

The SAN MATEO COUNTY ASTRONOMICAL SOCIETY

April 2017 — NO GENERAL MEETING THIS MONTH



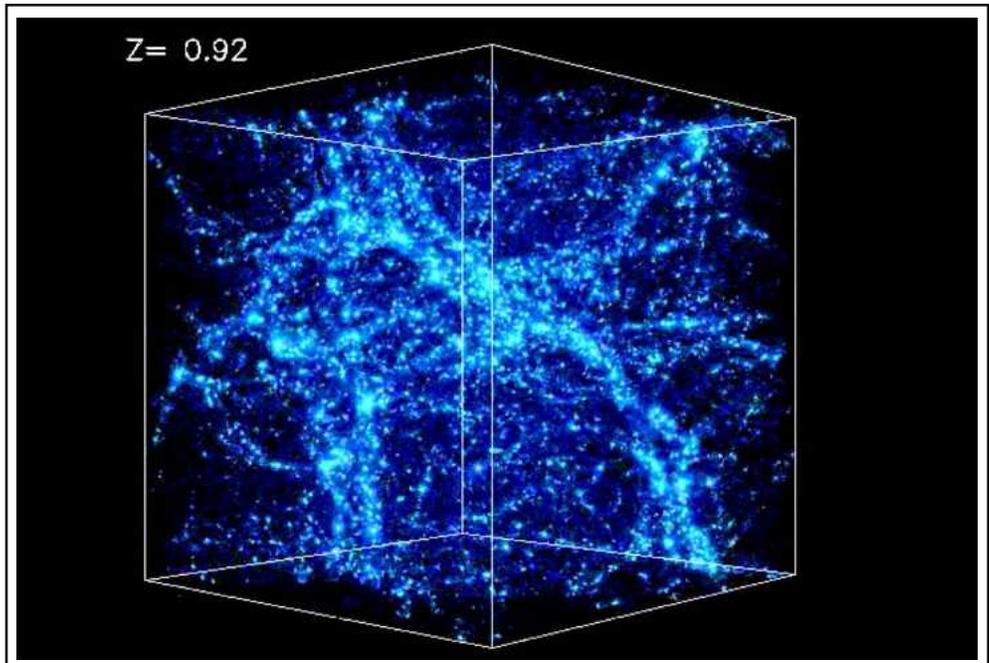
EVENT HORIZON

Founded in 1960, the San Mateo County Astronomical Society is a 501(c)(3) non-profit organization for amateur astronomers and interested members of the public. Visitors may attend Society meetings and lectures on the first Friday of each month, September to June, and star parties two Saturdays a month. All events are free for visitors and guests. Family memberships are offered at a nominal annual cost. Detailed info is found at www.smcasastro.com, where those who want can join via Paypal.

Membership includes access to this monthly Event Horizon newsletter, discounted costs and subscriptions to calendars and magazines, monthly star parties of the Society and the College of San Mateo, use of loaner telescopes, field trips, social occasions and general meetings presenting guest speakers and programs. For additional information, please email us at SMCAS@live.com, or call us at (650) 678-2762.

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THE LARGE SCALE STRUCTURE and of the universe was the topic at the March SMCAS meeting. Dr. Mehmet Alpaslan described technologies used to study the way in which filaments, the largest known structures, transport gas into individual galaxies and affect star formation. See Ken Lum's review on page 3.

DATES TO SAVE

Apr 7: NO GENERAL MEETING in April.

Apr 8: Spring Equinox Spaghetti Feed/Potluck at Crystal Springs Methodist Church, San Mateo.

Apr 14: Celebration of Color: Lecture and Art Exhibit by Mohsen Janatpour at the CSM Theatre.

May 5: General meeting at the CSM Planetarium.

More events and further details on page 5.

President's Corner

March was another problematic month for Crestview Park Star parties, but some signs of improvement! The March 18th Crestview star party did not happen due to continuing bad weather, similar to our January and February star parties. However, March 25th we had probably the best conditions this year, although still not great, as many thought this was the coldest evening at Crestview Park they could remember! The skies were mostly clear looking up, not so great on the horizon. The major planets were below the horizon, although Jupiter was just rising above the tree about the time the party ended at 9:30pm, just a bit too late for viewing. We had 7 members attend, and around 20 members of the general public. Thanks to all the hardy volunteers who showed up and helped educate the public, who appreciated our being there in spite of the cold!



Ed Pieret sets up in front of the new SMCAS banner, displayed on the side of his van.

