

The SAN MATEO COUNTY ASTRONOMICAL SOCIETY

June 2016 — 637th 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.smcastro.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.



VIP TRANSPORTATION awaited SMCAS astronomers at the first ever star party at Levi Stadium in Santa Clara. The event was part of a sleepover for Northern California Girl Scouts who sold over 600 boxes of cookies in one year. Pictured, left to right: star party organizer Jessica Henricks, and SMCAS members Mike Ryan and Marion Weiler. Article on page 5.

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DATES TO SAVE

June 3: General Meeting, Pizza, and Presentation at the CSM Planetarium. CSM's Justin Stevick will demonstrate the recent planetarium upgrades. For more detail, see the last paragraph of the President's Corner on page 3.

July 1: NO GENERAL MEETING in July.

July 16: Annual banquet and installation of officers, 6:00pm, Round Table Pizza, 61 43rd Ave, San Mateo. Details on page 10.

More events on page 8.

President's Corner

Let me start with an important reminder: we will be electing our SCMAS Executives and Board of Directors at our June 3rd meeting. Please contact any current Board member if you wish to be considered for one of these positions, or you can also nominate yourself at the June meeting itself. Our society runs on volunteers, and here is an opportunity to get involved!

In May, we supported a number of star parties. The biggest was at the KIPAC Open House at SLAC National Laboratory on May 7, where we had 6 SMCAS volunteers. Approximately 800 visitors showed up, and kept us busy during the course of the event. We weren't able to do Solar viewing during daylight as planned, due to the cloudy weather, but the skies cleared enough right at sunset that we were able to do stargazing. Special thanks to volunteers Rachel Freed, Ken Lum, Ed Pieret, Frank Seminario, and Wolf Witt.

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Photographs from the KIPAC open house.

Above and above right: Frank Seminario and Rachel Freed give visitors a look at telescopes of different designs and apertures.

Right: Ken Lum explains the principles of a refractor.



President's corner, continued from page 2

On Monday May 9th we held a Transit of Mercury viewing event at CSM on the Terrace of Building 10, where we had 9 SMCAS volunteers. Our first optimistic volunteer showed up at 6:00am to watch the transit at sunrise, only to find the usual cloudy skies over the Bay and no Sun in sight. Other volunteers arrived around 7:00am or later, but it wasn't until around 8:30 that the skies began to clear enough to start getting limited views. From about 9:30am until the end of the transit the clouds disappeared and viewing conditions were good. There was a fairly steady stream of visitors and we had a successful event. Special thanks to SMCAS volunteers Edwin Ching, Rachel Freed, Bruce Huston, Ken Lum, Ed Pieret, Mike Ryan, and Tom Stephany. An extra special thanks to Karen Boyer who played her ukelele and provided us with pleasant background music!

Also of note in May, thanks to John Fiske for planning, but unfortunately weather cancelled, a star party for the John Muir School in San Bruno on May 20. And thanks to Ed Pieret for supporting the star party for the Girl Scout sleepover at Levi Stadium on May 21 (see the full article on page 5). This was a unique location for us and the first star party in the Stadium. We are making history!

Lastly, at our June meeting we won't have our usual speaker in the Planetarium after our general meeting. Our June 3rd meeting occurs during semester break at the College of San Mateo. As a result, we don't expect any participation by CSM students. So instead of our usual guest speaker coming in from outside, we are having the Planetarium operator, Justin Stevick, show off the newly upgraded Planetarium to us. Earlier this year, CSM installed new 4k resolution digital projectors and a GOTO CHRONOS II star projector. The digital projectors provide more detail and brightness. The new star projector uses brighter LED lighting, while consuming 1/3 the power of the previous projector. It also has such features as a high-res projection of the Milky Way which can paint a very subtle, very real Milky Way across the dome. While we have been having presentations in the Planetarium, we haven't seen all this new equipment in operation, so this should be a real treat!

Marion Weiler

President, San Mateo County Astronomical Society



Photographs from the transit of Mercury on May 9.

Above: *SMCAS members Ed Pieret, Bruce Huston, Marion Weiler, Ken Lum, and Rachel Freed.*

Below left: *Mike Ryan helps out with a non-threatening telescope.*

Below right: *Karen Boyer and her ukelele.*

[May Meeting Review](#)

Exploding Stars, Dark Energy, and the End of the Universe

By Ken Lum

Our May meeting featured Dr. Brad Tucker of the Australian National University who was very generous in stopping by the SMCAS to give a talk while visiting our area. Dr. Tucker is working on the mechanism of the formation of Type 1a supernovae which are being used as standard candles to calibrate the rate of expansion of the Universe. Edwin Hubble most famously showed in 1929 that the Universe was expanding. Studies using Type Ia supernovae in the 1990s showed the Universe to be also accelerating in its expansion rate. The cause of this acceleration is completely unknown, but has been given the name of "Dark Energy". This discovery was the subject of the 2011 Nobel Prize in Physics awarded to Adam Riess, Brian Schmidt, and Saul Perlmutter.

