

# The SAN MATEO COUNTY ASTRONOMICAL SOCIETY

June-August, 2019 Issue: 660<sup>th</sup> General Meeting Notice: June 21, 2019



## 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 membership information is found at <http://www.smcasastro.com/membership.html> where those who want can join via PayPal. Membership also includes access to our 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 (650) 678-2762. **Membership forms are available near the end of this newsletter beginning on page 23.**



Figure 1: San Mateo County Astronomical Society member and aspiring astrophysicist Isabella "Isy" Cooke peering through her Galileo-scope at the July 19-20, 2019 Glacier Point Star Party at Yosemite National Park. Isy assembled the telescope herself. More about the Glacier Point Star Party starting on page 12. Photo from Lisa Cooke.

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## August, 2019 Events:

**Saturday, August 3, 2019, 6 pm –8 pm:** Crestview Summer Star-B-Que, Page 17

**Saturday, August 3, 2019, 8:30 pm –10:30 pm:** Crestview Star Party, Page 22

**Friday, August 9, 2019, 7:30 pm –9:30 pm (two shows):** [The Sky Tonight Planetarium Show](#)

**Saturday, August 10, 2019, 8:30 pm –10:30 pm:** CSM, Jazz under the Stars, Page 17

**Saturday, August 24, 2019, 8 pm –10:30 pm:** Crestview Star Party, Page 22

**Saturday, August 31, 2019, 8 pm –10:30 pm:** Crestview Star Party, Page 22

## August, 2019 Solar System Rise and Set Times:

By Ron Cardinale

SMCAS 2019 (PDT)	Aug 3 Rise	Aug 3 Set	Aug 24 Rise	Aug 24 Set	Aug 31 Rise	Aug 31 Set
Sun	6:15 AM	8:14 PM	6:33 AM	7:49 PM	6:39 AM	7:39 PM
Moon	9:11 AM	10:28 PM	12:32 AM	3:08 PM	8:01 AM	8:58 PM
Mercury	5:03 AM	7:04 PM	5:39 AM	7:28 PM	6:20 AM	7:39 PM
Venus	5:59 AM	8:10 PM	6:46 AM	8:02 PM	7:01 AM	7:57 PM
Mars	7:03 AM	8:47 PM	6:47 AM	8:00 PM	6:41 AM	7:44 PM
Jupiter	4:23 PM	2:06 AM	3:01 PM	12:44 AM	2:36 PM	12:18 AM
Jupiter's moons	c J e g		i c J e g		i J g c	
9 PM, East on left	J=Jupiter, c=Callisto, e=Europa, g=Ganymede, i=Io					
Saturn	6:37 PM	4:19 AM	5:10 PM	2:51 AM	4:42 PM	2:23 AM
Uranus	11:52 PM	1:23 PM	10:29 PM	12:00 PM	10:02 PM	11:32 AM
Neptune	9:52 PM	9:25 AM	8:28 PM	8:00 AM	8:00 PM	7:32 AM
Pluto	7:02 PM	4:45 AM	5:38 PM	3:20 AM	5:10 PM	2:52 AM
- SMCAS Star B Que and star party at Crestview on the 3rd.						
- Star parties at Crestview on the 24th and 31st.						
- Jazz Under the Stars at CSM on the 10th.						

## ***President's Corner:***

**Welcome to the Summer edition of the Event Horizon newsletter!** August 3<sup>rd</sup> will mark the passing of the SMCAS Board President position back to Mike Ryan who is one of the original founders of the club. I am excited to have Mike back in the leadership role and look forward to supporting his efforts.

Our August 3<sup>rd</sup> Star-B-Que at Crestview Park will mark the official installation of officers and will be followed by a star party. One of the key initiatives we focused on this year did come to pass: the hosting of a Star Party at Yosemite's Glacier Point on July 19<sup>th</sup> and 20<sup>th</sup>. The SMCAS Board's official stance as of July 1<sup>st</sup> was to cancel the club's participation since the National Park Service could not secure camping accommodations for the participants. At the last minute, the National Park Service indicated they would open the Bridalveil Campground for attendees. This location is only 8 miles from Glacier Point. However, many of the participating club members made other plans for the same weekend. Based on our feedback, the NPS opened the star party to all Bay Area clubs and three clubs responded with a total of 7 volunteers and 6 telescopes for star-gazing. From the Santa Cruz Astronomy Club (SCAC), Terry Dietz recorded the event in [photographs](#). Bill Seiler, SCAC Treasurer, together with Monterey Institute for Research in Astronomy (MIRA) Club Member Nelson Balcar, handled the slide show presentations. From SMCAS, Norm Abt and the Cooke family (Isy, Lisa, & Michael) attended with telescopes. For the Cooke family, this was a follow-up trip to their participation at this year's Golden State Star Party! Their experience at Glacier Point is presented on page 13. I look forward to working with Mike to secure a date for another Glacier Point star party opportunity next year.

I also want to remind everyone that there are two major outreach events SMCAS will be participating in this coming October:

- Family Science and Astronomy Festival at CSM on October 5<sup>th</sup>;
- KIPAC Open House (Community Day) at SLAC on October 19<sup>th</sup>.

Ed Pieret has provided details about the CSM event beginning on page 17. The announcement for the KIPAC Open House event at SLAC is on page 20. More details for this event will be forthcoming. SMCAS will be seeking volunteers to participate in both events. Ed Pieret ([EPieret@comcast.net](mailto:EPieret@comcast.net)) and Bill Lockman ([wlockman@mac.com](mailto:wlockman@mac.com)) will be organizing SMCAS participation in the CSM and SLAC events, respectively, so contact them to join in, a rewarding and fun experience!

Clear Skies!

