

The SAN MATEO COUNTY ASTRONOMICAL SOCIETY

May 2017 — 643rd 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.



SMCAS VICE PRESIDENT ED PIERET writes in this issue about outreach activities, a fun and rewarding benefit of SMCAS membership and also one of the society's fundamental purposes. This photograph of Ed is from last summer's Girl Scout star party at Levi Stadium in Santa Clara. See Ed's article on page 5.

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DATES TO SAVE

May 5: General Meeting, Pizza, and Presentation at the CSM Planetarium. Details on page 4.

May 23: SMCAS Board Meeting at the CSM ISC Room.

Jun 2: General meeting at the CSM Planetarium.

Jun 20: SMCAS Board Meeting at the CSM ISC Room.

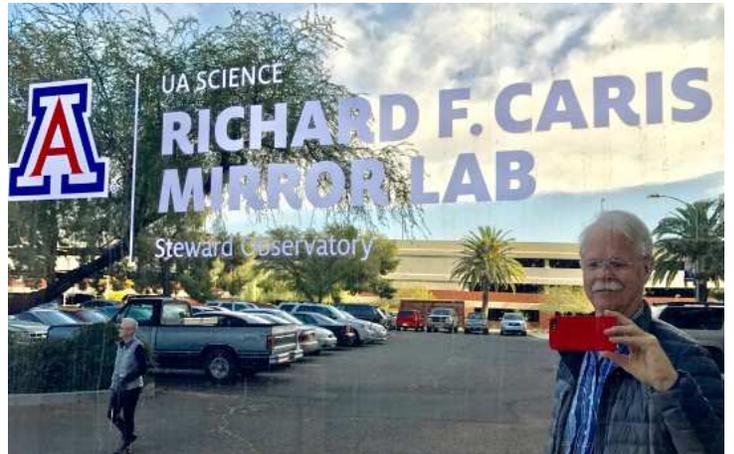
More events and further details on page 7.

President's Corner

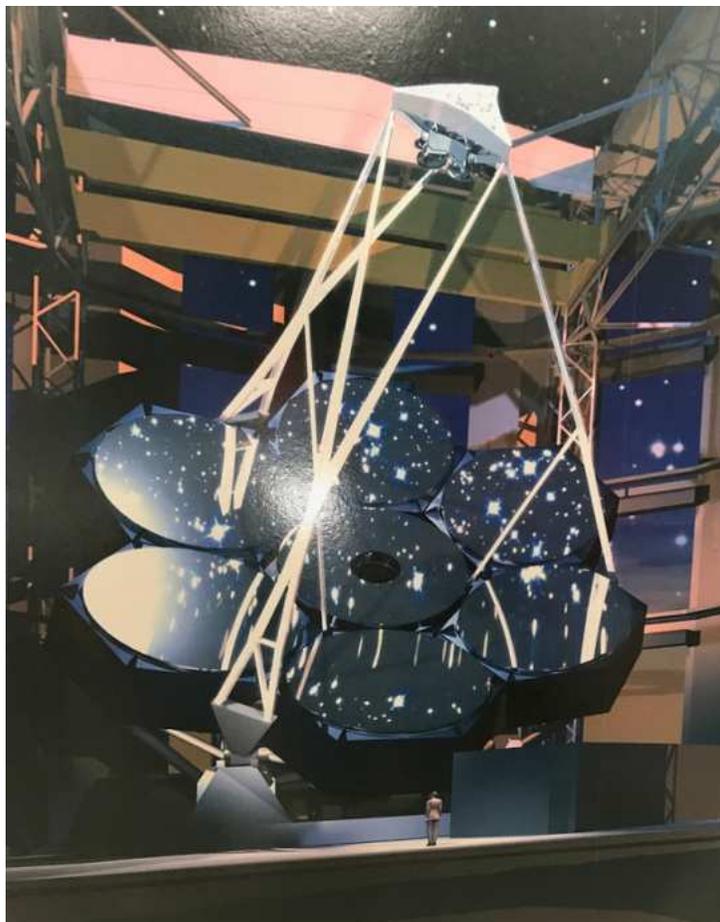
At our May 5th meeting, we will be opening nominations for the SMCAS Executives and Board of Directors. Executives include President, Vice President, Secretary, and Treasurer. In addition, we have 5 Board Members at Large. Nominations will close and the election will be held at our June 2nd meeting. Installation of the successful candidates will occur at our Annual Banquet in July, and they will serve a 1 year term. We are an all-volunteer organization, and cannot continue without the active participation of our membership! I encourage you to become involved on the Board. It's a great way to get to know the other Board members, the rest of the SMCAS members, and have a worthwhile and rewarding experience!