Dr. Tucker's interest is to investigate the mechanisms by which Type 1a supernovae are formed. Understanding these mechanisms is important in knowing how reliable these exploding stars are as standard candles. Previously, it was thought that these supernovae were the product of a binary star system wherein one companion was a white dwarf in close orbit around a non-white dwarf star in another stage of stellar evolution. Due to the deep gravity well of the white dwarf, material from the non-white dwarf star is accreted onto the surface of the white dwarf. This continues until the mass of the white dwarf exceeds what is known as the Chandrasekhar limit, the maximum possible mass achievable by a white dwarf before the ability of electron degeneracy to support the white dwarf is overcome by gravity and the stellar remnant catastrophically collapses leading to a carbon-carbon fueled fusion explosion as a Type Ia supernova. This Chandrasekhar limit mass is 1.4 solar masses. Since Type Ia supernovae all explode at this same mass, they are all estimated to reach the same maximum absolute magnitude of brightness of $M = -19.3$ which makes them excellent standard



Supernova SN2012fr, just to the right of the center of the host galaxy, NGC 1365 in Fornax.

candles for estimating distances once the apparent visual magnitude is measured as seen from Earth for comparison.

But this proposed mechanism of supernova formation has been based mainly on being able to observe supernovae only as far back as 2.5 hrs after their explosion. Dr. Tucker has been able to observe three of these supernovae much earlier to within a few minutes of the initiation of their explosions using the Kepler satellite as used in the Kepler Extra-Galactic Survey (KEGS). He and his team found that an alternative mechanism can cause these supernova explosions in the form of merging white dwarfs. As both mechanisms lead to explosions with stellar remnant bodies at 1.4 solar masses, these supernovae will still produce reliable standard candles for measuring the expansion rate of the Universe. So the finding that the Universe's rate of expansion is accelerating is still valid.

Reference

Olling RP, Mushotzky R, Shaya EJ, et al. 2015. No signature of ejecta interaction with a stellar companion in three type Ia supernovae, *Nature* 521, 332–335.

Levi Stadium Girl Scout Star Party

By Marion Weiler

On Saturday night May 21, four astronomers from SMCAS made history by putting on the first ever Star Party at Levi's Stadium in Santa Clara. This Star Party was in support of a Girl Scout sleepover event in the stadium which involved over 2,000 participants! Girl Scouts from Northern California who sold over 600 boxes of cookies this past year were invited to participate in the sleepover as a reward.

Levi's Stadium was a unique location to hold a star party, and challenging one at that due to the brilliant field lights and the tall grandstands blocking most of the sky to the north and south of our viewing area. Although dark skies were nowhere to be found, the weather cooperated with us better than expected. Overcast and rain showers in the afternoon gave way to clear skies by sunset just in time for viewing to start.

Our telescopes were set up at mid-level (3rd floor elevator stop) in the stadium on the Intel Plaza next to the United Lounge area. Intel Plaza is a large open space with awesome views down to the field on the eastern side, and views across Santa Clara and the setting sun to the western

side. We were able to set up our telescopes in one corner near the field where we could get a continuous view of the moon and planets without obstruction from the Grandstands.

The first star gazers started arriving around 8:30pm when only Jupiter was viewable in the sky. As the evening progressed, the full moon rose over the eastern side of the grandstand, bringing Mars and Saturn into view with it. All four objects ended up being excellent targets for viewing, even given the lighting, and our estimated four to five hundred star party visitors were awestruck with what they saw.

It was a treat to watch the evening unfold on the field. It started with the gates to the field opening at 7:00pm to allow the first girls to come on the field. The activity and noise levels hardly abated until Taps was played at 1:00am and the activities including the star party were over. From our viewing area, we had a bird's eye view of the entire stadium field, which after 10:30pm became a sea of colorful tents, every space filled.

Continued on page 6



A panoramic view of the tents

Girl Scouts, continued from page 5

Our astronomers were given first class treatment. We and our equipment were chauffeured via utility carts from the ground level loading dock up to Intel Plaza (see cover photo). We were given access to a private snack room on the second floor and a free pizza dinner in the United Lounge.

After breaking down out telescopes for transport around 1:30am, we were again picked up by chauffeured utility cart and driven via a scenic route along the outside deck of the stadium at mid-level. This was somewhat eerie to see that early in the morning - large beautifully lit up, but empty, spaces. The route also afforded us beautiful views of the lights of Santa Clara at night. A very inspiring finish to a long night!

