical events to appreciate this year. Events started with the Quadrantid meteor shower which peaked on January 3–4, then go on to the solar eclipse August 21st, and finishing up near the close of the year we will have the King of Meteor Showers, the Geminids, peaking on December 13–14. We'll also have many other events along the way, including many minor meteor showers such as the Perseids, and several comets to look out for (see Ted Jones' article, page 6).

Our holiday party on December 17th turned out great for the 25+ attendees. there was lots of socializing, good food, good cheer and a presentation by Ken Lum on the history of the Lowell Observatory in Flagstaff Arizona. It was also a chance for a surprise birthday celebration for Ken Lum's wife Loh Chung! And once again many thanks to Bob Franklin for arranging the church room location for our event.

A holiday movie treat I managed to fit in: Hidden Figures. It's a movie with some good behind-the-scenes insights about the dawn of the US space program. The major theme of the film is the role of African American women as the computers for the space program in the era before the first IBM mechanical computers arrived, the success in spite of the discrimination they faced, and the key role they played. Beyond this, the movie gives us a look at the pressures the engineering team was faced with in trying to beat, and then catch up with the Russians in putting a man in space. Add in some vintage footage of the capsule launches and recoveries, and you get to see from a very different perspective a significant period of US space program history that many of our SMCAS members grew up in.

**Marion Weiler**

*President, San Mateo County Astronomical Society*



*Loh Chung Lum with her very tall surprise birthday cake. Transferring the cut slices to plates was challenging!*

## [December Meeting Review](#)

### Mars Trek: Powerful Online Tools for Exploring Mars

By Ken Lum

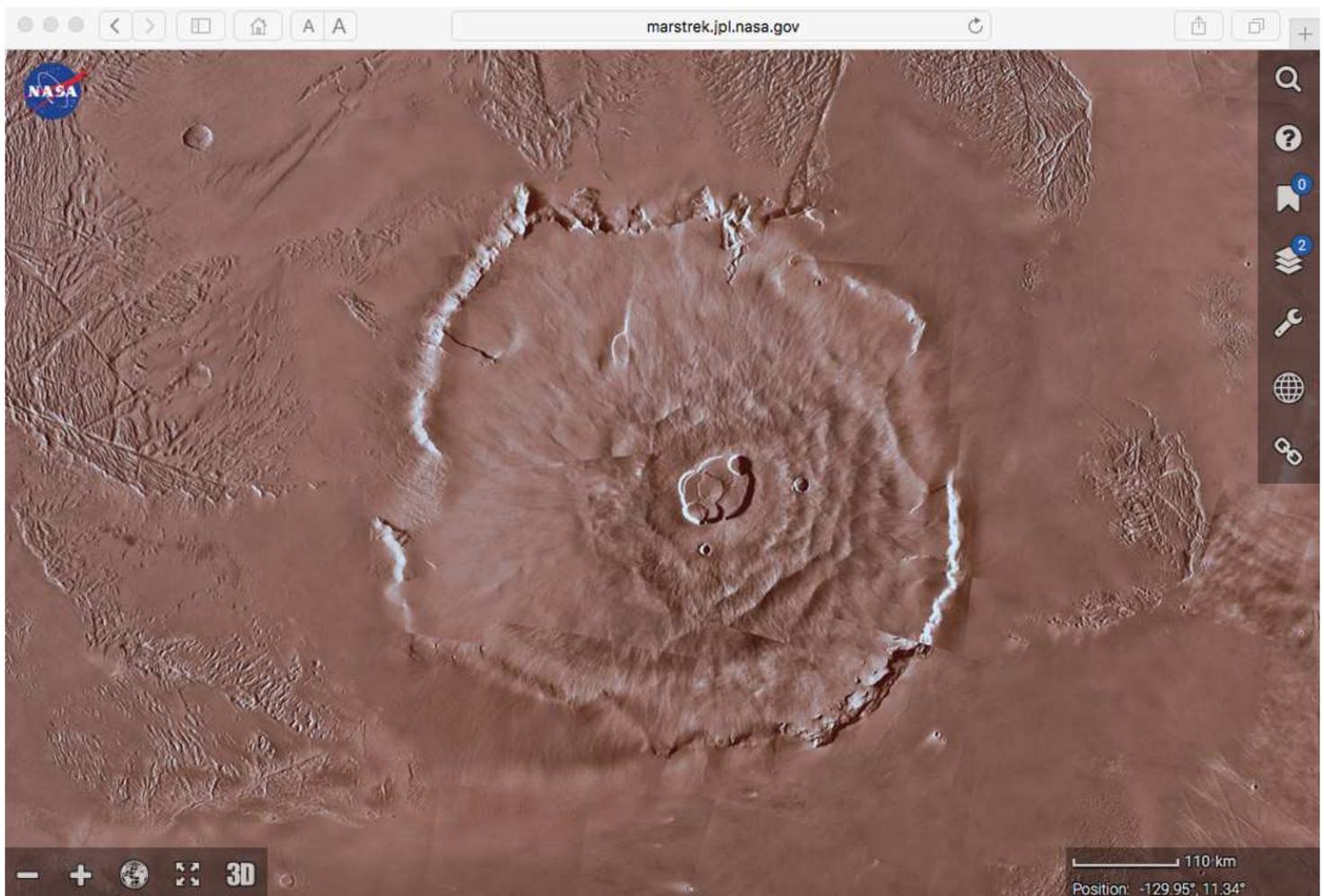
Mars was the topic of our General Meeting on Dec. 2, 2016 with Brian Day of NASA Ames Research Center. During his talk, Brian reviewed the many discoveries made about Mars since the first reconnaissance spacecraft were sent there beginning with the flyby of the NASA Mariner 4 spacecraft in 1964. A full list of successful and unsuccessful missions can be found at:

[mars.nasa.gov/programmissions/missions/log](https://mars.nasa.gov/programmissions/missions/log)

The missions were initially flybys followed by orbiters. Then, there were landers and rovers all resulting in a retinue of missions now active in orbit and on the surface of Mars.

From the first detailed telescopic observations of Mars made in the late 19th and early 20th Centuries, there seemed to be hints of the possibility of life on the planet. The Italian astronomer, Giovanni Schiaparelli, thought he saw various channels on Mars which he called “canali” in Italian, but was interpreted as possible canals of artificial origin built by intelligent beings by his English language readers, most notably Percival Lowell in America. Also, surface features showed changes in color and distribution which were often interpreted as possible seasonal changes in vegetation.

***Continued on p. 4***



*Olympus Mons as seen from the Mars Trek website.*

### **Mars Trek, continued from p. 3**

But none of these theories proved to be true once spacecraft were able to perform closeup reconnaissance. Instead, a cratered, thus far, dead, mostly dry world has been found as yet showing no signs of life. Nonetheless, Mars has been shown to be a geologic wonderland full of dead shield volcanoes such as Olympus Mons, a very large canyon called Valles Marinaris originating from some plate tectonics early in the planet's history that came to an end when the planet cooled, and craters and what look like water channels and river beds left over from a time when Mars was a much wetter planet with oceans and rivers. Presently, there is still water to be found on Mars, mostly locked in two polar ice caps.

Exploration by rovers of the craters where subsurface strata is exposed have shown the presence of rocks and minerals usually thought to be formed from exposure to water in the past. These include flays and sulfates along with minerals formed following water evaporation such as gypsum often found in what morphologically appear to be sedimentary rocks resulting from water induced settling of soil previously suspended in water.

Since all life that we know of on Earth requires water for its existence, it is natural for mission planners to orient exploratory missions to Mars to "follow the water" in their efforts to find evidence of past or present life. However, no such evidence has yet been found.

Nonetheless, the effort continues, most notably with the large NASA Curiosity rover which landed in 2012. Its discoveries have included the discovery of feldspar, pyroxenes and olivine which are similar to what is found in water-weathered basaltic soils in Hawaii suggesting that its landing site at Gale crater was once covered with a



*Brian Day of NASA Ames Research Center, left, answering questions after his talk at the December SMCAS general meeting.*

modest ocean or lakes making it possibly habitable in the past. Where most of Martian water has gone remains very much a mystery with many hypotheses proposed.

