

# ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

**Vol. 62, No. 5 - May 2014**

**GENERAL MEETING – MAY 21, 2014**

*Randall Museum . 199 Museum Way . San Francisco*

*7:00 pm Doors Open . 7:30 pm Announcements . 8:00 pm Speaker*

*SFAA's General Meetings occur on the 3<sup>rd</sup> Wednesday of each month (except January)*

*PLEASE NOTE THAT THIS MEETING WILL TAKE PLACE IN THE  
RANDALL MUSEUM'S BUCKLEY ROOM LOCATED ON THE LOWER LEVEL*

***FARIDE KHALAF***

***Amateur Astronomer/Private Pilot, Chabot Space & Science Telescope Operator***

***THE DUSTY DOZEN***



Join Faride Khalaf, amateur astronomer, private pilot, and certified telescope operator at Chabot Space and Science Center, for a talk on ***The Dusty Dozen***, about the twelve American astronauts that have walked on the Earth's moon.

Mr. Khalaf will introduce the "Dusty Dozen," the twelve American astronauts that served as the first ambassadors to visit our companion world, Luna. Learn about the six Apollo lunar missions and these rare and adventurous men who risked so much for the reward of skipping along the surface of the Moon.

*Faride Khalaf began his aviation career as a skydiver in the 1980's and went on to earn his Airframe and Power plant licenses (A&P) from the College of Alameda in California. Faride is an FAA Certified Aircraft Inspector, was an Aircraft Mechanic Instructor at the late Sierra Academy in Oakland, and was a General Aircraft Mechanic at United Airlines for a decade. While at United, Faride spent two years teaching structural repairs and for two years was*

*a Fuel Systems Specialist. He is the sole owner of a 1947 Cessna 120 airplane and is an amateur astronomer who works with Chabot's astronomy program as a volunteer. His presentations are in high demand at many venues around the Bay Area.*

## **PRESIDENT'S MESSAGE**

Hello SFAA,

It's May and with it comes the warmer nights and the summer constellations. Our public nights are back in full swing, and more members are showing up for the private and city star parties. This also means the impact we have on our newer and prospective members are greater. Think back to your first star party or even the first time someone took the time to show you the stars. Think of the wonder and the glory of the night sky. There are many more out there just waiting for someone to show them, and this could be your chance to change someone's life! If you don't already, please consider coming out to the city star parties and the public nights to help the club spread the joy.

In other events, the club will have a table at Makers Faire this weekend. If you are a Do-It-Yourselfer or are interested in telescope making, come take a look at our table and give it a try. The faire is a good time and there are lots of interesting exhibits to see. Go to <http://makerfaire.com/> for more information.

I look forward to seeing everyone at the next lecture at the Randall, The Dusty Dozen. It should be interesting. Remember that this month will be downstairs in the Buckley room instead of our usual location.

Thank you for reading and keep watching the skies!

**MATTHEW JONES**  
**President**  
**San Francisco Amateur Astronomers**  
**2014**

## MESSAGE FROM OUR TREASURER

The Board and Officers have spent some time in writing down SFAA practices and procedures so that Members are informed on SFAA procedures and future Board/Officers don't have to reinvent the wheel every few years. From time to time we will include one of these Guidelines in Above The Fog so that Members are kept up-to-date regarding important SFAA administrative topics.

We welcome any suggestions for improvement. Please direct your inputs to me at [sfaatreasurer@gmail.com](mailto:sfaatreasurer@gmail.com) Thank you.

Michael Patrick, Treasurer, SFAA

### S.F.A.A. Guidelines

#### 303 - Mt. Tamalpais Parking Passes

Owner: Officers & Board Members	Last Revision Date: 7 March 2014
Initial Approval & Effective Date: 18 March 2014	Last Review/Approval Date: 23 March 2014
Related Guidelines: 301 & 302	Next Review Date: January 2016

##### 1. Guideline

Under an agreement with the California State Parks, the SFAA is authorized to issue CSP (California State Parks) Parking Passes to current members that allow the holder to stay and observe at the Rock Springs parking lot after normal park closing hours, up to 2:00 AM of the following morning. These passes must be displayed on the holder's vehicle dash at all times during scheduled member's only or public star parties. These passes are not valid on nights other than those scheduled and approved by the California State Parks Ranger. Failure to display a current pass may result in the vehicle being cited or towed by the California State Parks Ranger.

Please check before you leave home for Mt. Tamalpais that you have a valid parking pass, in your vehicle, which shows the current year.

##### 2. Process for Obtaining a Parking Pass

SFAA Mt. Tamalpais/Rock Springs after hours parking passes will be issued to new or renewing members upon request as part of the joining or renewing process. Passes are not automatically mailed out upon joining or renewing.

Joining or renewing membership is best done through the SFAA website and there are two methods offered: using your credit card via a PayPal process or writing a check and mailing an application via the US Postal Service.

In the PayPal process under "Adding Special Instructions to the Seller" please write that you would like a parking pass mailed to you.

If you decide to write a check and mail in your "Application for New or Renewing Membership" form (also found on the "Membership" page of the SFAA website), after printing the form, fill it out and simply check the box next to "Please mail to me a Mt. Tamalpais Parking Permit".

In both cases a parking pass will be mailed to you within a few days of the processing of your membership.

Parking Passes are also obtainable from Board Members or Officers at the event on Mt. Tamalpais or at our monthly meeting / lecture at the Randall Museum. The requester must provide proof of payment for current membership. If current proof is not available, the Officer or Board member will take the requestor's name and inform the Treasurer. Upon verification of current membership the Treasurer will mail a pass to the requestor.

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#### For SFAA Use Only

*This document supersedes all prior versions. It is available to members by request and external auditors if necessary. The purpose of this document is to promote consistency and uniformity in action. Depending upon the SFAA's needs, policies may be changed by Officers with approval by the Board of Directors from time to time.*

# ***SAN FRANCISCO AMATEUR ASTRONOMERS UPCOMING LECTURES***

**June 18, 2014**

***BRAD TUCKER***

**Astrophysicist/Cosmologist, University of California at Berkeley**

## ***EXPLODING STARS, DARK ENERGY & THE END OF THE UNIVERSE***

Join Astrophysicist/Cosmologist Brad Tucker, one of the top researchers on Dark Energy, for an intriguing talk.