***Frank Seminaro***

*Outgoing President, San Mateo County Astronomical Society*

[Frank\\_Seminaro@yahoo.com](mailto:Frank_Seminaro@yahoo.com)

## ***SMCAS Annual Meeting, June 21, 2019:***

**By Marion Weiler**

The SMCAS Annual Meeting, on the summer solstice no less, was a great success. Great socializing and plenty of food — pasta, polenta, lasagna, veggies, garlic bread, salad, multiple desserts and drinks, provided by SMCAS. At the meeting, outgoing President Frank Seminaro brought us up-to-speed on upcoming events, primarily the status of the Yosemite Glacier Point star Party scheduled for July 19-20: we decided to make a final go, no-go, decision on July 1. At issue is the camping/lodging situation, there may be no convenient place to stay this year. Also, we discussed significant events coming up:

- Annual Star-B-Que and installation of Officers at Crestview Park August 3<sup>rd</sup> (see page 17 for more information)
- General meeting and presentations September 6<sup>th</sup> and October 4<sup>th</sup>;
- CSM Family Science and Astronomy Festival October 5<sup>th</sup> (volunteers needed! More information on page 19);
- SLAC/KIPAC Community Day with SMCAS Star Party October 19<sup>th</sup> (volunteers needed! See announcement on page 20).

Then we held the annual election of our SMCAS 2019-20 Officers and Board Members at Large. Nominations were closed, and a voice vote held. The official results are:

<b>Officers:</b>	
Mike Ryan	President
Ed Pieret	Vice-President
Tom McDonough	Treasurer
Marion Weiler	Secretary

<b>Board Members-at-Large:</b>
Edwin Ching
Bill Lockman
Ken Lum
Steve Minkin
Frank Seminaro

The installation of these Officers and Board Members will be held at our August 3<sup>rd</sup> Star-B-Que at Crestview Park. From the rest of the Board and the membership: thank you, Frank for your great service as President this past year. And special thanks to Mary Ann McKay for her service on the Board the past three years, as well as providing assistance to Editor Bill Lockman in preparing our Event Horizon newsletter!

Following the election, we were enthralled by a full-dome Planetarium show by Prof. Darryl Stanford, followed by a showing of the excellent award-winning Evans and Sutherland full-dome video, 'Secret Lives of Stars', narrated by Sir Patrick Stewart, followed by Q/A with Prof. Stanford.

# Keeping Moonwalkers' Feet Dry: USS Hornet's Role in the Apollo Program

By Ken Lum



Figure 2: Lunar Module Pilot Edwin "Buzz" Aldrin descending from the Apollo 11 Lunar Module as photographed by Commander Neil Armstrong at the Sea of Tranquility landing site, July 20, 1969. Photo from Chris Clare.

It's hard to believe, but this year is now the 50<sup>th</sup> Anniversary of the **Apollo 11** Moon Landing which took place on July 20, 1969 (Figure 2). I was in college at the time and home for the summer break when I watched the event on our primitive B & W television set. How many even remember what such a television even looked like? And recall how archeological it now seems that most of the photos taken of that epochal event were taken on film cameras, even the ones used by the astronauts in space!



Figure 3: Docent Peter Shyvers. (Cropped photo from Ken Lum)

With the coming of this anniversary, we invited **Mr. Peter Shyvers** (Figure 3), a docent on the museum ship, **USS Hornet (CV-12)** (Figure 5), to come and describe this mission and the role that aircraft carrier played in the recovery

of the Apollo 11 and Apollo 12 command modules (Figure 4).

There has been a total of eight **USS Hornets** in the US Navy since the first one, a ten-gun sloop, commissioned in 1775. But the most well-known are two aircraft carriers serving



Figure 4: Recovery of the Apollo 11 Command module, July 24, 1969. (US Navy)

in WW II. The first carrier,



Figure 5: USS Hornet in Alameda as a museum ship (Courtesy of USS Hornet)

**USS Hornet (CV-8)**, was built in 1941 and launched the first raid on Tokyo on April 18, 1942 led by Lieutenant Colonel James H. Doolittle. After participating in the Battle of Midway, she was sunk at the Battle of the Santa Cruz Islands (Part of the Guadalcanal campaign) in October, 1942. The ship's wreckage was located just this past February at a depth of 17,500 ft.

The second carrier **USS Hornet (CV-12)** was launched in 1943 to replace CV-8. She participated in numerous Pacific island-hopping campaigns leading to the defeat of Japan in 1945. In the 1950s, she was extensively modernized to handle jet aircraft and had a minor role in the Vietnam War. CV-12 ended her operational career as the recovery ship for the Apollo 11 and 12 command modules and their crews both in 1969 in the Pacific before being decommissioned in 1970. The carrier was designated a National Historic Landmark in 1991 and California State Historic Landmark in 1999. **USS Hornet (CV-12)** opened as a museum ship in 1998 in Alameda, CA where she is presently open to the public.

I visited the ship in May (Figure 6) and was very graciously given an extensive tour of the engine rooms by Mr. Shyvers. I also visited most of the rest of the publicly accessible parts of the ship. I must confess she is kept in exceptionally excellent display condition with all the paint work and deck displays in very good condition. I was also impressed during my tour that there was a quite large number of visitors in attendance, probably numbering around at least 200, keeping the docents very busy.



Figure 6: Ken Lum on the USS Hornet flight deck. (Photo from Ken Lum)



Figure 7: Apollo test capsule CM-011 (AS-202) on display at the USS Hornet (Photo from Ken Lum)

this fortunately never happened, the procedure was ended after Apollo 14.

A **Sea King Helicopter** of the type that recovered the Mercury, Gemini, and Apollo crews is also on display painted in the livery of the one

Among the exhibits are the **Apollo test capsule CM-011 (AS-202)** (Figure 7) which was launched without a crew from Cape Canaveral on a Saturn 1B rocket August 25, 1966 and recovered by the **Hornet** in the Pacific after a suborbital flight of 1 hour, 33 minutes.

There is also an **Airstream trailer Mobile Quarantine Facility (MQF)** that housed the Apollo 14 astronauts upon their return. These were used to quarantine astronauts in the event they carried infectious diseases back from the Moon. As



Figure 8: Naval aircraft on display on the USS Hornet flight deck (Photo from Ken Lum)

used to recover the Apollo 11 crew. Other displays include restored naval aircraft from WW II to the immediate post-Vietnam war era (Figure 8), making for an exceptional naval aviation museum.