For those that haven't been to one of our events or star parties lately, you have probably missed seeing the SMCAS banner Ed Pieret had made (see picture). It fits nicely on his van and helps promote SMCAS, giving our events a better sense of identity. Many thanks to Ed for designing and producing the banner! Also in the photograph you can see the curbs painted blue and green starting under Ed's van, which has helped with the visibility of the curb in the dark. This happened as a result of the SMCAS Board working with the San Carlos Public Works Department to improve conditions at Crestview Park.

Reminders. April will be a little bit different of a month for us. There is no April General meeting on April 7 due to CSM being closed. However, we will have our Spring Equinox Social on Saturday, April 8. The following Friday, April 14, is Mohsen Janatpour's 30th annual Art and Science Presentation in the CSM Theatre. This year the title is 'Celebration of Color' . Each year we help with this event by setting up telescopes in the Theatre atrium (weather permitting), and showing the night sky to attendees after the presentation. I hope you all will take the opportunity to attend this lecture!

Lastly, please join me in welcoming our newest member, Chaitania Churi of Redwood City.

Happy stargazing!

Marion Weiler

President, San Mateo County Astronomical Society

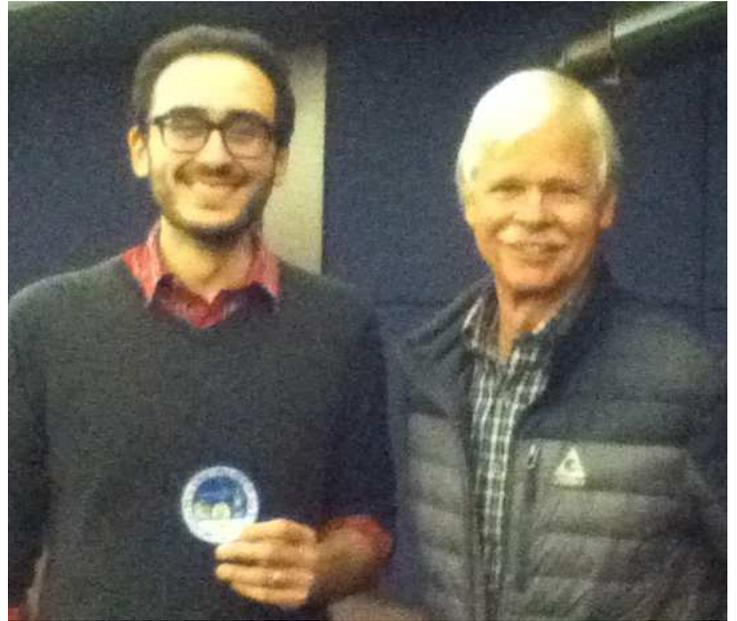
March Meeting Review

How Galaxies are Influenced in the Universe

By Ken Lum

Our speaker in March was Dr. Mehmet Alpaslan of NASA Ames who came and spoke to us about the influence of the formative environment of galaxies on their evolving physical characteristics. It has been known since the late 1980s, based on the work of Valérie de Lapparent, Margaret Geller, and John Huchra, that galaxies were distributed non-uniformly in what appeared to be filaments and walls surrounding relatively empty voids looking very much like giant soap bubble structures known as cosmic webs (Fig.1). Dr. Alpaslan and his team compared some of the properties of galaxies in the voids with those found on the boundaries and interiors of the filaments. In particular, he was interested in the comparative masses and rates of star formation of the galaxies from these different regions of a cosmic web.

Initially, 3D maps of thousands of galaxies were obtained by observing them with large telescopes equipped with aluminum plates placed at their focal planes that had holes drilled that corresponded to the galaxies' image positions on the focal plane. Light was collected from these galaxies via fiber optic cables placed in the holes allowing simultaneous acquisition of spectral and luminosity data of as many as over 400 galaxies in a single observing run thereby greatly enhancing the efficiency of data collection. In particular, the telescopes used included the 4 meter Anglo Australian Telescope and the 2.5 meter Sloan Digital Sky Survey telescope at Apache Point, New Mexico. The right ascension and declination positions combined with distance data from redshift observations provided the information needed to generate 3D computer maps of how these galaxies were distributed. Information about galactic stellar masses based on their luminosities and star formation rates from their spectra were



Dr. Mehmet Alpaslan standing beside SMCAS president Marion Weiler with his SMCAS patch—first step on the way to a Nobel!

also obtained. This data formed the basis of the Galaxy And Mass Assembly (GAMA) survey.