Tucker will discuss the brilliant explosions at the end of stars lives, known as supernova. The past 15 years has been a "boom" period for supernovae with vast amounts of time and effort being invested in these objects. Not only are they important for understanding the life of stars, but they can be used as cosmological probes to study what the Universe is made of and how it is growing. This use has shown that the Universe is accelerating in its expansion, the subject of the 2011 Nobel Prize, and is being caused by dark energy which will cause the end of the Universe. In this talk, Tucker will show how our understanding of these objects has been revolutionized and what this means for the Universe.

**July 16, 2014**

***TOM GREENE***

**Astrophysicist, NASA Ames Research Center**

## ***THE JAMES WEBB SPACE TELESCOPE: SCIENCE POTENTIAL AND PROJECT STATUS***

The unprecedented sensitivity and resolution of the James Webb Space Telescope (JWST) will significantly advance a broad variety of astrophysics soon after it is launched in 2018. Its large (6.5-m diameter) primary mirror and infrared instruments will allow it to see some of the very first luminous objects that formed in the Universe after the Big Bang. Other major science themes of JWST encompass studying the assembly of galaxies, the birth of stars and planetary systems, planetary systems and the origins of life. JWST will be the premier astrophysics space observatory for NASA and ESA over its 5 - 10 year mission lifetime, supplanting the Hubble Space Telescope (which primarily works at visible and ultraviolet light wavelengths). In addition to the topics covered in this talk, many scientists will use JWST to make discoveries that we have not yet imagined.

JWST employs many unique technologies, and the mission has been in development for over 10 years. Many major hardware components - all large optics and all science instruments - have been completed, and integration of major components has begun. In this talk I will illustrate the mission's science potential and highlight the status of this development effort.

April 14, 2014

SFAA Member Social and Lunar Eclipse Watching Party

Member Social

7:00 – 9:00 p.m. Park Chalet Garden Restaurant  
1000 Great Highway, Golden Gate Park, San Francisco

Public Eclipse Viewing

9:00 p.m. – 1:00 a.m. Park Chalet Gardens



On Monday, April 14, 30 to 50 members of SFAA gathered for a member social at the Park Chalet Garden Restaurant at the western end of Golden Gate Park to socialize over drinks and appetizers. This event preceded a total lunar eclipse public viewing event hosted by SFAA at the Park Chalet Gardens from 9:00 p.m. to 1:00 a.m. The social event was a hit. The social venue provided a great atmosphere for both long-time members and new members to become acquainted. Sunil met five or ten folks who were relatively new to the club. He also spoke with some die-hard astrophotographers and learned a lot!

The skies were pretty cloudy, but for the entire time, we had a great open grassy area for viewing. Mitchell set up his 6" Newtonian reflector which it was decided was adequate because of the cloudy conditions. In addition to our members, 50 to 75 more people filtered through for an hour here and there between 9:00 p.m. and midnight. This laid the ground work for more socializing while watching for cloud breaks to catch views of the eclipse as it progressed.

Many thanks to SFAA Board Member Paul Salazar for all of his efforts in coordinating this event for us and Sunil for making sure all hosting details were attended to at the event.

## **August 2-3, 2014 – Yosemite Star Party at Glacier Point**



**To sign up, just e-mail Dave Frey at [yofiestasemite@yahoo.com](mailto:yofiestasemite@yahoo.com).  
Be sure to put “Yosemite Sign Up” in the subject line to reserve your campsite.  
Sign up soon – It’s filling up fast! Remember, the trip is available to MEMBERS ONLY.**

Since this is a Public Viewing Event that the SFAA attends as guests of the National Parks, all campers are expected to bring a telescope and be willing to host public viewing. The club aims to bring one telescope for every two SFAA members attending.

### **About the Trip**

The SFAA is provided with FREE admission to Yosemite National Park as well as FREE reserved, shared campgrounds at Bridalveil Group Campground.

The campsite is 8.5 miles away from Glacier Point.

We will host two public star parties at Glacier Point, on Friday and Saturday night. We have the public (about 200 – 300 people) from twilight for a few hours, and then the rest of the night (and all day) to ourselves; this is a mighty good deal, considering how some folks come 12,000 miles to see these rocks. The National Park Service limits astronomy clubs to a maximum of 30 SFAA campers. Please do not ask if your friends can come ...unless they are SFAA members and have telescopes.

### **Observing site at Glacier Point**

The observing area is mostly open, with incredible views from about NNW to the east, around to due south. The horizon from south around to the west is partly blocked by tall trees. Still, there is a lot of open sky, and typically, the seeing and transparency are excellent. It has warm temperatures of 70 to 90 during the day, and cool to chilly 40’s at night, due to the elevation of 7200 feet.

### **Star Party**

One of the rangers does a sunset talk, and then delivers the crowd to us. Following that, a member of the club will give an evening talk, (want to volunteer?) The public will have white flashlights, and we need to be tolerant of that. We will have 3 club members with red brake light tape to politely cover the offending flashlights. Expect many questions from the public.

### **The Reward**

By around 9:30 or so, we will have the place to ourselves, and can stay until dawn if you so choose. Scopes must be removed when we quit, then set up again on Saturday. Some of us may set up sun scopes during the afternoon, show Half Dome festooned with rock climbers, and invite people to come back again after sunset.

### **Gastronomic Astronomic**

Early Saturday eve is the traditional potluck meal and is always tons of fun. Please provide enough food for ~ say 3 or 4 people. Salads, main courses, pu pu’s, and desserts are all welcome. The question is: Who will have the best astronomical gastronomic theme of incredible edibles this year? Remember the Brown Dwarfs? Prizes will be awarded!

Please remember this repast takes time. It’s better to start our own gastronomic party early so that there’s no need to rush for set up Saturday evening on Glacier Point.