There were numerous celebratory events at the ship called **Splashdown 50** in remembrance of the 50<sup>th</sup> Anniversary of the Moon Landings. July 20 was the principal event on the actual 50<sup>th</sup> Anniversary date of the Apollo 11 Moon Landing. From what I could see on being there, there appeared to be at least a couple of thousand visitors roaming around the ship making for a well-attended event. There were also several exhibition displays put on by **NASA**, accompanied by presentations and demonstrations. **Brian Day**, who has spoken to **SMCAS** on a number of occasions, was present showing iron meteorite samples and a small bit of Moon Rock in a plastic casing.

On the flight deck, **Dave Rodrigues**, aka the **Astrowizard**, was entertaining a group of kids with his innovative show (Figure 9). And staff from the **Lick Observatory** set up about half a dozen white light and H-alpha solar scopes to show the Sun. There were some faint, but large prominences seen but few sunspots due to the Sun being now in solar minimum.

For those who have not gone but want to visit the ship later, she is located at:

707 W Hornet Ave, Pier 3

Alameda, CA 94501

Website: <https://www.uss-hornet.org>

Hours are: Open Daily, 10 AM – 5 PM. Admission closes at 4 PM.

Admission prices to the ship:

Adult Admission:	\$20
Seniors & Military:	\$15
Students:	\$15
Youth:	\$10
Children 6 & Under:	Free
Members:	Free

*Dress warmly, as it can be quite windy and cold!*



*Figure 9: Dave Rodrigues, aka Astrowizard on hyperdrive at the USS Hornet (Photo from Ken Lum)*



# ***My Golden State Star Party (GSSP 2019) Experience:***

**By Bill Lockman**

[GSSP 2019](#) was held at the Frosty Acres Ranch near Adin, CA from June 29<sup>th</sup> to July 3<sup>rd</sup>, 2019, in phase with the new moon. I had an absolute blast at GSSP! I had great camaraderie with my fellow astronomers, especially those from the Santa Cruz Astronomy Club, [SCAC](#) (of which I am also a member) and also SMCAS. I had the opportunity to interact with John and Lynn Chakel and Ted Jones, the former editor of the SMCAS 'Event Horizon' newsletter. I had the Cooke family over to my trailer and explained to them how to guide the telescope and take exposures of the Lagoon Nebula (described below). I also had the opportunity to meet a fellow astronomer who just happens to live on the same street in Fremont as I do! Small world!



*Figure 10: Bill Lockman's astrophotography setup.*

The daytime temperatures were pleasant (in the low 80's). The nighttime weather was chilly (mid 30's) but the seeing was reasonable and the skies were mostly clear and dark. The facilities (porta-potties) were clean and there were free hot showers available. The fare at the catered dinners was good (but not as spectacular as in previous years), while the food at the benefit dinner in neighboring Bieber, CA was absolutely delicious. What made the trip most enjoyable for me, however, was that I finally had some success in astrophotography. I'd like to share that experience with you.

My astrophotography setup is shown in Figure 10. The most important components are a steady Advanced Telescope Systems tripod and Astro-Physics AP-900 mount. Next in importance is a high-Strehl Stellarvue 105 mm aperture f/7 triplet refractor coupled to a strong Optec QuickSync FT motorized 3" Feathertouch focuser. I successfully used for the first time a QHY168C color CMOS camera capable of cooling the sensor to 35-40° C below the ambient temperature. Guiding is performed using a 50 mm f/4.2 Stellarvue guide scope with a Starlight Xpress Lodestar X2 guide camera attached. A QHYCCD PoleMaster camera is used for quick and accurate polar alignment.

The secret weapon in this system is an on-telescope PrimaLuce Labs Eagle2 Pro Windows 10 computer/power distribution system and USB hub. While my cabling job looks ugly, cable snags are minimized because the computer and telescope move together. The whole

assembly can be controlled remotely by a tablet or laptop through a Wi-Fi connection to the on-telescope computer.

With one 35-Ah battery to power the computer, camera, focuser and accessories, and a Li-ion battery to power the mount, running all night without recharging is no problem.

Maxim DL is used to focus and acquire images (“light frames”). PHD2 is used for guiding. Offline, PixInsight (a remarkably powerful piece of software) is used for de-Bayering, aligning, stacking and stretching the images. Photoshop and Photos (Mac OSX) are used for final adjustments. At present, no calibration frames are used. The camera sensor is cooled to  $-15^{\circ}\text{C}$ .

I took a 3-minute guided exposure of the Wild Duck Cluster (M11) as shown in Figure 11. M11 is a compact open cluster approximately 6100 Light Years (LY) away in the Scutum Star Cloud. M11 contains the equivalent of 11000 solar masses within a radius of 95 LY. Its age is  $(318 \pm 50)$  million years. The image of M11 provides

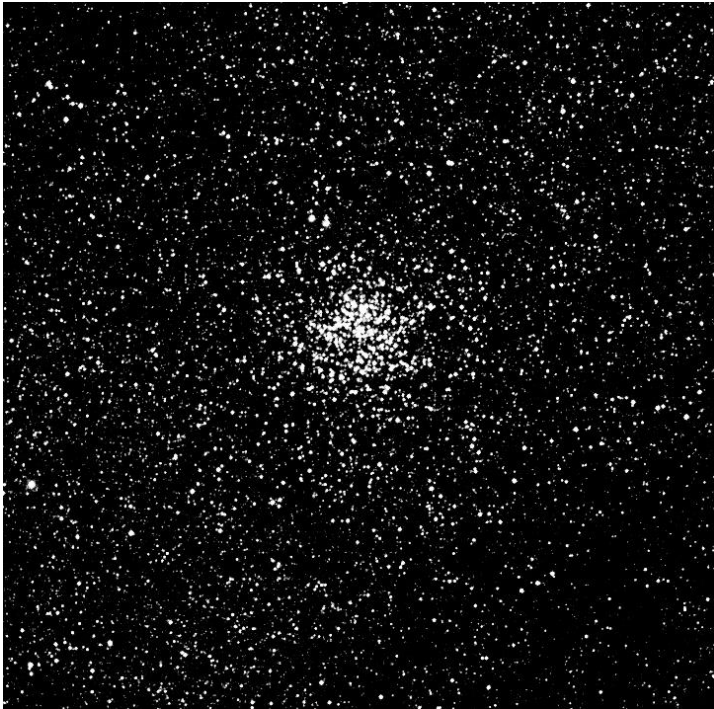


Figure 11: The Wild Duck Cluster (M11).