In April I had the opportunity to take a tour of the University of Arizona's [Richard F. Caris Mirror Lab](#). This lab that designs, casts, and polishes the largest honeycomb mirrors in the world. Then, of course, these mirrors are used by some of the largest telescopes in the world, including the [Large Binocular Telescope \(LBT\)](#), the [Large Millimeter Telescope \(LMT\)](#) and the [Large Synoptic Survey Telescope \(LSST\)](#). They are currently working on the mirrors for the [Giant Magellan Telescope \(GMT\)](#).

The Mirror Lab was built underneath the University



Author selfie in the reflective window of the lab.



football stadium. This was a conscious decision by the lab's founder Roger Angel, who when looking for lab space, remembered that at the start of the US nuclear Manhattan Project in the 1940's, the first nuclear reactor, [Chicago Pile-1](#), was built underneath the University of Chicago's football stadium because it was cheap real estate—no

Continued on p. 3

(Left) Artist's rendition of Giant Magellan Telescope, consisting of 7 mirrors. Six off-axis 8.4 meter or 27-foot segments surround a central on-axis segment, forming a single optical surface 24.5 meters, or 80 feet, in diameter with a total collecting area of 368 square meters. The GMT will have a resolving power 10 times greater than the Hubble Space Telescope. Polishing the off-axis mirrors is especially challenging, as they are not spherical in shape. Polishing required the development of specialized polishing discs that could change shape as they moved across the mirror surface. Note the person at the bottom for a sense of scale.

President's Corner, continued from p. 2

one else wanted to be there—and decided to take the same approach at the University of Arizona. We were given a presentation in one of the conference rooms, then went into the mirror lab itself where we saw the casting and polishing stations. It was a privilege to see the first mirror from the 7-mirror configuration of the GMT undergoing final testing. The process of casting and polishing just one of the GMTs mirrors takes about 1 year, months of which involves letting the cast mirror cool to a point where polishing can begin!

It's a fascinating and informative tour, and I highly recommend it if you are ever in Tucson Arizona. Be sure to [book your tour in advance!](#)

Happy stargazing!

Marion Weiler

President, San Mateo County Astronomical Society



Underneath the Stadium. Mirror 1, in foreground, undergoing final testing. Mirror 4 in background. Note the worker at bottom left for a sense of scale.

SMCAS General Meeting and Presentation on Friday May 5, 2017

Rob Hawley

Astronomer, Eclipse Chaser, Astrophotographer

Using your Eyes and your Camera to get the most out of Solar Eclipses

Friday, May 5, 2017 , College of San Mateo, Building 36

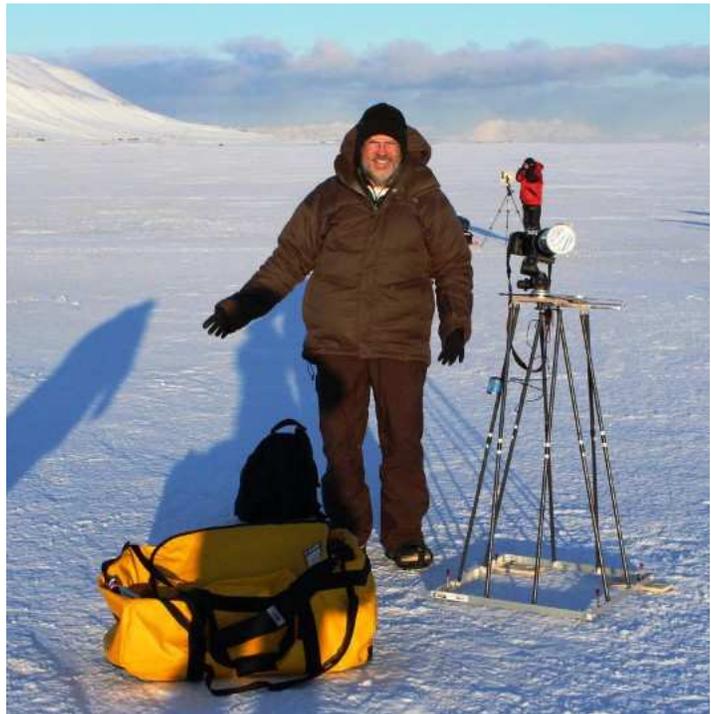
SMCAS General meeting at 7:00 p.m. ISC Room, room 110