Check the [National Weather Service](#) for up-to-date weather info on Yosemite Park current weather and conditions.

See you at the campsite.  
Ken & Dave

## **A Look at the Numbers as NASA's Hubble Space Telescope Enters its 25th Year,** 12 May 2014 (Source: NASA/GSFC)



**The Hubble Telescope as seen from NASA Space Shuttle STS-125 in May 2009. The Hubble Space Telescope was reborn with Servicing Mission 4 (SM4), the fifth and final servicing of the orbiting observatory. Image Credit: NASA**

On April 24, 1990, the space shuttle Discovery lifted off from Earth with the Hubble Space Telescope nestled securely in its bay. The following day, Hubble was released into space, ready to peer into the vast unknown of space.

NASA's Hubble Space Telescope recently marked its 24th year in space and to celebrate its 25th year, NASA is taking a look at some of the amazing statistics generated by the world-famous telescope.

Hubble has reinvigorated and reshaped our perception of space and uncovered a universe where almost anything seems possible within the laws of physics. Hubble has revealed properties of space and time that for most of human history were only probed in the imaginations of scientists and philosophers alike. Today, Hubble continues to provide views of cosmic wonders never before seen and is at the forefront of many new discoveries.

Shortly after Hubble was deployed in 1990, the observatory's primary mirror was discovered to have a flaw that affected the clarity of the telescope's early images. Astronauts repaired Hubble in December 1993. Including that trip, there have been five astronaut servicing missions to Hubble. The first servicing mission occurred Dec. 2-13, 1993. Subsequent servicing missions occurred on Feb. 11-21, 1997; Dec.19-27, 1999; March 1-12, 2002; and May 11-24, 2009.

Here are some statistics on the Hubble as of its 24th anniversary on April 24, 2014:

- Hubble captures pictures of stars, planets and galaxies from its orbit around Earth while moving at 17,500 mph.
- Hubble has made more than 1 million observations since its mission began in 1990.

- Hubble has observed 38,000 celestial targets.
- Hubble has orbited Earth more than 3 billion miles along a circular low-Earth orbit of about 350 miles altitude
- As of Hubble's 24th anniversary in April 2014, Hubble's observations have taken up more than 100 terabytes of data.
- Hubble currently generates 844 gigabytes of data per month.
- About 4,000 astronomers from all over the world have used the telescope to probe the universe.
- Astronomers using Hubble data have published more than 11,000 scientific papers, making it one of the most productive scientific instruments ever built.
- Hubble weighs 24,500 pounds -- as much as two full-grown elephants.
- Hubble's primary mirror is 2.4 meters (7 feet, 10.5 inches) across.
- Hubble is 13.3 meters (43.5 feet) long -- the length of a large school bus.

The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency. NASA's Goddard Space Flight Center in Greenbelt, Maryland, manages the telescope. The Space Telescope Science Institute (STScI) in Baltimore conducts Hubble science operations. STScI is operated for NASA by the Association of Universities for Research in Astronomy Inc., in Washington.

For images and more information about Hubble, visit: <http://www.nasa.gov/hubble>

Rob Gutro  
NASA's Goddard Space Flight Center

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## A New Meteor Shower in May?

**May 6, 2014:** The head of NASA's Meteoroid Environment Office, Dr. Bill Cooke, often lets cameras do his sky watching for him. He and his colleagues operate a nationwide network of automated fireball observatories that capture anything that burns into Earth's atmosphere.

On the morning of May 24<sup>th</sup>, however, he plans to go out in person.

"There could be a new meteor shower, and I want to see it with my own eyes," says Cooke.



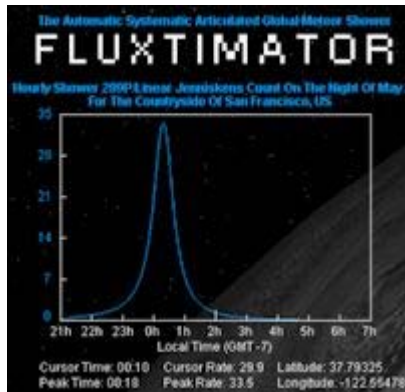
A new ScienceCast video anticipates a possible new meteor shower in May 2014. [Play it](#)



The shower is the May Camelopardalids, caused by dust from periodic comet 209P/LINEAR. No one has ever seen it before, but this year the Camelopardalids could put on a display that rivals the well-known Perseids of August. "Some forecasters have predicted more than 200 meteors per hour," says Cooke.

Comet 209P/LINEAR was discovered in February 2004 by the Lincoln Near-Earth Asteroid Research project, a cooperative effort of NASA, the Massachusetts Institute of Technology Lincoln Laboratory, and the US Air Force. It is a relatively dim comet that dips inside the orbit of Earth once every five years as it loops around the sun.

Two years ago, meteor experts Esko Lyytinen of Finland and Peter Jenniskens at NASA Ames Research Center announced that Earth was due for an encounter with debris from Comet 209P/LINEAR. Streams of dust ejected by the comet mainly back in the 1800s would cross Earth's orbit on May 24, 2014. The result, they said, could be a significant meteor outburst.



Other experts agreed, in part. There is a broad consensus among forecasters that Earth will indeed pass through the debris streams on May 24<sup>th</sup>. However, no one is sure *how much* debris is waiting. It all depends on how active the comet was more a century ago when the debris streams were laid down.

How many meteors will you see from your hometown? Check out the May Camelopardalid flux estimator. [More](#)

"We have no idea what the comet was doing in the 1800s," says Cooke. As a result of the uncertainty, "there could be a great meteor shower—or a complete dud."

The best time to look is during the hours between 6:00 and 08:00 Universal Time on May 24<sup>th</sup> or between 2 and 4 o'clock in the morning Eastern Daylight Time. That's when an ensemble of forecast models say Earth is most likely to encounter the comet's debris. North Americans are favored because, for them, the peak occurs during nighttime hours while the radiant is high in the sky.