To aid in this research, NASA is pooling as much available Mars data into a website known as Mars Trek:

[marstrek.jpl.nasa.gov](http://marstrek.jpl.nasa.gov)

whereby a student or researcher can explore any part of Mars on an interactive map and find data pertinent to any chosen location such as its coordinates, elevation or depth, etc. Descriptions of some individual locations, particularly spacecraft landing sites, can be accessed via its Bookmarks feature. The interactive Mars map is particularly interesting as it allows zooming in to overhead maps of any location down to the highest available resolution. In addition, data can be downloaded that would allow any selected Mars landscape segment to be replicated with 3D printers. Other features seem to still be works in progress with NASA indicating that updates will be available in the future. So stay tuned!

## 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](http://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, Jan 6		<b>No General Meeting in January</b>
Sat, Jan 21	5:00 pm	<b>Crestview Park Star Party</b>
Sat, Jan 28	5:30 pm	<b>Crestview Park Star Party</b>
Fri, Feb 3	7:00 pm	<b>General Meeting, Pizza Social and Presentation</b>
Sat, Feb 18	5:45 pm	<b>Crestview Park Star Party</b>
Sat, Feb 25	5:45 pm	<b>Crestview Park Star Party</b>
Fri, Mar 3	7:00 pm	<b>General Meeting, Pizza Social and Presentation</b>
Sat, Mar 18	7:00 pm	<b>Crestview Park Star Party</b>
Sat, Mar 25	7:15 pm	<b>Crestview Park Star Party</b>

*The times given for Crestview star parties are approximately at sunset. Arrive then to set up a telescope or if you want to learn about telescopes. If you would like to merely see the wonders of the night sky through our telescopes, observing starts about an hour later and usually continues for about two hours.*

## [Members Forum](#)

### Comets for the Casual Observer in 2017

**By Ted Jones**

On Christmas night in 2014, I located comet C/2014 Q2 (Lovejoy) with binoculars from my backyard. I had a great time tracking it across the sky for the next few months. It was a very bright for a comet, about magnitude 6 when I first saw it and eventually reaching mag 4. Serious comet observers with large apertures and expertise to match have had many targets to observe since Lovejoy but for the beginner or binocular observer there has been nothing to rival it.

I have been looking forward to several comets in 2017. While unlikely to equal Lovejoy, they have a good chance of being bright enough and in the evening sky for long enough to afford a similar experience with modest equipment.

#### **Observing Tips and Resources**

Be skeptical of claims of naked eye visibility. Any comet predicted to reach mag 6 or better seems to attract them, apparently the product of writers who do not appreciate the distinction between point sources and extended objects, or for that matter how faint a mag-6 star is. As far as I can tell nothing currently predicted for 2017 is likely to approach naked eye visibility. However the prospects seem good for binocular observers willing to take the time needed to find faint targets.

An excellent web site for reports on the status of current and upcoming comets is [www.aerith.net](http://www.aerith.net). It is a good place to find out how bright a comet is and how actual observations compare to predictions. Predicting brightness accurately is notoriously difficult, so it's worth checking the status occasionally to stay current. Also check the main page for newly discovered comets, which sometimes brighten rapidly.

Comets can be added as solar system objects to the free planetarium software Stellarium. The

process, though not really difficult, is a little obscure. There are some pretty good instructions [in this discussion at stargazerslounge.com](#). Once you have added the comets you are interested in, you can ask Stellarium to find them just as you would search for a planet or NGC object. This gives you up to the minute coordinates with a zoomable display of the comet's position.

#### **Some Bright Comets for 2017**

Right now: comet **45P/Honda-Mrkos-Pajduskova** returns every 5 years or so. It reached perihelion on Dec 31, when I read a couple implausible "naked eye" claims for it. Currently it is very low in the west after sunset, with reported magnitude 7. At the end of January it will pass behind the sun, re-emerging in the morning sky in February. It will move rapidly away from the sun, and by mid-month will be well above the horizon by midnight. It may reach mag 6 in February or March, but prediction sources disagree in their expectations.

In March–May: **41P/Tuttle-Giacobini-Kresak** is another Jupiter-family comet with a period of 5–6 years. It will pass close by us, with the potential to reach mag 6 or brighter. It will be very well placed in the vicinity of Ursa Major and Draco, which will make it observable for most of the night.