Maps of the filaments were generated using a mathematical technique called Point Processing using Minimum Spanning Trees (MSTs) from

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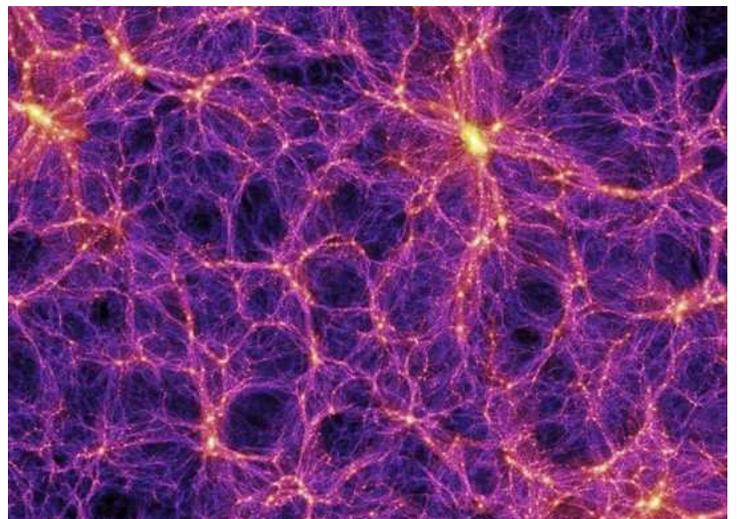


Figure 1. The cosmic web of galaxies (via NASA).

Galaxies, continued from p. 3

graph theory. MSTs are the shortest lines connecting a series of variably spaced galaxy locations on the 3D map. This technique has been used to determine the shortest distance needed to travel through a network of points and locations and can be done by computer.

As the filaments contain more matter, they have a greater gravitational attraction causing isolated galaxies in the voids to fall towards the filaments. A comparison was made of the stellar masses and rates of star formation of galaxies from the different environments of voids, filament boundaries, and cores of filaments. Galaxies in voids, presumably with less gas, were found to be fewer in number and have lower stellar mass and rates of star formation. By contrast, galaxies falling into filaments have higher stellar mass and higher rates of star formation reflecting the steeper gravitational well of filaments with more mass and density of intergalactic gas. So the mass of gas in the environment of a galaxy is the dominant factor in influencing its stellar mass and rate of star formation.

As galaxies enter the filament, they undergo greater rates of star formation from accumulating even more gas and undergoing more galactic collisions from crowding of galaxies in the filament. This leads to consumption of the gas in star formation and stripping of the gas from collisions leading to a quenching of star formation as the galaxies detach from the boundaries of the web and enter the cores of the filaments. They then collect in converging filament areas known as multi-streaming regions where the higher stellar mass, but lower star forming rate galaxies accumulate in galactic clusters. This has become known as the Cosmic Web Detachment (CWD) model of galaxy evolution [1] (Fig. 2). Dr. Alpaslan and his team's empirical observations of thousands of galaxies appear to confirm this

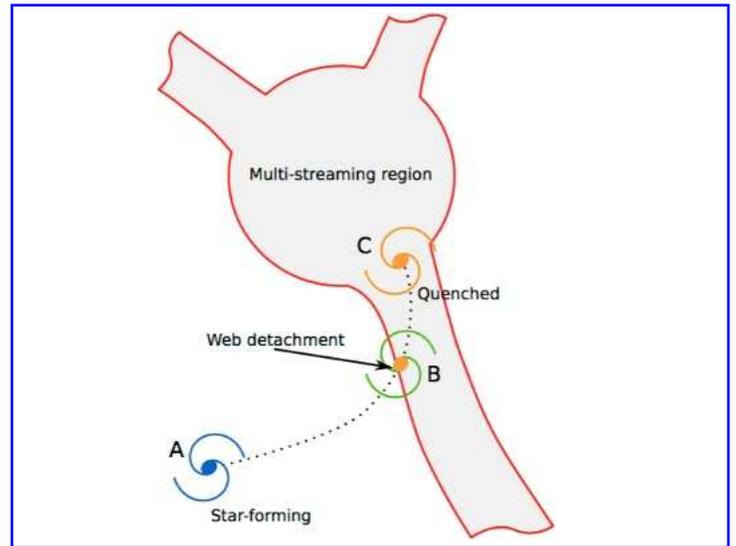


Figure 2. The Cosmic Web Detachment model of galaxy evolution [1].

model [2]. He said that the Milky Way galaxy, with its relatively high rate of star formation, was on the boundary of one of these cosmic web filaments as the CWD model would predict.