Figure 13: The Trifid Nebula (M20).

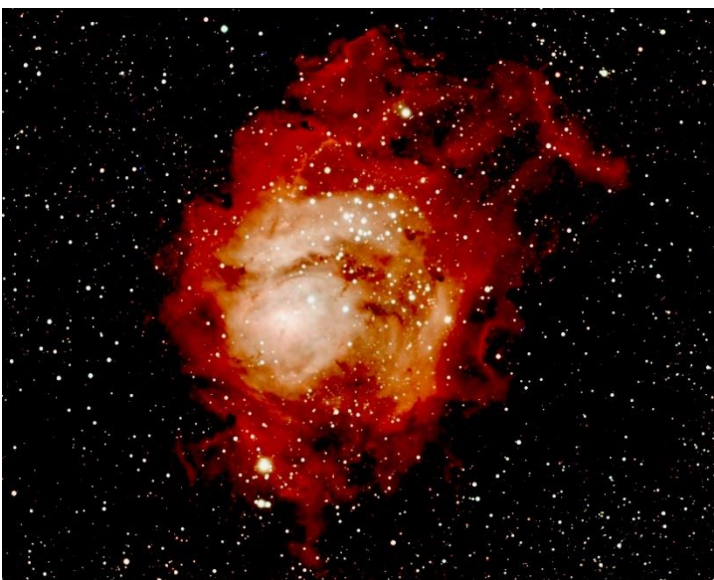


Figure 12: The Lagoon Nebula (M8).

a good test of focus and field flatness. Under high magnification, stars appear round out to the edge of the image.

The Lagoon Nebula shown in Figure 12 is 4100 LY away in the Sagittarius Constellation. It contains an active star-forming core surrounded by a hydrogen gas cloud which emits hydrogen-alpha (orange-red) photons at a wavelength of 656.8 nanometers (nm). The final image is an unweighted average of fifty 50 second exposures, six 100 second exposures, ten 200 second exposures and five 300 second exposures. The idea behind the different exposures is to enhance the nebulosity of the outer regions while not blowing out the central star-forming region, similar to HDR bracketing.

The Trifid Nebula (M20) shown in Figure 13 is approximately 5000 LY away in the Sagittarius Constellation. This structure is an unusual combination of a hydrogen-alpha emission nebula, a blue reflection nebula and a dark nebula forming the apparent “gaps” within the emission nebula. The image is an average of seven 5-minute exposures. I wish I had taken more light frames! The color balance in this image is adjusted to enhance the blue reflection nebula. This is why the emission nebula appears pink instead of an orange-red color.

I am encouraged by the results I have obtained so far. Shortly, I will apply dark- and bias frames to statistically subtract away sources of noise in the light-frame exposures. In future outings, I will devise a way to take flat frames to remove uneven illumination effects such as vignetting near the edges of the field. I also plan to use software to measure and correct for errors in the telescope’s mount and sky alignment, thus improving its pointing accuracy. I will also learn how to correct for temperature changes affecting focus and how to remotely control the telescope’s pointing using an observatory program, such as Stellarium. I also plan to delve more deeply into PixInsight for improved post-processing results.

# Glacier Point Star Party in Yosemite National Park, July 19-20, 2019

## A Collaborative Effort:

By Bill Lockman



Figure 14: Volunteer astronomers at Glacier Point Yosemite Star Party, July 19-20. Left to right: Terry Dietz, Bill Seiler, Santa Cruz Astronomy Club (SCAC); Nelson Balcar, Monterey Institute for Research in Astronomy Club (MIRA); Norm Abt, Isy, Michael and Lisa Cooke (SMCAS). Bill Seiler's 18-inch Dobsonian is shown in the foreground. Photo courtesy Terry Dietz.

Due to the circumstances explained in the President's Corner article on page 4, this year's Glacier Point Star Party became a collaborative effort by volunteers shown in Figure 14 from three different astronomy clubs. Due to a prior commitment, I could not attend the Glacier Point event this year. But fortunately, the star party appeared to be adequately staffed by the multi-club volunteer group.

Terry Dietz (SCAC) recorded the entire two-night affair in [photographs](#). Visual star-gazing was provided by Bill Seiler (SCAC) with his 18" Hubble Optics Dobsonian, Terry Dietz (SCAC) with his 11" Celestron SCT, Nelson Balcar (MIRA) with his 14" Celestron SCT, Norm Abt (SMCAS) with his 5" Celestron SCT, and the Cooke family (SMCAS) with their 70 mm Meade ETX refractor and Galileo-scope (Figure

1). "It was a great night for [the] view, [we] could see bands on Jupiter and [we] got the usual 'Wow' reaction to the Butterfly Cluster," stated Norm Abt.

Bill Seiler and Nelson Balcar entertained the public with instructional slide shows during the pre-darkness orientation sessions. "When the 50th anniversary was announced on Saturday's pre-darkness gathering, there was spontaneous widespread applause, and that from an international audience: quite a nice surprise to witness! Definite highlight!", stated Nelson Balcar. "As small as our [volunteer] group was, I think we met all the demand from the folks, perhaps numbering 100-125, up at GP. Some, of course, stayed for a long time, in spite of, or because of, the moon," Nelson said.

## ***Cooke Family's Glacier Point Star Party Experience:***

**By Michael Cooke**

For the Cooke Family, it seemed fitting that on the way to the Glacier Point Star Party where we celebrated the US and Russia race to the moon, we saw a big bear walking down the road on the way to our Bridalveil camp site in Yosemite National Park. While this wasn't a Russian bear but a big California black bear, it was just 20 feet from our car and an exciting reminder that the competition with Russia really helped drive the US to land a man on the moon. The Cookes met up with Norm Abt as the SMCAS representatives but we were excited and relieved that we also had help from Bill Seiler and Terry Dietz from SCAC, and Nelson Balcar from MIRA who were all veterans of putting on a star party of this magnitude.