"We expect these meteors to radiate from a point in Camelopardalis, also known as 'the giraffe', a faint constellation near the North Star," he continues. "It will be up all night long for anyone who wishes to watch throughout the night."

Indeed, that might be a good idea. Because this is a new meteor shower, surprises are possible. Outbursts could occur hours before or after the forecasted peak.

In case of a dud, there is a consolation prize. On May 24<sup>th</sup> the crescent Moon and Venus are converging for a tight conjunction the next morning, May 25<sup>th</sup>. Look for them rising together just ahead of the sun in the eastern sky at dawn.

"That's a nice way to start the day," says Cooke, "meteors or not."

#### Credits:

Author: [Dr. Tony Phillips](#) | Production editor: [Dr. Tony Phillips](#) | Credit: [Science@NASA](#)

#### Web Links:

[NASA's All-Sky Fireball Network](#) -- Science@NASA

[May Camelopardalid Flux Estimator](#) -- from the SETI Institute

**2014 ASTRONOMY PROGRAMS**  
**Mt. Tamalpais State Park**  
**Explore the Wonders of the Universe**  
 Free and open to all (no signup). [Directions](#)

<p><b>May 31</b> 8:30 p.m.</p>	<p><b>Dr. Kevin Zahnle NASA-Ames Research Center</b>  <b>“When Worlds Collide”</b>          Planet Earth is constantly being struck by interplanetary debris, from fine dust to rocks or boulders big enough to outshine the Sun when they die, to asteroids or comets or even small stray planets.  <b>Co-produced with Wonderfest</b></p>
<p><b>June 28</b> 8:30 p.m.</p>	<p><b>Dr. Wil van Breugel, UC Merced</b>  <b>“Masks of the Cosmos”</b>          Humans have always wondered about the Cosmos and their own place in it. Different cultures have believed that they have discovered its true nature, but might these ideas just be anthropological ‘masks’ projected on the universe?</p>
<p><b>August 2</b> 8:30 p.m.</p>	<p><b>Dr. Beate Heinemann , Lawrence Berkeley Lab</b>  <a href="http://physics.berkeley.edu/research/faculty/heinemann.html">.physics.berkeley.edu/research/faculty/heinemann.html</a>  <b>“How We Found the Higgs Boson”</b>          How does the Large Hadron Collider near Geneva in Switzerland work and how did its use lead to the discovery in 2012 of the Higgs boson. What is hoped to be learned in the future at this collider.</p>
<p><b>August 30</b> 8:00 p.m.</p>	<p><b>Dr. Lloyd Knox , UC Davis</b> <a href="http://virgo.physics.ucdavis.edu/~knox/">virgo.physics.ucdavis.edu/~knox/</a>  <b>“The Big Bang in Context”</b>          Follow the history of the "big bang" picture of our origins of the universe, clarified by observational successes. What remaining questions drive scientists toward deeper exploration.</p>
<p><b>September 27</b> 7:30 p.m.</p>	<p><b>Dr. Lynn Cominsky , Sonoma SU</b> <a href="http://universe.sonoma.edu/~lynnc">universe.sonoma.edu/~lynnc</a>  <b>“NuSTAR's Sharper View of the Universe”</b>          Launched in June 2012, NuSTAR is bringing the high-energy Universe into focus. Exploding stars, hidden black holes and other exotic objects are all being studied in an entirely new light.</p>
<p><b>October 25</b> 7:00 p.m.</p>	<p><b>Andrew Fraknoi, Foothill College</b> <a href="http://foothill.edu/ast">foothill.edu/ast</a>  <b>" The Top Tourist Sights of the Solar System”</b>          Where will Bill Gates’ Great-Granddaughter go on her honeymoon? Using spectacular space photos we will explore the most intriguing future “tourist destinations” among the planets and moons in our cosmic neighborhood  <b>Co-produced with Wonderfest-part of Bay Area Science Festival</b></p>

**May 2014 - THE EVENING SKY**  
**May Sky Map:** <http://skymaps.com/skymaps/tesmnl405.pdf>  
**May Sky Calendar:** <http://skymaps.com/articles/nl405.html>

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**BAY AREA ASTRONOMY EVENTS**

**Kenneth Lum**

<http://tech.groups.yahoo.com/group/bayastro/?v=1&t=directory&ch=web&pub=groups&sec=dir&slk=91>

**BAY AREA REGULARLY SCHEDULED EVENTS**

<p><b>EVERY FRIDAY NIGHT 7:00 PM – 10:00 PM excluding major holidays</b></p> <p><b>The Telescope Makers' Workshop</b></p> <p><b>CHABOT SPACE AND SCIENCE CENTER 10000 Skyline Boulevard Oakland, CA 94619-2450</b></p>	<p><b>THE TELESCOPE MAKERS' WORKSHOP</b> is held every Friday night from 7pm - 10pm, excluding major holidays (e.g. Christmas Day and New Year's Day) that fall on Fridays. The Workshop is always closed on Memorial Day Weekend. Attendance every Friday night is not mandatory, and members work at their own pace. The Workshop meets at Chabot Space &amp; Science Center, 10000 Skyline Blvd., Oakland. Contact us for more specific details:</p> <p>Contact: E-mail Richard Ozer (<a href="mailto:rozer@pacbell.net">rozer@pacbell.net</a>) or (510) 406-1914</p>
<p><b>EVERY FRIDAY &amp; SATURDAY EVENING, weather permitting 7:30 PM – 10:30 PM</b></p> <p><b>CHABOT SPACE AND SCIENCE CENTER 10000 Skyline Boulevard Oakland CA 94619-2450 (510) 336-7300</b></p>	<p><b>EXPLORE THE NIGHT SKIES AT THE CHABOT OBSERVATORIES</b> For more information: <a href="http://www.chabotspace.org/">http://www.chabotspace.org/</a></p> <p><b>Free Telescope Viewing</b> Regular hours are every Friday &amp; Saturday evening, weather permitting: 7:30pm -10:30pm Come for spectacular night sky viewing the best kept secret in the Bay Area and see the magnificence of our telescopes in action!</p> <p><b>Daytime Telescope Viewing</b> On Saturday and Sunday afternoons come view the sun, moon, or Venus through Chabot's telescopes. Free with General Admission. (weather permitting)</p> <p>12pm - 5pm: Observatories Open</p>
<p><b>Sunset – 5:11 PM (TWICE MONTHLY)</b></p> <p><b>Inclement weather (clouds, excessive wind and showers) will cause the event to be canceled without notice.</b></p> <p><b>SAN MATEO COUNTY ASTRONOMICAL SOCIETY STAR PARTY</b></p>	<p><b>STAR PARTIES AT CRESTVIEW PARK, SAN CARLOS</b></p> <p>Come out and bring the kids for a mind expanding look at the universe</p> <p>The City of San Carlos Parks and Recreation Department and the San Mateo County Astronomical Society has open Star Parties twice a month. These events are held in Crestview Park, San Carlos California. Note that inclement weather (clouds, excessive wind and showers) will cause the event to be canceled without notice.</p> <p>For more information call Bob Black, (650)592-2166, or send an email to <a href="mailto:SMCAS@live.com">SMCAS@live.com</a> or call Ed Pieret at (650)862-9602.</p> <p><b>Reasons to Attend</b> If you have kids interested in space or planets bring them here for a real life view of planets, nebula, star clusters and galaxies. If you are thinking of buying a telescope or want help using a telescope you own, come here to talk</p>