The Girl Scouts organization, in conjunction with the Astronomical Society of the Pacific, and the SETI Institute, are working on putting together a Space Science merit badge. This star party was intended to help build interest in astronomy for the girls in expectation of the badge. We may see more such Girl Scouts star party events in the future, as well as opportunities for individual involvement as advisers for merit badges.

Many thanks to Ed Pieret for organizing our involvement, and thanks to Mike Ryan, Marion Weiler and Wolf Witt for supporting it with their telescopes. A representative from the Peninsula Astronomical Society also participated.



Ed Pieret pointing out a telescope's target in the night sky



Mike Ryan, almost unrecognizable in the foreground, setting up in the Intel Plaza viewing area

NOAA's Joint Polar Satellite System (JPSS) to revolutionize Earth-watching

By Ethan Siegel

If you want to collect data with a variety of instruments over an entire planet as quickly as possible, there are two trade-offs you have to consider: how far away you are from the world in question, and what orientation and direction you choose to orbit it. For a single satellite, the best of all worlds comes from a low-Earth polar orbit, which does all of the following:

- orbits the Earth very quickly: once every 101 minutes,
- is close enough at 824 km high to take incredibly high-resolution imagery,
- has five separate instruments each probing various weather and climate phenomena,
- and is capable of obtaining full-planet coverage every 12 hours.

The type of data this new satellite—the Joint Polar Satellite System-1 (JPSS-1)—will take will be essential to extreme weather prediction and in early warning systems, which could have severely mitigated the impact of natural disasters like Hurricane Katrina. Each of the five instruments on board are fundamentally different and complementary to one another. They are:

1. The Cross-track Infrared Sounder (CrIS), which will measure the 3D structure of the atmosphere, water vapor and temperature in over 1,000 infrared spectral channels. This instrument is vital for weather forecasting up to seven days in advance of major weather events.
2. The Advanced Technology Microwave Sounder (ATMS), which assists CrIS by adding 22 microwave channels to improve temperature and moisture readings down to 1 Kelvin accuracy for tropospheric layers.
3. The Visible Infrared Imaging Radiometer Suite (VIIRS) instrument, which takes visible and

infrared pictures at a resolution of just 400 meters (1312 feet), enables us to track not just weather patterns but fires, sea temperatures, nighttime light pollution as well as ocean-color observations.



4. The Ozone Mapping and Profiler Suite (OMPS), which measures how the ozone concentration varies with altitude and in time over every location on Earth's surface. This instrument is a vital tool for understanding how effectively ultraviolet light penetrates the atmosphere.
5. Finally, the Clouds and the Earth's Radiant System (CERES) will help understand the effect of clouds on Earth's energy balance, presently one of the largest sources of uncertainty in climate modeling.

The JPSS-1 satellite is a sophisticated weather monitoring tool, and paves the way for its' sister satellites JPSS-2, 3 and 4. It promises to not only provide early and detailed warnings for disasters like hurricanes, volcanoes and storms, but for longer-term effects like droughts and climate changes. Emergency responders, airline pilots, cargo ships, farmers and coastal residents all rely on NOAA and the National Weather Service for informative short-and-long-term data. The JPSS constellation of satellites will extend and enhance our monitoring capabilities far into the future.

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!

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, Jun 3	7:00 pm	General Meeting, Pizza Social and Presentation
Sat, Jun 4	8:30 pm	Crestview Park Star Party
Sat, Jun 25	8:30 pm	Crestview Park Star Party
Fri, Jul 1		There will be NO general meeting on this date
Sat, Jul 2	8:15 pm	Crestview Park Star Party
Sat, Jul 16	6:00 pm	Annual banquet and installation of officers Round Table Pizza, at 61 43rd Ave, San Mateo
Sat, Jul 30	8:15 pm	Crestview Park Star Party
Fri, Aug 5		There will be NO general meeting on this date
Sat, Aug 6	8:15 pm	Crestview Park Star Party
Thu, Aug 11		Perseid Meteor Shower peaks
Sat, Aug 27	7:45 pm	Crestview Park Star Party

June Rise and Set Chart

SMCAS 2016 (PDT)		Jun 4 Rise	Jun 4 Set	Jun 25 Rise	Jun 25 Set
Sun	Solstice on 20th	5:48 AM	8:27 PM	5:49 AM	8:34 PM
Moon		5:44 AM	8:06 PM	-11:39 PM	11:08 AM
Mercury	Before sunrise	4:43 AM	6:20 PM	4:55 AM	7:35 PM
Venus	In the sun's glare	5:48 AM	8:23 PM	6:12 AM	8:57 PM
Mars	Most of the night	6:58 PM	4:48 AM	5:17 PM	3:08 AM
Jupiter	All evening	12:53 PM	1:46 AM	11:41 AM	12:28 AM
Jupiter's moons		c J i e g		J e c i g	
10 PM, East on left		J=Jupiter, c=Callisto, e=Europa, g=Ganymede, i=Io			
Saturn	Opposition on 3rd	8:04 PM	5:59 AM	6:35 PM	4:31 AM
Uranus	Before sunrise	3:14 AM	4:10 PM	1:53 AM	2:51 PM
Neptune	In the wee hours	1:32 AM	12:48 PM	12:10 AM	11:25 AM
Pluto	Late at night	10:31 PM	8:23 AM	9:07 PM	6:58 AM

- Star Parties are at Crestview on the 4th and 25th.
- There will be no Jazz Under the Stars this month.