The view from Glacier Point was fantastic even before the stars came out. As the big telescopes were being set up, excited people started to gather around and ask questions. There was a contest to see who could see Jupiter first. Bill Seiler had a nice slide show and presentation on telescopes and some of the different objects in the sky that you could see with them. In the middle of the presentation, Michael Cooke alerted the audience to the ISS flying overhead, eliciting oohs and ahs. The skies were clear and there were well over 100 people in the audience. For a group of college-age students from Taiwan, Lisa Cooke translated into Mandarin all the good information Nelson was telling them. There was a steady stream of people looking through the telescopes, even plenty of interest in Isy Cooke's little Galileo style scope. The SCAC gentlemen were quick with answers to questions and gave out stickers promoting their club.

Once again as the telescopes were being set up on the second night, the crowds began to form. Isy was running around getting people to vote on their favorite star party mission badge design, adding to the excitement. As the rest of us fielded questions from "what is the name of that peak" to "what is the focal length of your telescope," Nelson started the presentation that night by asking where people were from. There were many people from the Bay Area and Southern California, but in addition there were people from Illinois, North Carolina, New York, Florida as well as from closer states like Colorado, Nevada, Utah, Washington, and Oregon. There were also international visitors from England, Germany, Kuwait, India, China, and more. The amphitheater was packed, it was standing-room only, with perhaps twice as many people as from the night before.



*Figure 15: Winning Glacier Point Star Party mission badge design from Isy Cooke. Photo by Michael Cooke.*



*Figure 16: Moon rising behind Half-Dome, Yosemite National Park. Photo from Michael Cooke.*

Saturday, July 20 was the 50<sup>th</sup> anniversary of the Apollo moon landing, so the talk started about that. Isy Cooke announced the result of her star party mission badge vote (Figure 15). Then Bill Seiler followed on with a quick tour of objects in the night sky. There were long lines to look through the scopes well into the night. The sky started to lighten about 11 PM due to the rising [waning gibbous] moon, Figure 16. As the moon began to clear the mountains a half an hour later, the crowd became hushed and the excitement was palatable. As the moon became fully visible, there

was an outbreak of oohs, aahs and wows and then singing. The moon became the star of the show for the next hour or so. After that, the Cooke Family, as well as their telescope, ran out of power and while the other astronomers continued on well into the early morning hours, we headed back to camp.

The Glacier Point Star Party at Yosemite National Park was an excellent opportunity to reach out to the visitors and share the knowledge of the sky as well as to see your favorite astronomical objects at 7,600 feet through clear skies. It was a beautiful place to camp and hike around during the day and in the end, no one got eaten by a bear!

## NASA Night Sky Notes:



The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.org](https://nightsky.jpl.nasa.org) to find local clubs, events, and more!

### Chill Out: Spot an Ice Giant in August

By David Prosper

Is the summer heat getting to you? Cool off overnight while spotting one of the solar system's ice giants: **Neptune**! It's the perfect way to commemorate the 30th anniversary of Voyager 2's flyby.

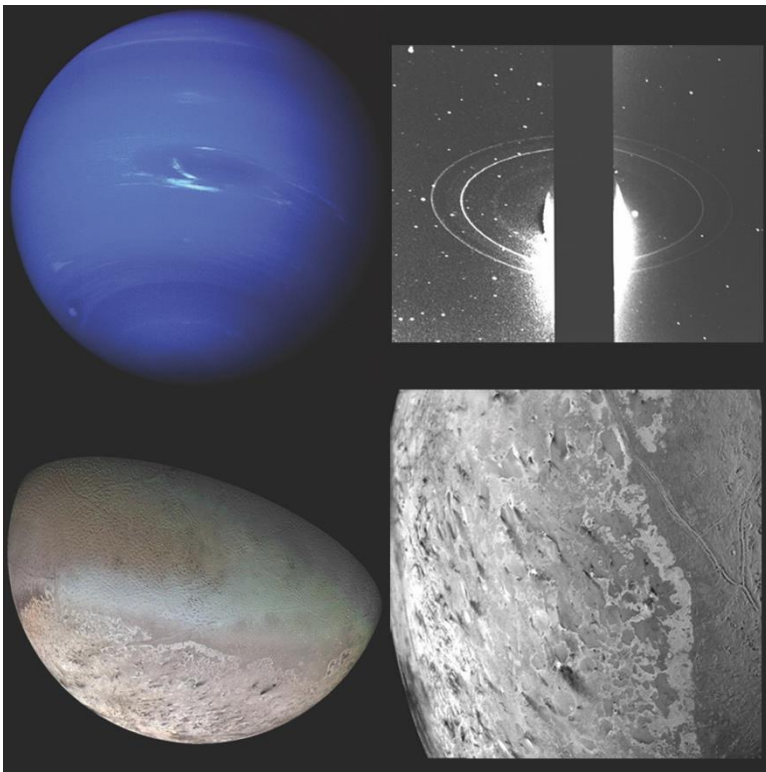


Figure 17: Clockwise from top left: Neptune and the Great Dark Spot traced by white clouds; Neptune's rings; Triton and its famed icy cantaloupe surface; close up of Triton's surface, with dark streaks indicating possible cryovolcanic activity. Find more images and science from Voyager 2's flyby at [bit.ly/NeptuneVoyager2](https://bit.ly/NeptuneVoyager2) Image Credit: NASA/JPL

Neptune is too dim to see with your unaided eye so you'll need a telescope to find it. Neptune is at opposition in September, but its brightness and apparent size won't change dramatically as it's so distant; the planet is usually just under 8th magnitude and 4.5 billion kilometers away. You can see Neptune with binoculars, but a telescope is recommended if you want to discern its disc; the distant world reveals a very small but discernible disc at high magnification. Neptune currently appears in Aquarius, a constellation lacking in bright stars, which adds difficulty to pinpointing its exact location. Fortunately, the Moon travels past Neptune the night of August 16<sup>th</sup>, passing less than six degrees apart (or about 12 Moon widths) at their closest. If the Moon's glare overwhelms Neptune's dim light, you can still use the its location that evening to mark the general area to search on a darker night. Another Neptune-spotting tip: Draw an imaginary line

from bright southern star Fomalhaut up to the Great Square of Pegasus, then mark a point roughly in the middle and search there, in the eastern edge of Aquarius. If you spot a blue-ish

star, swap your telescope's eyepiece to zoom in as much as possible. Is the suspect blue "star" now a tiny disc, while the surrounding stars remain points of white light? You've found Neptune!