	<p>with experienced users. If you think you might have an interest in astronomy come and talk to experienced amateur astronomers.</p> <p>Cautions  Dress warmly and wear a hat.  Visitors should park on the street and walk into the park so your headlights don't affect the observer's dark adaptation.  Only park in the parking lot if you are arriving before dark and plan to stay until the end of the event. You shouldn't need lights but if you feel you do, only bring a small flashlight with the lens covered using red cellophane or red balloon.  Please respect the telescopes and ask permission from the owner if you wish to touch.  Parents, please watch your children.  The park is residential, and adjacent to homes and backyards, please keep noise to a minimum.</p> <p>Schedule Time  Astronomers arrive to set up at around sunset. Observing starts at about one hour after sunset and continues for two to three hours.</p>
<p><b>EVERY CLEAR SATURDAY MORNING OBSERVATORY  10:00 AM – 12:00 PM</b></p> <p><b>FOOTHILL COMMUNITY COLLEGE  12345 Moody Road  Los Altos Hills</b></p> <p><b>Cost: Free</b></p>	<p>Solar observing with a Hydrogen alpha solar telescope every clear Saturday morning. This allows spectacular views of solar prominences and unusual surface features on the Sun not otherwise visible with regular white light telescopes.  Admission is free.</p> <p>Foothill Observatory is located on the campus of Foothill College in Los Altos Hills, CA. Take Highway 280 to the El Monte Rd. exit. The observatory is next to parking lot 4. Parking at the college requires visitor parking permits that are available from the machines in the parking lots for \$ 3.00.</p>
<p><b>EVERY CLEAR FRIDAY EVENING  9:00 PM – 11:00 PM</b></p> <p><b>FOOTHILL COMMUNITY COLLEGE OBSERVATORY  12345 Moody Road  Los Altos Hills</b></p> <p><b>Cost: Free</b></p>	<p>Foothill Observatory is open for public viewing every clear Friday evening from 9:00 p.m. until 11:00 p.m. Visitors can view the wonders of the universe through the observatory's computer-controlled 16-inch Schmidt-Cassegrain telescope. Views of objects in our solar system may include craters and mountains on the moon, the moons and cloud-bands of Jupiter, the rings of Saturn, etc. Deep space objects including star clusters, nebulae, and distant galaxies also provide dramatic demonstrations of the vastness of the cosmos. The choice of targets for  Any evening's viewing depends on the season and what objects are currently in the sky.</p> <p>The public viewing programs at Foothill are free of charge and are open to guests of all ages. Please note that the observatory is closed when the weather is cloudy. Also note that visitor parking permits are available from the machines in the parking lots for \$3.00.</p> <p>Come to Foothill Observatory and join us in the exploration of our Universe!</p> <p>Foothill Observatory is located on the campus of Foothill College in Los Altos Hills, CA. Take Highway 280 to the El Monte Rd exit. The observatory is next to parking lot 4. Parking at the college requires visitor parking permits that are available from the machines in the parking lots for \$3.00.</p>