Dr. Alpaslan also notes that the highest rate of star formation in the Universe occurred long ago around 11 billion years ago or 2.7 billion years after the Big Bang. It is now only about 3 percent of that long ago peak, and the Universe is slowly declining towards a heat death. So have fun while you can!

References

1. Aragon-Calvo M. A., Neyrinck M. C., and Silk J. 2016. How cosmic web detachment drives galaxy quenching (arxiv.org/pdf/1607.07881.pdf).
2. Alpaslan M. 2016. How galaxies are influenced in the universe. SETI Talks 2016. (www.youtube.com/watch?v=2CYMENUxYUg). This is a video repeat of Dr. Alpaslan's lecture at the SETI Institute in November, 2016 on YouTube should you want to see it again. Note our fearless Marion Weiler is seen in the audience at the end of the video!

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, Apr 7 | | No General Meeting in April |
| Sat, Apr 8 | 6:00 pm | Spring Equinox Social, Crystal Springs Methodist Church |
| Fri, Apr 14 | 7:30 pm | Presentation of Art & Science: Celebration of Color by Mohsen Janatpour, CSM Theater |
| Sat, Apr 22 | 8:00 pm | Crestview Park Star Party |
| Sat, Apr 29 | 8:00 pm | Crestview Park Star Party |
| Fri, May 5 | 7:00 pm | General Meeting, Pizza Social and Presentation |
| Sat, May 20 | 8:15 pm | Crestview Park Star Party |
| 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 |

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

Evening comets of note: 45P/H-M-P and up-and-comer C/2015 V2 (Johnson). Finder charts are at <https://is.gd/4pcometcampaign> (45P, scroll down the page) and <http://tinyurl.com/mdflwdr> (C/2015 V2). For ephemerides enter "45P" or "C/2015 V2" at <http://www.minorplanetcenter.net/iau/MPEph/MPEph.html>.

Associated Students and the Math/Science Division of College of San Mateo present

Professor Mohsen Janatpour's Lecture & Art Exhibition

on

Celebration of Color

Friday, April 14, 2017 • 7:30 pm • College of San Mateo Theatre

Admission FREE, Reception following

30th Presentation of Art & Science

With the evolution of species, the appearance of millions of cone cells in a very small indentation in the retina of the human eye opened the gates of the universe of color to the homo sapiens' mind. Since then we have been fascinated by the colors of a sunrise and sunset as bees and hummingbirds are attracted to the color of flowers. In our everyday commerce of living, our choices of outfits to wear, houses to live in, cars to drive, and furniture to decorate, are heavily influenced by our predilection for certain color schemes.

In the art world, the debates about superiority of color to form, or form to color, has enlivened philosophical discussions for centuries. In psychological studies, almost every study of human perception heavily relies on studies of color perception.

In the 30th Presentation of Art and Science, I would like to celebrate color by discussing my basic understanding of color, both scientifically and artistically. And, if completed in time, demonstrate my ideas by the exhibition of Symvisio XII.

Weather permitting, we will complete the evening by setting up telescopes in front of the theatre, courtesy of the San Mateo County Astronomical Society and CSM Astronomy department. With help from the experts, you will be treated to the spectacular view of celestial beauties such as Jupiter, its moons, and the Honeycomb nebula.

Beethoven parking lots C, D, E are closest to the event

See campus map at collegeofsanmateo.edu/map

For more information, call (650) 574-6272

or visit Janatpour's web site at www.mohsensart.com.



SMCAS Spring Equinox Social and Spaghetti Feast

Saturday, April 8 6:00-9:00 pm

Come help us be part of the world community celebrating this year's Spring Equinox! Bring your appetite, your spouse, your family, friends and all the stories you wish to tell; there will be no truth meter present!

This event is free for members and their families/friends. You are encouraged to bring your favorite appetizer, bread, side dish or desert to share, but it is not required. We will supply the pasta and sauces, plates/utensils as usual! **RSVP to Marion at mgwe@pacbell.net with the number of people in your party.**

An Equinox is the time when the sun crosses the plane of the earth's equator, making night and day of approximately equal length all over the earth and occurring about March 21 (vernal equinox or spring equinox) and September 22 (autumnal equinox). Astronomically, the March equinox marks the end of winter and the beginning of spring in the Northern Hemisphere

Many cultures around the world hold feasts and celebrate festivals and holidays to mark the March equinox.