Neptune and Uranus are ice giant planets. These worlds are larger than terrestrial worlds like Earth but smaller than gas giants like Jupiter. Neptune's atmosphere contains hydrogen and helium like a gas giant, but also methane, which gives it a striking blue color. The "ice" in "ice giant" refers to the mix of ammonia, methane, and water that makes up most of Neptune's mass, located in the planet's large, dense, hot mantle. This mantle surrounds an Earth-size rocky core. Neptune possesses a faint ring system and 13 confirmed moons. NASA's Voyager 2

mission made a very close flyby on August 25, 1989. It revealed a dynamic, stormy world streaked by the fastest winds in the solar system, their ferocity fueled by the planet's surprisingly strong internal heating. Triton, Neptune's largest moon, was discovered to be geologically active, with cryovolcanoes erupting nitrogen gas and dust dotting its surface, and a mottled "cantaloupe" terrain made up of hard water ice. Triton is similar to Pluto in size and composition, and orbits Neptune in the opposite direction of the planet's rotation, unlike every other large moon in the solar system. These clues lead scientists to conclude that this unusual moon is likely a captured Kuiper Belt object.

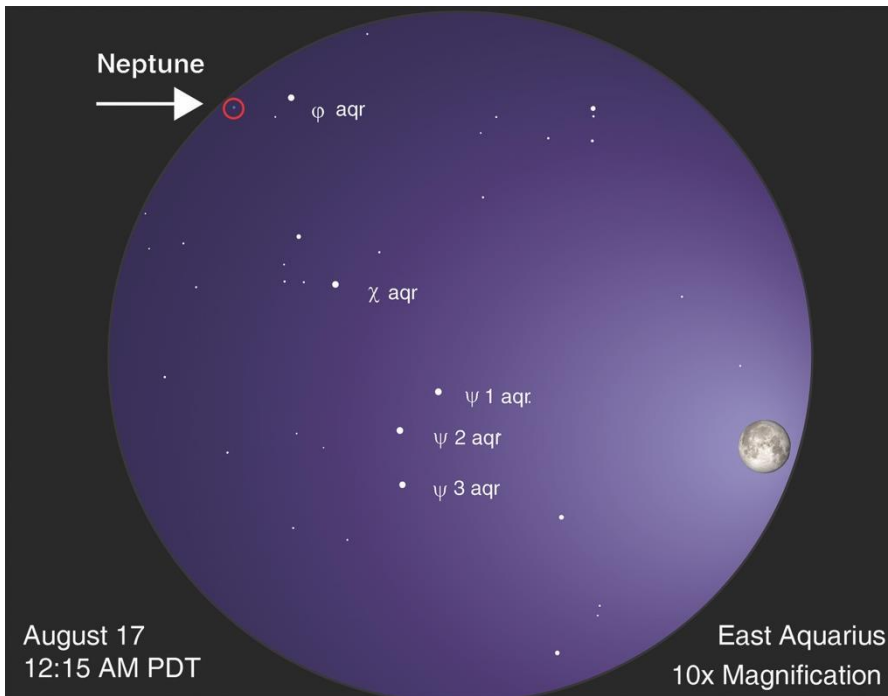


Figure 18 Finder chart for Neptune. This is a simulated view through 10x50 binoculars (10x magnification). Please note that the sizes of stars in this chart indicate their brightness, not their actual size. Moon image courtesy NASA Scientific Visualization Studio; chart created with assistance from Stellarium.

You can catch up on all of NASA's current and future missions at [nasa.gov](https://www.nasa.gov)



## ***Star-B-Que at Crestview Park, August 3<sup>rd</sup>:***

**Ken Lum and Bill Lockman**

This note is to remind everyone that next **Saturday, August 3 beginning at 6 PM**, we will be having our annual SMCAS Star-B-Que at Crestview Park in San Carlos (page 22 for directions to the park). Unfortunately, due to wildfire concerns, the City of San Carlos is not allowing us to use the BBQ grills at the park to cook. So, we will cook all the hamburger, polish sausage, and chicken wings at Ken Lum's house which is only three blocks away at 3452 Brittan Ave. and bring the meat to the park for distribution. This event is a **potluck** so we encourage everyone to bring their favorite vegetable, salad, fruit dishes, and desserts to share.

In addition to the picnic, we will also have an Installation ceremony for the newly elected 2019-2020 Club Officers and Board members. The election results are shown on page 5.

Following the picnic, we will have one of our monthly star parties so we encourage those who can to bring telescopes to set up to do our usual star-gazing activities. Both Jupiter and Saturn are well placed for observing right now. And spectacular objects in the summer Milky Way will be at their best visibility of the season.

We hope to see all of you at Crestview Park on Saturday, August 3<sup>rd</sup>!