Presentation at 8:00 p.m. in the CSM Planetarium

Free and open to the public, free parking (lots 5 and 6 recommended)

On August 21, 2017, millions of people across the United States will see nature's most wondrous spectacle—a total eclipse of the Sun. It is a scene of unimaginable beauty; the Moon completely blocks the Sun, daytime becomes a deep twilight, and the Sun's corona shimmers in the darkened sky. However, totality only lasts for two minutes. During that time a lot happens. Rob will use his own experience (both good and bad) to help the participants get the most out of the eclipse experience, whether you are going to just view it with your eyes or bring your portable observatory. For those who cannot attend, the material Rob will be presenting (and more) are in the YouTube movies linked from his website robhawley.net.

Rob has been active in local astronomy and astronomy outreach since 2002. He is currently active in both the Fremont Peak Observatory Association (where he is Treasurer) and in the Peninsula Astronomy Society. Since 1999 he has been actively chasing the shadow of the moon attending every eclipse (except for 2003 in Antarctica). Along the way he has learned a lot on how to take photographs (and how not to take them). 2017 will be his 14th.



Rob in Svalbard for the 2015 eclipse

Members Forum

Outreach

By Ed Pieret

Outreach efforts are the basis of SMCAS' status as a California 501(c)(3) non-profit corporation. These efforts are some of the more important and rewarding activities that the club facilitates, although only a handful of our members actively participate.

The following outreach activities are open to the public and offered at no cost:

- Crestview Star Parties
- Monthly Meetings
- The annual Family Science and Astronomy Festival (Scheduled for September 30 in 2017)

We also offer activities to schools and other groups which include:

- Star parties at schools and other venues
- Astronomical presentations

Finally, a number of our members participate in Project Astro which partners an astronomer with a school teacher to facilitate classroom visits.

We are members of the Night Sky Network which provides materials and instruction to aid in explaining complex astronomy topics to the public.

You may feel that you do not understand astronomy well enough to talk about it with the public. In fact, public knowledge of astronomy is so limited that you are much more of an expert than you realize. For most astronomy topics the club can provide you with materials, background information and in many cases, videos of people presenting the topic.

If you would like to schedule a private event or if you would like to get material to help you with your own presentation, let me know. You can reach me at Epieret@comcast.net or (650)862-9602.

The North Star

By Ted Jones

In Shakespeare's *Julius Caesar* (c. 1600), Cassius calls himself "constant as the northern star," referring of course to Polaris. In 1600 the celestial pole was about 3 degrees away from Polaris. Since then axial precession has moved it closer, currently to within about 40 arcminutes. The gap will reach a minimum of 14 arcminutes early next century, only slightly more than the 12 arcminute separation between the stars Mizar and Alcor in the handle of the Big Dipper.

Somewhat ironically given Shakespeare's use of it to represent constancy, Polaris really did not qualify as the north star in 44 BC, the year Julius Caesar was assassinated. At that time the pole was closer to Kochab (Beta Ursae Minoris) than

Polaris, although it was not particularly close to either star, 8 and 12 degrees away respectively. For comparison, at present Gamma Cephei, the top of the "house" in Cepheus, is about 12 degrees from the pole.

It seems to be widely believed that the north star is very bright, perhaps even the brightest star in the sky (other than the sun). In fact, it ranks about 50th. This seems to go hand in hand with an unstated expectation that that there must necessarily be a pole star; witness, for example, any number of online articles that call the barely visible Sigma Octantis (mag 5.7) the south star.

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SMCAS Loaner Telescope Program

By Ed Pieret

SMCAS Has a number of loaner telescopes available for active members to borrow. They are meant to be an introduction to the wonders of astronomy and a way for members to assess their interest prior to buying their own telescope or purchasing an upgrade.

To borrow a telescope or learn more, contact Ed Pieret, EPIERET@comcast.net or (650)862-9602.

The rules for borrowing a telescope are:

1. Loan period is for 60 days. It can be extended for another 60 days upon request provided there

are no requests for the same telescope.

2. Borrowers are expected to participate in SMCAS outreach activities including Crestview Star Parties. If the borrower loses interest in astronomy or buys a telescope, the loaner and accessories are to be returned promptly.