**BAY AREA EVENTS – MAY 2014**

<http://groups.yahoo.com/neo/groups/bayastro/conversations/topics/49>

<p><b>Saturday, May 17, 2014</b> 10:00 am – 8:00 pm</p> <p>-and-</p> <p><b>Sunday, May 18, 2014</b> 10:00 am – 6:00 pm</p> <p><b>SAN MATEO COUNTY EVENT CENTER</b> 1346 Saratoga Drive San Mateo CA 94403</p> <p><b>Cost</b> \$32.50 Adult \$22.50 Student \$17.50 4-12</p>	<p><b>MAKER FAIRE</b></p> <p>Maker Faire is the Greatest Show (and Tell) on Earth - a family-friendly festival of invention, creativity and resourcefulness, and a celebration of the Maker movement.</p> <p>Part science fair, part county fair, and part something entirely new, Maker Faire is an all-ages gathering of tech enthusiasts, crafters, educators, tinkerers, hobbyists, engineers, science clubs, authors, artists, students, and commercial exhibitors. All of these "makers" come to Maker Faire to show what they have made and to share what they have learned.</p> <p>The launch of Maker Faire in the Bay Area in 2006 demonstrated the popularity of making and interest among legions of aspiring makers to participate in hands-on activities and learn new skills at the event. A record 195,000 people attended the two flagship Maker Faires in the Bay Area and New York in 2013, with 44% of attendees first timers at the Bay Area event, and 61% in New York. A family event, 50% attend the event with children. Also in 2013, 98 independently-produced Mini and Featured Maker Faires occurred around the world, including Tokyo, Rome, Santiago, and Oslo.</p> <p>Maker Faire is primarily designed to be forward-looking, showcasing makers who are exploring new forms and new technologies. But it's not just for the novel in technical fields; Maker Faire features innovation and experimentation across the spectrum of science, engineering, art, performance and craft.</p> <p>Maker Faire is a gathering of fascinating, curious people who enjoy learning and who love sharing what they can do. It's a venue for makers to show examples of their work and interact with others about it. Many makers say they have no other place to share what they do. DIY (Do-It-Yourself) is often invisible in our communities, taking place in shops, garages and on kitchen tables. It's typically out of the spotlight of traditional art or science or craft events. Maker Faire makes visible these projects and ideas that we don't encounter every day.</p> <p>Cost shown is for advance purchase. Other options available at website including weekend passes.</p> <p>Website: <a href="http://makerfaire.com/makerfairehistory/">http://makerfaire.com/makerfairehistory/</a></p>
<p><b>Saturday, 05/17/14</b> 6:30 PM – 8:30 PM</p> <p><b>JACKSON THEATER SONOMA COUNTRY DAY SCHOOL</b> 4400 Day School Place Santa Rosa CA 95403</p> <p><b>Cost:</b> <b>Adults \$35</b> <b>ALL students \$10</b></p>	<p><b>AN EVENING WITH NASA ASTRONAUT STORY MUSGRAVE THE PACIFIC COAST AIR MUSEUM AT THE CHARLES M. SCHULZ-SONOMA COUNTY AIRPORT IS PROUD TO PRESENT</b></p> <p><b>"AN EVENING WITH NASA ASTRONAUT STORY MUSGRAVE."</b></p> <p><b>LECTURE LOCATION: JACKSON THEATER, SONOMA COUNTRY DAY SCHOOL</b></p> <p>This is a not-to-be-missed opportunity to hear Dr. Story Musgrave's inspiring, multi-media presentation on his amazing experiences in space and his vision for creating a successful life. Story was a NASA astronaut for over 30 years and flew on six spaceflights, performed the first shuttle spacewalk on Challenger's first flight and was the lead spacewalker on the Hubble Telescope repair mission. His visionary speeches have captivated audiences all over the world and his expertise and passion for science, technology, innovation, creativity and leadership are sure to inspire the student within us all.</p> <p>Today Story operates a palm farm in Florida, a production company in Sydney and a sculpture company in Burbank, California. He is also a landscape architect, a concept artist with Walt Disney Imagineering, an innovator with Applied Minds Inc. and a professor of design at Art Center College of Design in Pasadena, CA. Story also performs multimedia presentations on topics such as vision, leadership, motivation, safety, quality, innovation, creativity, design, simplicity, beauty and ecology.</p>

	<p>Story's vision on how to create a successful life is important to all of us -- especially to our young people as they make critical choices about education and careers. You will have an opportunity to meet and greet Story after his presentation.</p> <p>For more information and to purchase tickets, please go to:  <a href="http://pacificcoastairmuseum.org/events/storymusgrave/">http://pacificcoastairmuseum.org/events/storymusgrave/</a></p> <p>Contact: Christina Olds  Email: <a href="mailto:christina.olds@pacificcoastairmuseum.org">christina.olds@pacificcoastairmuseum.org</a>  Phone: (707)575-7900  Website: <a href="http://pacificcoastairmuseum.org/events/storymusgrave/">http://pacificcoastairmuseum.org/events/storymusgrave/</a></p>
<p><b>Saturday, May 17</b>  <b>9:00 pm – 11:00 pm</b></p> <p><b>RANCHO CANADA DEL ORO</b>  <b>OPEN SPACE PRESERVE</b>  <b>Casa Loma Road</b>  <b>Morgan Hill</b></p>	<p>Would you like to see the band of the Milky Way? You can at Rancho Canada del Oro. Come join us under the dark skies of this site. You will be able to see constellations, asterisms, binary stars, multiple stars, open clusters, globular clusters, planetary nebulae's, galaxies, and so much more.</p> <p>More info and directions found at: <a href="http://www.meetup.com/OSA-Hiking-Enthusiasts/">http://www.meetup.com/OSA-Hiking-Enthusiasts/</a></p> <p>SS 8:11p, NT 9:17p, 93% Moon Rising at 11:17 pm</p>
<p><b>Tuesday, May 20</b>  <b>12 Noon</b></p> <p><b>SETI INSTITUTE</b>  <b>COLLOQUIUM SERIES</b>  <b>189 Bernardo Avenue</b>  <b>Mountain View 94043</b></p>	<p><b>IOANA COZMUTA, Science and Technology Corporation, NASA Ames Space Portal</b>  <b>MICROGRAVITY, THE FUTURE OF INNOVATION</b></p> <p>The International Space Station is a US taxpayers investment estimated at about \$70 billion spent over 30 years (with an overall price tag of \$100 billion by all member nations), thus it is natural to ask about the ISS's Return on Investment to justify its continuous operation and existence its scientific payoff. While this is not a trivial financial question, a more appropriate measure for the ISS would be the Return on Innovation phrased from the perspective of: "What is the cost of NOT innovating and NOT exploring in microgravity?" This simply correlates with the otherwise-not-accessible-knowledge, the number of unique "lessons learned" and discoveries, especially those that enable humanity to pursue solutions for global critical problems and open up new avenues in areas at big impasse. To add to it, maybe space is the necessary step that humanity will have to undertake to progress, to change consciousness and awareness and to encourage creative cooperation coupled with a communitarian view of Earths future.</p> <p>ISS is a top engineering achievement in space harboring a myriad of outstanding fundamental scientific investigations. There is a growing interest in highlighting the ISS achievements especially from the perspective of their impact on terrestrial technologies and by being the source of a cascade of accomplishments and developments ranging from the seed scientific discoveries to direct applications, many of them serendipitous in nature. The ultimate goal is to build upon these successes to increase the potential of commercialization and to create a stable, self-sustainable space based market. An overview of already identified microgravity benefits to material and life sciences will be given as well as examples highlighting the breadth of these scientific investigations and the aforementioned serendipitous effects. The value of a space-based novel initiative will be explored with specific examples in the works.</p> <p>The talk will also touch upon the need for a customized on-demand payload return from the ISS to augment the current payload downmass to Earth and increase the ISS commercialization potential. The existing transportation infrastructure is correlated with the current ISS utilization demands in terms of bulk downmass and schedule frequency and it is operated by the SpaceX Dragon Capsule and the Russian Soyuz with a combined frequency of about three to seven times per year. Based on previous experience with commercial partners it appears that a customized on-demand payload return system better meets the customers' needs and directly encourages potential emerging markets of ISS users. The talk will briefly step through the rationale behind defining a metric (requirements and design functions) that identifies/assigns quantifiable system level parameters to capture the various aspects of the need for a customized on-demand payload return from the ISS.</p>