The Fireside Room
Crystal Springs Methodist Church
2145 Bunker Hill Drive, San Mateo, CA
650-345-2381

If you have special diet needs regarding the spaghetti or sauce, please advise. For RSVP, special needs or questions, contact Marion at mgwe@pacbell.net

What It's Like on a TRAPPIST-1 Planet

By Marcus Woo

With seven Earth-sized planets that could harbor liquid water on their rocky, solid surfaces, the TRAPPIST-1 planetary system might feel familiar. Yet the system, recently studied by NASA's Spitzer Space Telescope, is unmistakably alien: compact enough to fit inside Mercury's orbit, and surrounds an ultra-cool dwarf star—not much bigger than Jupiter and much cooler than the sun.

If you stood on one of these worlds, the sky overhead would look quite different from our own. Depending on which planet you're on, the star would appear several times bigger than the sun. You would feel its warmth, but because it shines stronger in the infrared, it would appear disproportionately dim.

"It would be a sort of an orangish-salmon color—basically close to the color of a low wattage light bulb," says Robert Hurt, a visualization scientist for Caltech/IPAC, a NASA partner. Due to the lack of blue light from the star, the sky would be bathed in a pastel, orange hue.



This artist's concept allows us to imagine what it would be like to stand on the surface of the exoplanet TRAPPIST-1f, located in the TRAPPIST-1 system in the constellation Aquarius. Credit: NASA/JPL-Caltech/T. Pyle (IPAC).

But that's only if you're on the light side of the planet. Because the worlds are so close to their star, they're tidally locked so that the same side faces the star at all times, like how the Man on the Moon always watches Earth. If you're on the planet's dark side, you'd be enveloped in perpetual darkness—maybe a good thing if you're an avid stargazer.

If you're on some of the farther planets, though, the dark side might be too cold to survive. But on some of the inner planets, the dark side may be the only comfortable place, as the light side might be inhospitably hot.

On any of the middle planets, the light side would offer a dramatic view of the inner planets as crescents, appearing even bigger than the moon on closest approach. The planets only take a few days to orbit TRAPPIST-1, so from most planets, you can enjoy eclipses multiple times a week (they'd be more like transits, though, since they wouldn't cover the whole star).

Looking away from the star on the dark side, you would see the outer-most planets in their full illuminated glory. They would be so close—only a few times the Earth-moon distance—that you could see continents, clouds, and other surface features.

The constellations in the background would appear as if someone had bumped into them, jostling the stars—a perspective skewed by the 40-light-years between TRAPPIST-1 and Earth. Orion's belt is no longer aligned. One of his



Continued on p. 10

April Rise and Set Chart

| SMCAS 2017 (PDT) | Apr 1 Rise | Apr 1 Set | Apr 22 Rise | Apr 22 Set | Apr 29 Rise | Apr 29 Set |
|---------------------------------------|---------------------------------------------------|----------------------|------------------------|-----------------------|------------------------|-----------------------|
| Sun | 6:52 AM | 7:32 PM | 6:23 AM | 7:51 PM | 6:14 AM | 7:57 PM |
| Moon | 10:30 AM | +12:58 AM | 4:16 AM | 3:49 PM | 9:13 AM | 11:50 PM |
| Mercury | 7:32 AM | 9:08 PM | 6:11 AM | 7:27 PM | 5:42 AM | 6:39 PM |
| Venus | 5:55 AM | 6:41 PM | 4:45 AM | 5:01 PM | 4:30 AM | 4:44 PM |
| Mars | 8:25 AM | 10:20 PM | 7:49 AM | 10:11 PM | 7:38 AM | 10:07 PM |
| Jupiter | 7:54 PM | 7:26 AM | 6:19 PM | 5:56 AM | 5:48 PM | 5:27 AM |
| Jupiter's moons 10PM, East on left | c e J i g | | e c J i g | | e J i g c | |
| | J=Jupiter, c=Callisto, e=Europa, g=Ganymede, i=Io | | | | | |
| Saturn | 1:29 AM | 11:09 AM | 12:06 AM | 9:46 AM | 11:33 PM | 9:17 AM |
| Uranus | 7:27 AM | 8:25 PM | 6:08 AM | 7:08 PM | 5:41 AM | 6:43 PM |
| Neptune | 5:47 AM | 5:05 PM | 4:26 AM | 3:45 PM | 3:59 AM | 3:18 PM |
| Pluto | 2:58 AM | 12:45 PM | 1:36 AM | 11:23 AM | 1:08 AM | 10:55 AM |

- Jazz Under the Stars is at CSM on the 1st.
- Star parties are at Crestview on the 22nd and 29th.
- Plus moonset means the next day.