3. Active membership is required to borrow and keep a loaner telescope.

4. SMCAS Astronomers will assist the borrower in setup and productive use of the telescope.

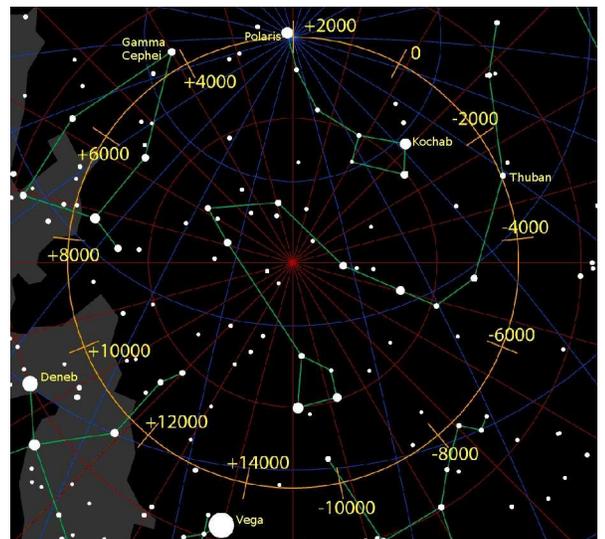
The following is a list of the current loaner telescopes.

Brand	Type	Name	Aperture	Focal	Comments	Status
Mead	Refractor	ETX 70AT	70 mm	350 mm	Goto, Hard Fitted Case, Separate Tripod in Soft Case, assorted eyepieces including electronic eyepiece.	Available
Jason	Compound	Comet 334	114 mm	1000 mm	Integrated finder. Also separate finder and laser dot finder. Erecting Prism, T-Adapter. .75 in optics. Separate tripod.	Available
Mead	Maksutov	ETX125EC	125 mm	1900	Autostar GoTo, Hard Case, assorted eyepices.	Available
Orion	Reflector	Skyview 4.5 deluxe EQ	4.5 in.	900 mm	All enclosed in soft case	Available
Edmunds	Compound	Astroscan	4.12 in.	445 mm	Wood tripod - not stable. Best on tabletop.	Available
Edmunds	Compound	Astroscan	4.12 in.	445 mm	Has stable tripod	Used for outreach
Home made	Reflector	Dobsonian	8 in.		In good shape. On wheels	Available
Celestron	Compound	8 SE	8 in.	80 in.	2 inch optics, Full goto, New Condition, Fitted case, Standard tripod, 30 mm. 2 in. eyepiece.	Available
Celestron	Compound	SP-C8	8 in.	80 in.	Has heavy Equatorial tripod, electronic controls, fitted case	Available
Orion	Reflector	Dobsonian	8 in.		Needs cleaning and adjustment	Needs Work
Sky Window	Mirror	11 X 80 Binoculars				Available

North Star, continued from p. 5

Only someone convinced there must be a south star would seize on one so obscure and hard to see.

In fact, Polaris is as good as it gets. The figure at right shows the position of the north celestial pole over a full precession cycle. It approaches a few other stars about as close as Polaris, notably Thuban around 3000 BC, but they are not as bright. The very bright Deneb and Vega will be putative north stars in their turn thousands of years from now, but they will be much farther from the pole. Most of the time there is no really good candidate at all. In the full 26,000 year cycle there is nothing to rival Polaris.



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, May 5	7:00 pm	General Meeting, Pizza Social and Presentation
Sat, May 20	8:15 pm	Crestview Park Star Party
Tue, May 23	7:00 pm	SMCAS Board Meeting
Sat, May 27	8:15 pm	Crestview Park Star Party
Fri, Jun 2	7:00 pm	General Meeting, Election of Officers, Pizza Social and Presentation
Sat, Jun 17	8:30 pm	Crestview Park Star Party
Tue, Jun 20	7:00 pm	SMCAS Board Meeting
Sat, Jun 24	8:30 pm	Crestview Park Star Party

General meetings and board meetings are held in the ISC Room (room 110) in building 36 at the College of San Mateo. For directions to the building or to the star party site at Crestview Park in San Carlos, see page 11. All SMCAS members are welcome at board meetings.

The times given for the 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.

Evening comets of note: 41P/T-G-K and C/2015 V2 (Johnson). Interactive finder charts are at <http://tinyurl.com/m8bpc5c> (41P) and <http://tinyurl.com/mq5cwwu> (C/2015 V2). For ephemerides enter "41P" or "C/2015 V2" at <http://www.minorplanetcenter.net/iau/MPEph/MPEph.html>.