- *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							
< June 2016 >							
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
29	30	31	1	2	7:00 PM General Membership Meetin	8:30 PM Crestview Star Party Sunset: 8:29 PM	
5 	6	7	8	9	10	11 Sunset: 8:32 PM	
12 	13	14	15	16	17	18 Sunset: 8:35 PM	
19	Summer Solstice	20 	21	22	23	24	8:30 PM Crestview Star Party Sunset: 8:36 PM
26	27 	28	29	30	1	2	

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

Calendar courtesy of Ed Pieret

Annual Banquet and Installation of Officers

Saturday, July 16 6:00 pm

Join us in the private dining room at Round Table for a fun evening with lots of good company and food, and more! We will also be installing our Officers and Board of Directors for 2016–17. The standard menu provided will be mix of pizza flavors, salad, wings, twists, and soft drinks. We will send out more details on pricing, etc., via the SMCAS Yahoo Group soon.

Round Table Pizza
61 43rd Avenue, San Mateo
650-345-2381

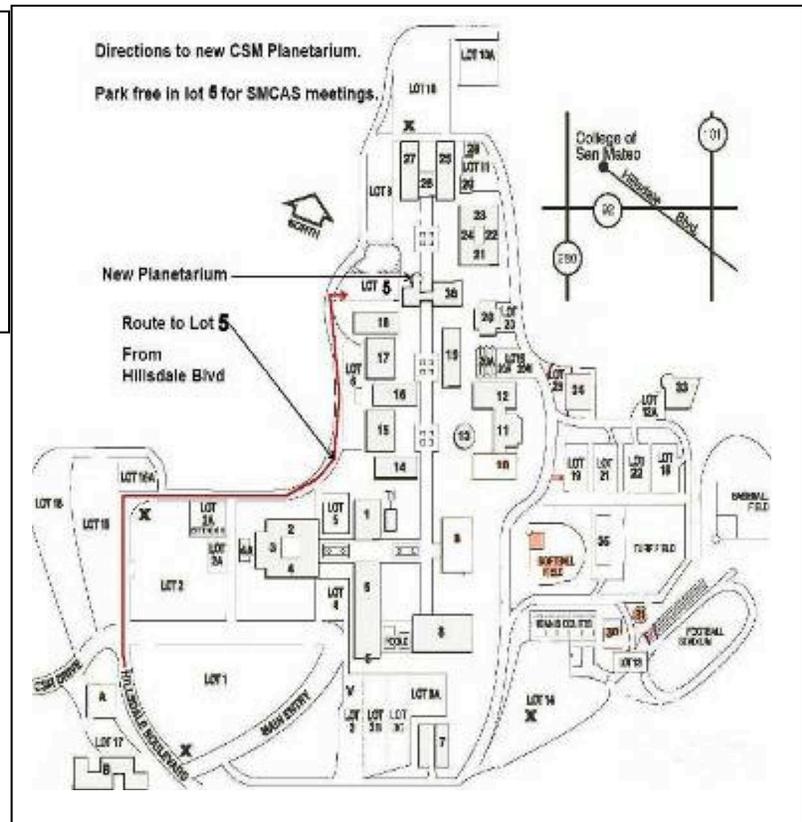
*Please RSVP to Marion Weiler at
mgwe@pacbell.net by Thursday, July 14*

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), at any monthly meeting, or send your check, payable to SMCAS, to: SMCAS, PO Box 974, Station A, San Mateo, CA, 94403.

Dues are currently \$30 for a new (family) membership and renewing member and \$15 for a student membership.

Please check one of the following boxes: () New member () Membership renewal () Student () Address or info change

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

Name(s) _____

Address/City/Zip: _____

Phone(s) _____ Email _____

SMCAS – Society Information

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

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

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

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

SMCAS Contact Information

Website: www.smcas.net

The CSM Astronomy Department schedule is at www.collegeofsanmateo.edu/astronomy/events.

Email: SMCAS@live.com

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

Yahoo Group Subscription: email smcas-subscribe@yahogroups.com to subscribe.

Event Horizon: To submit articles or photos, please contact Ed Pieret — epieret@comcast.net or 650.862.9602.