	<p>ISS is the first platform of its kind that enabled long term human presence in space, long term exploration of skills needed to survive the extreme environment, long terms exposure of basic scientific experiments to the microgravity environment. No matter what angle we look at it, the ISS is first and foremost a learning platform. As such its primary role is to help answer fundamental questions about living and working in space and help figure out the capabilities we need that we don't have to ensure a future sustainable human exploration: one facet oriented towards the depths of space, the other towards Earth.</p>
<p><b>Wednesday, May 21 7:00 pm</b></p> <p><b>SMITHWICK THEATER FOOTHILL COLLEGE 12345 El Monte Rd Los Altos Hills, CA</b></p>	<p><b>SILICON VALLEY ASTRONOMY LECTURE SERIES - Free, illustrated, non-technical talk</b></p> <p><b>CHUNG-PEI MA, Professor of Astronomy, University of California, Berkeley</b> <b>MONSTER BLACK HOLES: WHAT LURKS AT THE CENTER OF GALAXIES</b></p> <p>As the infrared cousin to Hubble, the Spitzer Space Telescope was launched in 2003 to study the cool universe with waves that are invisible to the human eye. It was designed to probe the birth and youth of stars and planetary disks, and to observe some of the most distant objects in the Universe. However, Spitzer's ultimate legacy may be in an area completely unanticipated when the mission was originally envisioned — the study of planets orbiting other stars. Dr. Bicaay will describe the long and winding road leading to Spitzer's launch, and present highlights from the mission's remarkable first decade of discovery.</p> <p>Dr. Michael Bicaay is the Director of Science at NASA's Ames Research Center, leading more than 400 scientists and technical staff conducting research in space, earth and biological science. His PhD from Stanford University is in Applied Physics and his research interests include the properties and contents of galaxies and galaxy clusters, as well as the large-scale structure in the universe. Before coming to Ames, he was on the scientific staff of Caltech's Infrared Processing and Analysis Center and was a Program Scientists at NASA Headquarters. While in Washington, he also served as an astrophysics consultant to the Smithsonian's National Air and Space Museum. After returning to Pasadena in 1996, he was a member of the science staff and scientific community liaison for the Spitzer Space Telescope.</p> <p>Foothill College is just off the El Monte Road exit from Freeway 280 in Los Altos. For directions and parking information, see: <a href="http://www.foothill.edu/news/transportation.php">http://www.foothill.edu/news/transportation.php</a> For a campus map, see: <a href="http://www.foothill.edu/news/maps.php">http://www.foothill.edu/news/maps.php</a></p> <p>The lecture is co-sponsored by:</p> <ul style="list-style-type: none"> <li>* NASA Ames Research Center</li> <li>* The Foothill College Astronomy Program</li> <li>* The SETI Institute</li> <li>* The Astronomical Society of the Pacific.</li> </ul> <p>We expect large crowds, so we ask people to try to arrive a little bit early to find parking. The lecture is free, but there is a charge of \$3 for parking on campus and exact change is appreciated.</p> <p>Past lectures can be viewed on our YouTube channel at: <a href="http://www.youtube.com/SVastronomylectures">http://www.youtube.com/SVastronomylectures</a></p>
<p><b>Wednesday, May 21 7:30 pm – 8:30 pm</b></p> <p><b>TERRA LINDA HIGH SCHOOL Room 207 320 Nova Albion Way San Rafael 94903</b></p> <p><b>Cost: Free</b></p>	<p><b>JAY TRIMBLE, NASA</b> <b>THIS IS MISSION CONTROL - MARIN SCIENCE SEMINAR</b></p> <p>NASA's space exploration missions are guided by teams of mission controllers on the ground. Whether it's the control of robots that extend our senses to the surface of distant planets, telescopic eyes that peer deep into the universe with multi-spectral vision, or human beings on a space station or the surface of the Moon, mission control is there. This is the story of what we do in mission control. (NEW DATE! May 21, 2014, April 20, 2011) Download flyer here</p>