NOAA's Joint Polar Satellite System (JPSS) to monitor Earth as never before

By Ethan Siegel

Later this year, an ambitious new Earth-monitoring satellite will launch into a polar orbit around our planet. The new satellite—called JPSS-1—is a collaboration between NASA and NOAA. It is part of a mission called the Joint Polar Satellite System, or JPSS.

At a destination altitude of only 824 km, it will complete an orbit around Earth in just 101 minutes, collecting extraordinarily high-resolution imagery of our surface, oceans and atmosphere. It will obtain full-planet coverage every 12 hours using five separate, independent instruments. This approach enables near-continuous monitoring of a huge variety of weather and climate phenomena.

JPSS-1 will improve the prediction of severe weather events and will help advance early warning systems. It will also be indispensable for



Ball and Raytheon technicians integrate the VIIRS Optical and Electrical Modules onto the JPSS-1 spacecraft in 2015. The spacecraft will be ready for launch later this year. Image Credit: Ball Aerospace & Technologies Corp.

long-term climate monitoring, as it will track global rainfall, drought conditions and ocean properties.



The five independent instruments on board are the main assets of this mission:

- The Cross-track Infrared Sounder (CrIS) will detail the atmosphere's 3D structure, measuring water vapor and temperature in over 1,000 infrared spectral channels. It will enable accurate weather forecasting up to seven days in advance of any major weather events.
- The Advanced Technology Microwave Sounder (ATMS) adds 22 microwave channels to CrIS's measurements, improving temperature and moisture readings.
- Taking visible and infrared images of Earth's surface at 750 meter resolution, the Visible Infrared Imaging Radiometer Suite (VIIRS) instrument will enable monitoring of weather patterns, fires, sea temperatures, light pollution, and ocean color observations at unprecedented resolutions.
- The Ozone Mapping and Profiler Suite (OMPS) will measure how ozone concentration varies with altitude and in time over every location on Earth's surface. This can help us understand how UV light penetrates the various layers of Earth's atmosphere.

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May Rise and Set Chart

SMCAS 2017 (PDT)		May 20 Rise	May 20 Set	May 27 Rise	May 27 Set
Sun		5:54 AM	8:16 PM	5:50 AM	8:21 PM
Moon		2:49 AM	2:36 PM	7:55 AM	10:35 PM
Mercury	Before sunrise	4:55 AM	6:02 PM	4:50 AM	6:20 PM
Venus	Before sunrise	3:55 AM	4:29 PM	3:45 AM	4:30 PM
Mars	After sunset	7:09 AM	9:53 PM	7:00 AM	9:47 PM
Jupiter	Most of the night	4:17 PM	3:59 AM	3:47 PM	3:31 AM
Jupiter's moons		c e J ig		e J ig C	
9 PM, East on left		J=Jupiter, c=Callisto, e=Europa, g=Ganymede, i=Io			
Saturn	Late at night	10:06 PM	7:50 AM	9:36 PM	7:21 AM
Uranus	Before sunrise	4:22 AM	5:26 PM	3:55 AM	5:00 PM
Neptune	In the wee hours	2:38 AM	1:58 PM	2:10 AM	1:31 PM
Pluto	Late at night	11:41 PM	9:31 AM	11:14 PM	9:03 AM

- Star parties are at Crestview on the 20th, and 27th.

- *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						
< May 2017 >						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	1	2	3 	4	5 7:00 PM General Membership Meetin	6 Sunset: 8:06 PM
7	8	9	10 	11	12	13 Sunset: 8:12 PM
14	15	16	17	18	19 	20 8:16 PM Crestview Star Party Sunset: 8:18 PM
21	22	23	24	25 	26	27 8:22 PM Crestview Star Party Sunset: 8:24 PM
28	Memorial Day 29	30	31	1	2	3

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

Calendar courtesy of Ed Pieret

JPSS, continued from p. 8

- The Clouds and the Earth's Radiant System (CERES) instrument will quantify the effect of clouds on Earth's energy balance, measuring solar reflectance and Earth's radiance. It will greatly reduce one of the largest sources of uncertainty in climate modeling.

The information from this satellite will be important for emergency responders, airline pilots, cargo ships, farmers and coastal residents, and many others. Long and short term weather monitoring will be greatly enhanced by

JPSS-1 and the rest of the upcoming satellites in the JPSS system.