# Jazz Under the Stars:

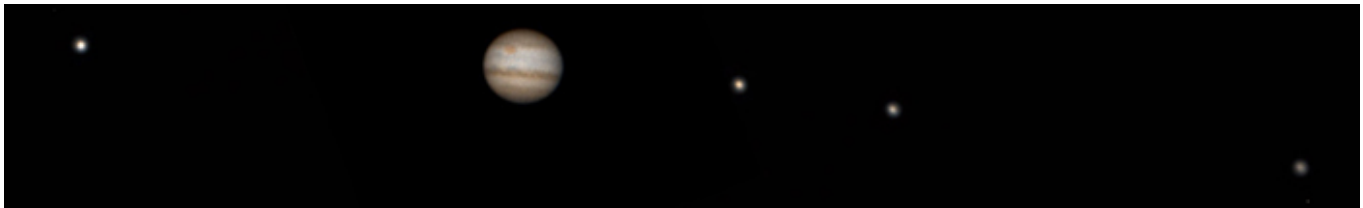
## CSM Science Building 36, Rooftop Observatory

Come peer through our telescopes and see craters on the Moon, the visible planets, star clusters, and more while we listen to CSM's very own **KCSM Jazz 91 FM**. Dress warmly. Free parking in Marie Curie Lot 5. Directions are available on the [Maps, Directions & Parking](#) page.

### Summer 2019 Schedule

Date	Time
June 8	9:00-11:00 pm
July 6	9:00-11:00 pm
August 10	8:30-10:30 pm

This event is weather dependent. Latest [weather updates](#).



Jovian System - Chanan Greenberg, Greenhawk Observatory

**Email questions.**

**Listen to and support great [jazz on KCSM](#).**

**No food or drinks in the observatory. Children are welcome and must be attended at all times.**

Supported by [San Mateo County Astronomical Society](#), [KCSM Jazz 91.1FM](#), and [CSM Astronomy](#).

Also see [SMCAS star parties at Crestview Park](#).

For more information, visit the Jazz Under the Stars web page here:

<http://collegeofsanmateo.edu/astronomy/jazz.asp>

## ***October 2019 Public Outreach Events:***

### ***Family Science and Astronomy Festival, October 5<sup>th</sup>:***

**By Edmund Pieret**

The San Mateo County Astronomical Society (SMCAS) will hold its primary public outreach event on the First Saturday of October in 2019. The event will be held in conjunction with the College of San Mateo on their campus.

Details are:

**Family Science and Astronomy Festival  
2:00pm to 11:00pm  
October 5, 2019  
The College of San Mateo Campus**

The current schedule for the event is as follows:

- 2:00 to 6:00 pm – Interactive events and hourly Planetarium shows
- 7:30 to 9:00 pm – Speaker (this year, the speaker will be Brian Day)
- 9:15 to 11:00 pm – Public telescope access at the CSM Observatory

Every year SMCAS has provided exhibits with “Making a Comet Nucleus”, “Building a Star-Finder (Planisphere)” and “Solar Observing”. We also provide additional interactive exhibits based upon the availability of members willing to provide support. Some of the most successful of these are:

- Solar System Models
- How Telescopes Work
- The Moon
- Causes of Moon Phases
- The Sun
- Gravity and Black Holes
- Making Craters

For all these activities and many more we have materials, banners, instructions and instructional videos.

Our biggest resource constraint is members willing to spend 4 hours interacting with the public explaining astronomy topics. No special knowledge of astronomy or previous education is required, and extensive background information is provided.

If you are willing to help, please send an email to [EPieret@comcast.net](mailto:EPieret@comcast.net) or let one of the officers or board members know. You can choose one of the above topics or tell us what you would like to present. We probably have materials to support your topic.

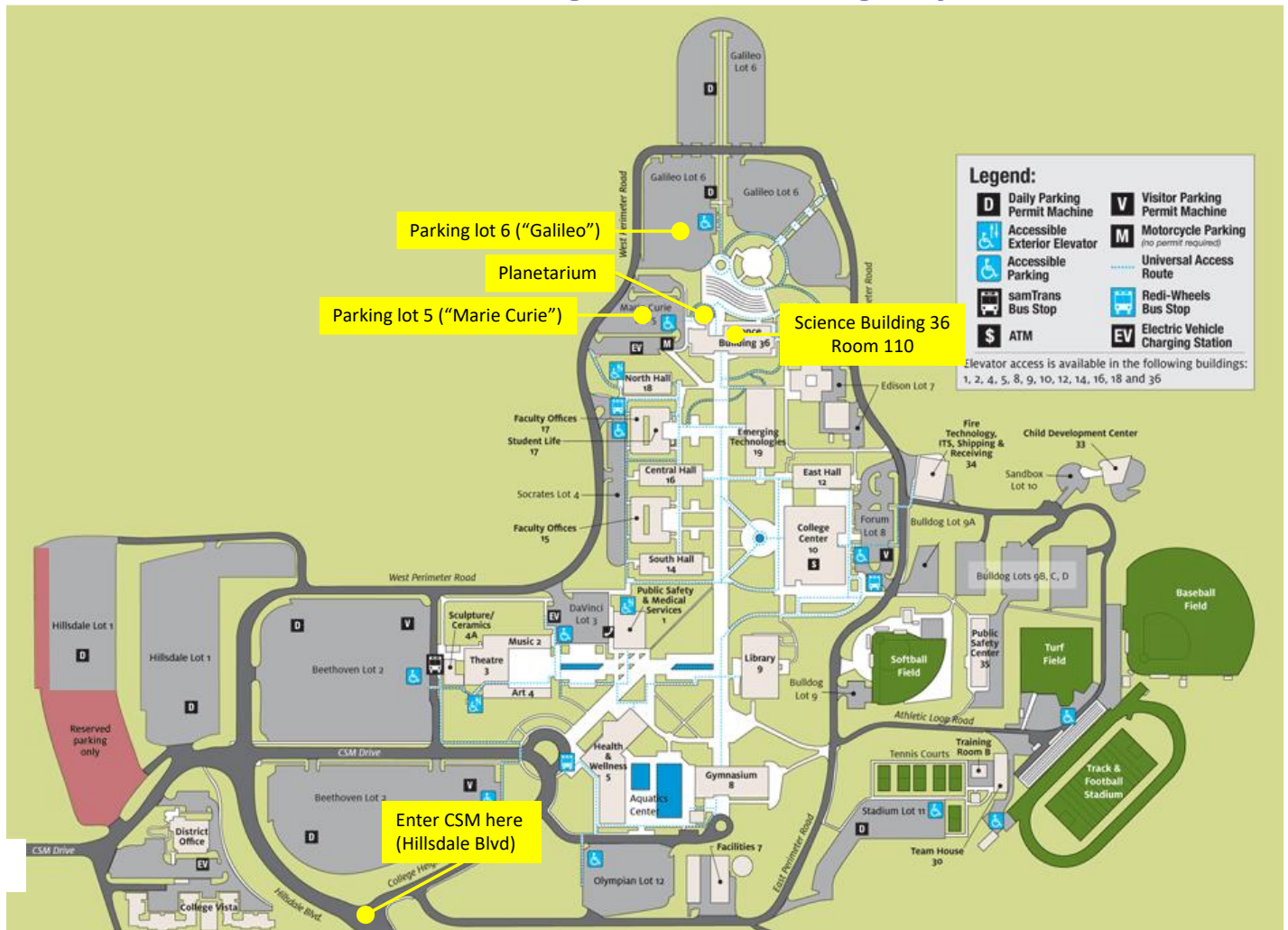
***KIPAC Open House (Community Day), October 19<sup>th</sup>:***