In June long-period comet **C/2015 V2 (Johnson)** reaches perihelion, with a predicted peak magnitude of 6–7. The orbital period is over 4 million years so there is no historical record, making the predicted brightness more uncertain. Recently it seems to be exceeding expectations, but it is still only mag 11.

The famous frequent visitor **2P/Encke** passes near us this year but prospects for northern hemisphere observers seem poor.

## Big Science in Small Packages

By Marcus Woo

About 250 miles overhead, a satellite the size of a loaf of bread flies in orbit. It's one of hundreds of so-called CubeSats—spacecraft that come in relatively inexpensive and compact packages—that have launched over the years. So far, most CubeSats have been commercial satellites, student projects, or technology demonstrations. But this one, dubbed MinXSS (“minks”) is NASA's first CubeSat with a bona fide science mission.

Launched in December 2015, MinXSS has been observing the sun in X-rays with unprecedented detail. Its goal is to better understand the physics behind phenomena like solar flares—eruptions on the sun that produce dramatic bursts of energy and radiation.

Much of the newly-released radiation from solar flares is concentrated in X-rays, and, in particular, the lower energy range called soft X-rays. But other spacecraft don't have the capability to measure this part of the sun's spectrum at high resolution—which is where MinXSS, short for Miniature Solar X-ray Spectrometer, comes in.

Using MinXSS to monitor how the soft X-ray spectrum changes over time, scientists can track changes in the composition in the sun's corona, the hot outermost layer of the sun. While the sun's visible surface, the photosphere, is about 6000 Kelvin (10,000 degrees Fahrenheit), areas of



the corona reach tens of millions of degrees during a solar flare. But even without a flare, the corona smolders at a million degrees—and no one knows why.

One possibility is that many small nanoflares constantly heat the corona. Or, the heat may come from certain kinds of waves that propagate through the solar plasma. By looking at how the corona's composition changes,

**Continued on p. 9**



*Astronaut Tim Peake on board the International Space Station captured this image of a CubeSat deployment on May 16, 2016. The bottom-most CubeSat is the NASA-funded MinXSS CubeSat, which observes soft X-rays from the sun—such X-rays can disturb the ionosphere and thereby hamper radio and GPS signals. (The second CubeSat is CADRE — short for CubeSat investigating Atmospheric Density Response to Extreme driving built by the University of Michigan and funded by the National Science Foundation.) Credit: ESA/NASA.*

## January Rise and Set Chart

<b>SMCAS 2017 (PST)</b>		<b>Jan 21 Rise</b>	<b>Jan 21 Set</b>	<b>Jan 28 Rise</b>	<b>Jan 28 Set</b>
Sun	Closest on 4th	7:19 AM	5:22 PM	7:14 AM	5:29 PM
Moon	FQ:5,FM:12,LQ:19,NM:27	1:51 AM	12:49 PM	7:37 AM	6:32 PM
Mercury	Before sunrise	5:48 AM	3:28 PM	5:58 AM	3:37 PM
Venus	In the evening	9:31 AM	9:12 PM	9:16 AM	9:17 PM
Mars	In the evening	9:51 AM	9:42 PM	9:36 AM	9:40 PM
Jupiter	Late at night	11:49 PM	11:09 AM	11:22 PM	10:43 AM
Jupiter's moons		c i j g e		c i j e g	
2 AM Sun, East on left		J=Jupiter, c=Callisto, e=Europa, g=Ganymede, i=Io			
Saturn	Before sunrise	4:46 AM	2:27 PM	4:22 AM	2:02 PM
Uranus	In the evening	10:55 AM	11:46 PM	10:28 AM	11:19 PM
Neptune	After sunset	9:16 AM	8:27 PM	8:49 AM	8:01 PM
Pluto	Mostly in sun's glare	6:27 AM	4:12 PM	6:00 AM	3:46 PM

- Star parties are at Crestview on the 21st and 28th.
- Information about the next Jazz Under the Stars was not available when this was written.

*- 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](https://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](https://smile.amazon.com/about).