Want to teach kids about polar and geostationary orbits? Go to the NASA Space Place: <https://spaceplace.nasa.gov/geo-orbits>.

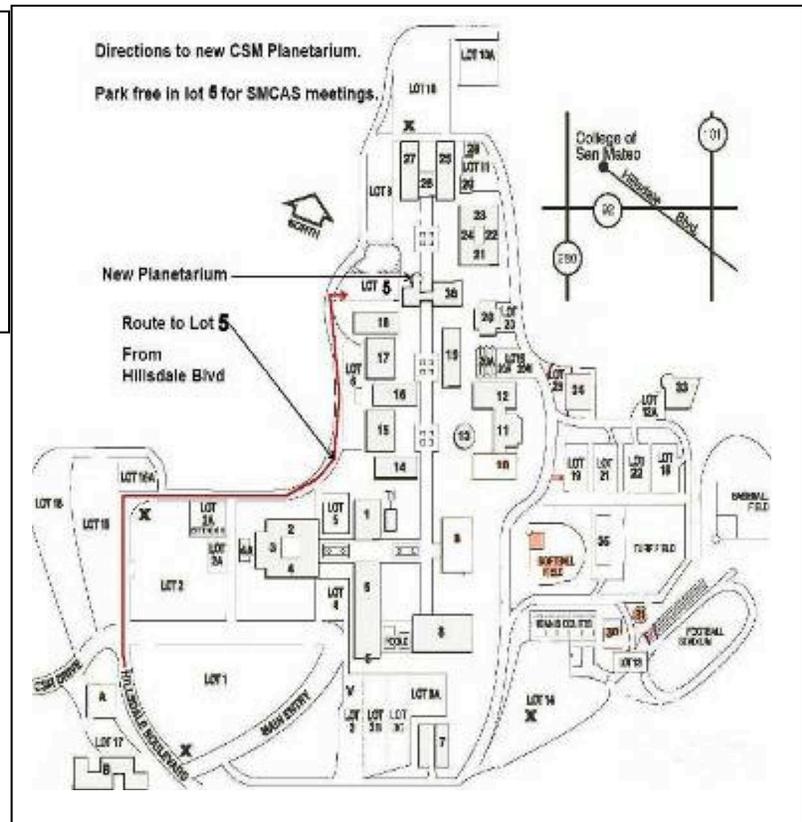
This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!

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.



San Mateo County Astronomical Society Membership Application

rev 04022017

SMCAS@live.com; P.O. Box 974, Station A, San Mateo CA 94403; (650) 678-2762

Date: _____ Please check one: [] New Member or [] Renewal

[] \$30 Regular Family Membership; [] \$15 Student Membership

All members, please indicate areas of interest below. New members, please complete entire form. Renewing members, please provide your name and any information that has changed in the last year.

We will list your name, address, email address, and phone number(s) in our membership roster unless you have checked the box preceding that information. The membership roster is distributed to active members only.

Each member's name and mailing address must be provided to the Astronomical League (AL), SMCAS' parent organization. If you don't want AL to have your phone number and email address, indicate below.

[] Name(s) _____ [] Email Address _____

[] Address _____

[] City & Zip Code _____

[] Phone Number(s): _____ [] Do not provide my phone number(s) to the AL.

[] Don't provide my email address to the AL. (Checking this means you can ONLY get **The Reflector** by regular mail)

Please check one: send **The Reflector** [] by mail, or [] by email.

Areas of Interest

SMCAS encourages member involvement. We invite you to provide additional information about your interests, skills, occupation and prior experience. Please identify SMCAS projects and functions that you might like to help facilitate.

Please indicate which of the following activities might be of interest to you:

_____ Star Parties - Do you own a telescope you can bring: Yes () No ()

_____ General Meetings - Finding (or being) a Speaker. Official greeter. Set up or take down ISC or refreshments.

_____ Family Science Day & Astronomy Festival (Usually at CSM the first Saturday in October).

_____ Social Events - Equinoctial and Summer Solstice potlucks, Summer Star-B-Que, Holiday Potluck.

_____ SMCAS Membership and Promotional Drives

_____ Communications – 'Event Horizon' Newsletter, Website(s), Facebook page, group email, Publicity posting.

_____ Educational Programs – School, museum and library star parties, Bay Area Astro teacher assistants.

Other/Comments: _____

<http://www.SMCASASTRO.com>