**By Bill Lockman**

From the KIPAC Newsletter #14 (June 27, 2019):

“[KIPAC](#) [Kavli Institute for Particle Astrophysics and Cosmology] has a long tradition of a very popular annual open house which includes outreach to the general public and local community. KIPAC and [SLAC](#) [Stanford Linear Accelerator Center] are joining forces for this year’s open house event, called Community Day, on October 19th. This will allow us to serve a larger number of participants, provide more activities, and share the various responsibilities with SLAC Communications group. If you have ideas for any new activity or event, please contact Ziba [Mahdavi]. We will be looking for KIPAC volunteers and as always will very much appreciate your help to make the event a success.”

## Directions to SMCAS Meetings at The College of San Mateo:



### 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", or Lot 6, "Galileo." Science (ISC) Bldg. (36) and the Planetarium lie straight ahead. Enter Bldg. 36 either through the door facing the lot, or walk around the dome to the courtyard entrance. We meet in ISC room 110 for pizza and soft drinks one hour prior to the talk in the Planetarium (pictured below).



## ***Directions to SMCAS Public Star Parties (Weather Permitting):***

### Crestview Park - San Carlos

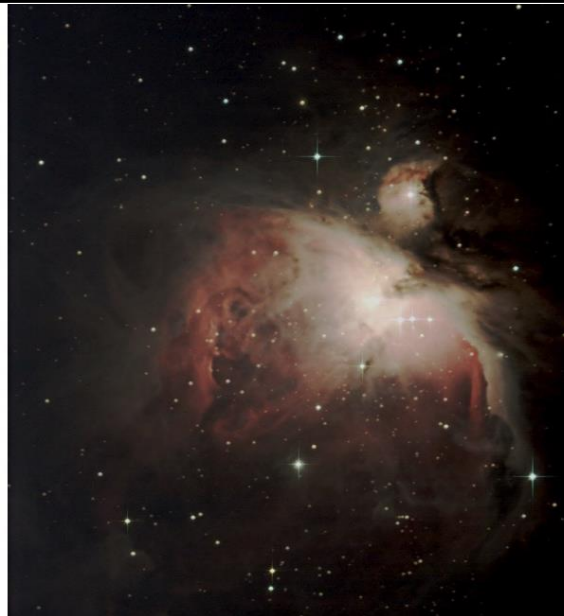
Come on out, and bring the kids, for a mind-blowing look at the Universe!

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 (toward 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.

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.

**Crestview Star Party schedule is here:**

<http://www.smcasastro.com/crestview-park.html>



# San Mateo County Astronomical Society

## Membership Application

rev 04062019

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

## ***Become an SMCAS Member Today! Here's what you get:***

- **Members Community**

Friendly advice and guidance from experienced recreational astronomers; access to SMCAS group emails which provide general orientation information, announcements of astronomy events, file access and exchange.

- **SMCAS Events**

General meetings are held the first Friday of most months, at 7 pm in the Integrated Science Center (ISC) Room and Planetarium in the Science Center (Bldg. 36) at the College of San Mateo (CSM), 1700 W. Hillsdale Blvd., San Mateo. Meetings include lectures and presentations on space science, an activity session, and refreshments (usually pizza).

We also offer stargazing two Saturdays a month, weather-permitting. Visitors and those without telescopes are welcome; members are glad to share! SMCAS also has sponsored dark-sky campouts at Fremont Peak State Park, field trips to SLAC, KIPAC and Lick Observatory, plus **member-only events, including Star-B-Ques and quarterly potlucks.**

- **Subscriptions** (free with your membership)

**The Event Horizon**, SMCAS' monthly newsletter, with SMCAS and member information, viewing tips and articles.

**The Reflector**, published quarterly by the Astronomical League, a national alliance of astronomy groups like SMCAS.

- **Significant Discounts on Equipment and Publications**

Discounts on purchases at Bay Area astronomical equipment retailer Orion Telescope Center, on sky calendars and ephemerides, and on such periodicals as *Sky & Telescope* and *Astronomy*.

- **Access to Loaner Equipment**

Use of SMCAS loaner telescopes and other astronomy equipment.

- **Sharing your Appreciation of Astronomy and Space Science with the General Public.**

Your SMCAS membership helps bring astronomy to interested lay people, especially students and children

**Annual Dues:** (SMCAS is a tax-exempt non-profit 501(c)(3). Dues may be tax deductible; consult your tax advisor):

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

**Every membership** includes all members of your immediate family, (including your kids).

### ***To join you can:***

Send application (see reverse side), with payment, to: SMCAS, P.O. Box 974, Station A, San Mateo CA 94403.

- Bring the completed application and payment to a meeting or event and give it to any SMCAS officer.
- Go online at <http://www.smcasastro.com/>, click on the Membership tab and pay via PayPal.
- **Bring your completed application to your first meeting or mail it to**

SMCAS, P.O. Box 974, Station A, San Mateo CA 94403

## **Application Form on reverse side**



# San Mateo County Astronomical Society

## Membership Application

rev 04062019

[SMCAS@live.com](mailto: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: \_\_\_\_\_