- 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 | | | | | | |
|------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------|--------|-------------------------------------------------------|
| April 2017 | | | | | | |
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
| 26 | 27 | 28 | 29 | 30 | 31 | 1 Sunset: 7:33 PM |
| 2 | 3  | 4 | 5 | 6 | 7 | 8 6:00 PM Spring Equinox Social Sunset: 7:40 PM |
| 9 | 10 | 11  | 12 | 13 | 14 | 15 Sunset: 7:47 PM |
| 16 | 17 | 18 | 19  | 20 | 21 | 22 8:00 PM Crestview Star Party Sunset: 7:53 PM |
| 23 | 24 | 25 | 26  | 27 | 28 | 29 8:00 PM Crestview Star Party Sunset: 7:59 PM |
| 30 | 1 | 2 | 3 | 4 | 5 | 6 |

San Mateo County Astronomical Society Event Calendar from the [Night Sky Network](#).

Calendar courtesy of Ed Pieret

Summer Opportunity: Resident Camp Counselor, Astronomy Specialist

Girl Scouts of Northern California is seeking resident camp counselors with enthusiasm for space science and astronomy for the summer of 2017. This specialist position will spend dedicated time leading interactive experiences about the sun, moon, stars, planets, and more with campers. This person will also help other counselors become comfortable with the activities. Apply to the Program Counselor www.camprocks.org/staff position at Camp Bothin, Camp Sugar Pine or Camp Skylark Ranch. In the Camping, Nature & Environment section of the application, please explain your interest in and experience with astronomy.

TRAPPIST-1, continued from p. 8

shoulders is lowered.

And, with the help of binoculars, you might even spot the sun as an inconspicuous yellow star: far, faint, but familiar.

Want to teach kids about exoplanets? Go to the NASA Space Place and see our video called, "Searching for other planets like ours":

spaceplace.nasa.gov/exoplanetsnap

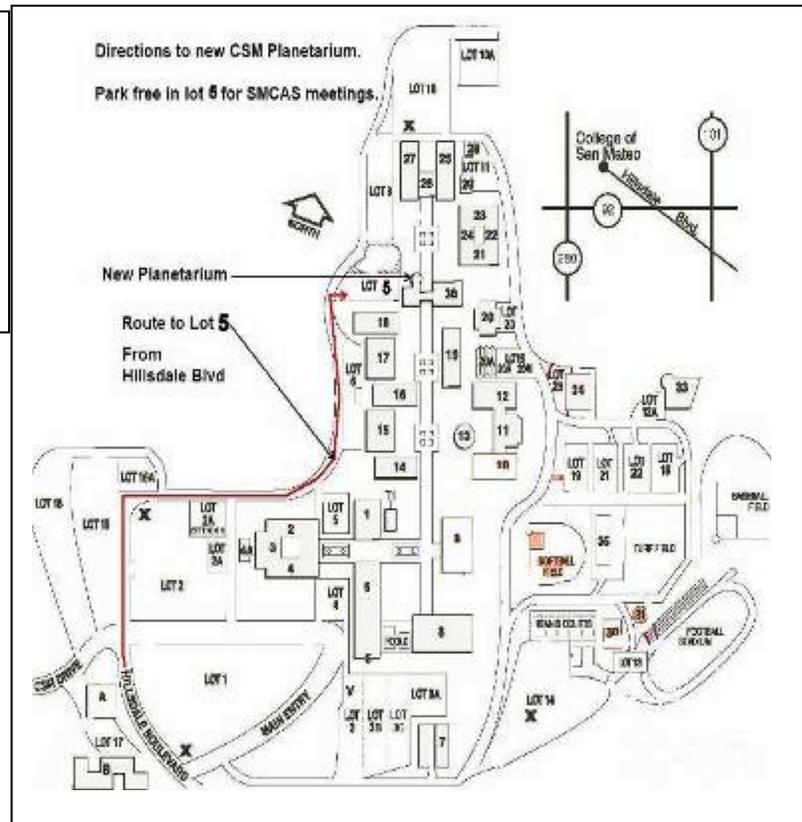
This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!

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.

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.



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

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 next page), 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. **Then 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 next page

<http://www.SMCASASTRO.com>



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: _____