San Mateo County Astronomical Society Event Calendar						
< January 2017 >						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
New Year's 1	2	3	4	5 	6	7 Sunset: 5:09 PM
8	9	10	11	12 	13	14 Sunset: 5:16 PM
15	Martin Luther 16	17	18	19 	20	21 5:00 PM Crestview Star Party Sunset: 5:23 PM
22	23	24	25	26	27	28 5:00 PM Crestview Star Party Sunset: 5:31 PM 
29	30	31	1	2	3	4

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

Calendar courtesy of Ed Pieret

**MinXSS, continued from p. 7**

researchers can determine which mechanism is more important, says Tom Woods, a solar scientist at the University of Colorado at Boulder and principal investigator of MinXSS: "It's helping address this very long-term problem that's been around for 50 years: how is the corona heated to be so hot."

The \$1 million original mission has been gathering observations since June.

The satellite will likely burn up in Earth's atmosphere in March. But the researchers have built a second one slated for launch in 2017.

MinXSS-2 will watch long-term solar activity—related to the sun's 11-year sunspot cycle—and how variability in the soft X-ray spectrum affects space weather, which can be a hazard for satellites. So the little-mission-that-could will continue—this time, flying at a higher, polar orbit for about five years.

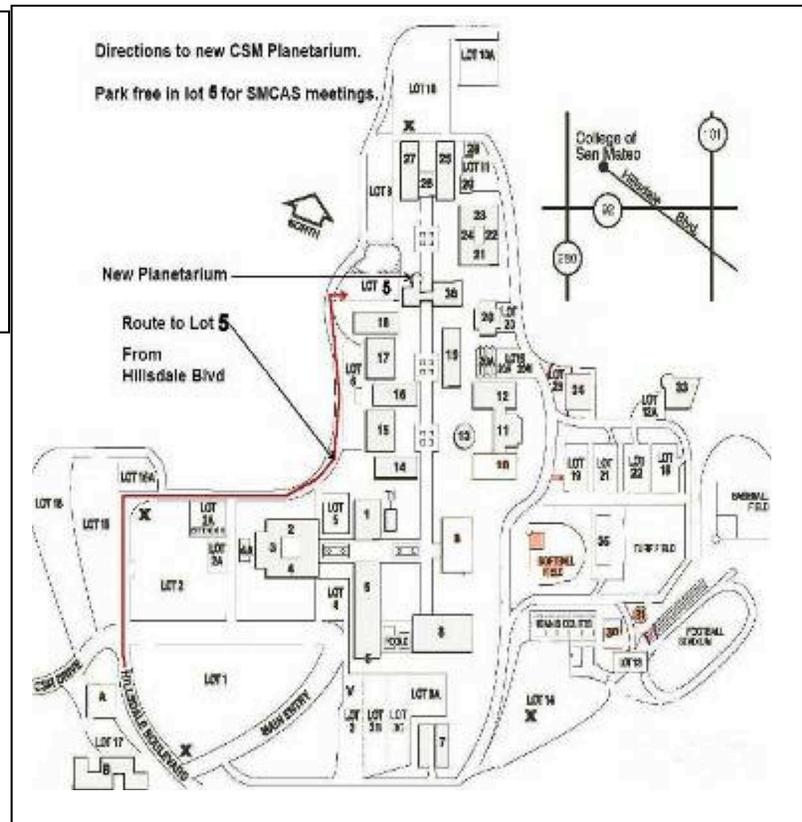
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## Directions to SMCAS Meetings at CSM, and to Star Parties

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.

**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.

### Directions to Crestview Park for Star Parties

**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](http://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 usually 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. Check our web site for any meeting changes. Directions: 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. Additional parking is available in Lot 6 if Lot 5 is full.

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 4<sup>th</sup> 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 Seminario.

**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.smcasastro.com](http://www.smcasastro.com)

The CSM Astronomy Department schedule is at [www.collegeofsanmateo.edu/astronomy/events](http://www.collegeofsanmateo.edu/astronomy/events).

**Facebook:** [www.facebook.com/groups/1800419490194179/](http://www.facebook.com/groups/1800419490194179/)

**Email:** [SMCAS@live.com](mailto:SMCAS@live.com)

**Society Yahoo group:** <http://groups.yahoo.com/group/smcas>.

**Yahoo Group Subscription:** email [smcas-subscribe@yahoogroups.com](mailto:smcas-subscribe@yahoogroups.com) to subscribe.

**Event Horizon:** To submit articles or photos, please contact Ed Pieret — [epieret@comcast.net](mailto:epieret@comcast.net) or 650.862.9602.