	<p>Jay Trimble founded and leads the User Centered Technology (UCT) Group at NASA Ames Research Center. The UCT group uses teams of people with different backgrounds, including design, anthropology and computer science, to build software for mission control for human and robotic spaceflight.</p> <p>Prior to leading the UCT Group at NASA Ames, Jay proposed and led the Mars Exploration Rover Human Centered Computing Project, building a multi-disciplinary team to work with the Jet Propulsion Lab to bring process and technology improvements to Mars Rover Operations.</p> <p>Previous experience includes being a flight controller for the space shuttle, and a science support team member for the Voyager Spacecraft encounter with Neptune. M.S. Computer Science from the University of Southern California, B.A. in Geology from the University of California, Berkeley</p> <p>Website: <a href="http://www.marinscienceseminar.com/">http://www.marinscienceseminar.com/</a></p>
<p><b>Thursday, May 22</b> <b>5:30 pm – 7:30 pm</b></p> <p><b>COMMONWEALTH CLUB</b> <b>595 Market Street, 2<sup>nd</sup> Floor</b> <b>San Francisco 94105</b></p> <p><b>Cost</b> <b>\$20 Non-Members</b> <b>\$8 Members</b> <b>\$7 Students</b></p>	<p><b>LEONARD SUSSKIND &amp; ART FRIEDMAN</b> <b>QUANTUM MECHANICS - THE THEORETICAL MINIMUM</b></p> <p>Come hear physicist Susskind and data engineer Friedman present a lively and accessible introduction to a famously difficult field, the theory and associated mathematics of quantum mechanics, which attempts to understand the behavior of sub-atomic objects through mathematical abstractions. Susskind and Friedman offer crystal-clear explanations of the principles of quantum states, uncertainty and time dependence, entanglement and particle and wave states, among other topics. They provide a tool kit for amateur scientists to learn physics at their own pace.</p> <p>Speakers: Leonard Susskind, Felix Bloch Professor of Theoretical Physics, Stanford University; Co-author, Quantum Mechanics: The Theoretical Minimum</p> <p>Art Friedman, Data Engineer; Co-author, Quantum Mechanics: The Theoretical Minimum</p> <p>Website: <a href="http://www.commonwealthclub.org/events/2014-05-22/leonard-susskind-art-friedman-quantum-mechanics-theoretical-minimum">http://www.commonwealthclub.org/events/2014-05-22/leonard-susskind-art-friedman-quantum-mechanics-theoretical-minimum</a></p>
<p><b>Friday, May 23</b> <b>9:15 pm – 11:15 pm</b></p> <p>Houge Park San Jose</p>	<p>SAN JOSE ASTRONOMICAL ASSOCIATION STAR PARTY</p> <p>Interested in learning about the night sky? Come out and look through our members scopes and ask us questions. It's free and educational. Sunset 8:16 pm, 22% moon rises 3:19 am.</p>
<p><b>Friday, 05/24/14</b> <b>06:00 PM - 07:30 PM</b></p> <p><b>CHABOT SPACE AND SCIENCE CENTER</b> <b>10000 Skyline Boulevard</b> <b>Oakland, CA 94619-2450</b></p>	<p><b>FARIDE KHALAF</b> <b>SATURN V – THE FIRST 700 SECONDS</b></p> <p>Watching the launch of the Apollo missions, who can forget the countdown, ignition sequence, and images of furious gas at blastoff? What we saw - the extent of what was broadcast on the daily news - is a very small fraction of all that led to NASA's greatest achievements. Engage with us as we discuss the little known technical aspects of various missions, detailing from the preparation of the first mission to the last countdown. It's a dream worth revisiting!</p> <p>Web site: <a href="http://www.chabotspace.org/space-talks.htm">http://www.chabotspace.org/space-talks.htm</a></p>





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**San Francisco Amateur Astronomers  
Application for New or Renewing Membership**

1. Memberships, with dues payment, are for one year running from standard renewal dates of 1 July to 30 June and 1 January to 31 December.
2. Submitting appropriate dues in April, May, June, July, August, September, membership will run to 30 June of the next year.
3. Submitting appropriate dues in October, November, December, membership will run to 31 December of the next year; submitting appropriate dues in January, February or March, membership will run to 31 December of the same year.
4. Renewals are maintained at the original membership date unless the renewal is made later than the original cutoff date (e.g. September or March as described in 3). In such cases the membership date is shifted to the next renewal date 30 June or 31 December.
5. New or renewal memberships sent in via USPS mail will have membership start date based on postmark date.

**This application is for:**

- New
- Renewing

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Email: \_\_\_\_\_

Home Telephone (optional): \_\_\_\_\_

Cell Phone (optional): \_\_\_\_\_

**Membership Type:**  Individual \$25.00 /  Family \$30.00 /  Student \$10.00 /  Supporting \$75.00

Please mail to me a Mt. Tamalpais Parking Permit

**To complete the membership process:**

- A. Print and fill out this form
- B. Make check or money order payable to San Francisco Amateur Astronomers
- C. Mail this form and payment to:

**Treasurer, SFAA  
PO Box 15097  
San Francisco, CA 94115**

New members will be entered onto the SFAA roster on the Night Sky Network (NSN) and will receive a verifying email from the NSN with username and password for the NSN. Renewing members will have their information updated but will not receive an email from the NSN. Both new and renewing members will receive a verifying email from the SFAA Treasurer upon completion of the membership process.

## 2013 CLUB OFFICERS & CONTACTS

President	<b>MATTHEW JONES</b>	<a href="mailto:president@sfaa-astronomy.org">president@sfaa-astronomy.org</a>
Vice President	<b>Douglas Smith</b>	<a href="mailto:vice-president@sfaa-astronomy.org">vice-president@sfaa-astronomy.org</a>
Treasurer	<b>Michael Patrick</b>	<a href="mailto:treasurer@sfaa-astronomy.org">treasurer@sfaa-astronomy.org</a>
Secretary	<b>Ryan Binford</b>	<a href="mailto:secretary@sfaa-astronomy.org">secretary@sfaa-astronomy.org</a>
Speaker Chair	<b>Linda Mahan</b>	
Newsletter Editor	<b>Annette Gabrielli</b>	<a href="mailto:editor@sfaa-astronomy.org">editor@sfaa-astronomy.org</a>
Board Members	<b>Anil Chopra</b>	<a href="mailto:Anil.Chopra@sfaa-astronomy.org">Anil.Chopra@sfaa-astronomy.org</a>
	<b>Anthony Barreiro</b>	<a href="mailto:Anthony.Barreiro@sfaa-astronomy.org">Anthony.Barreiro@sfaa-astronomy.org</a>
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	<b>Suzanne Huang</b>	<a href="mailto:Suzanne.Huang@sfaa-astronomy.org">Suzanne.Huang@sfaa-astronomy.org</a>

## CLUB TELESCOPES

The SFAA owns eight very fine, easy to use, loaner telescopes well-suited for deep sky, planets, and star parties. All scopes are available to any SFAA member. The loaner custodians for the majority of our fleet are Pete & Sarah Goldie. Please contact them at [telescopes@sfaa-astronomy.org](mailto:telescopes@sfaa-astronomy.org) for details if you are interested in borrowing a scope or if you have items you can donate for the loaner program (eyepieces, star maps/books, red flashlights, collimator, etc.). Please contact the appropriate member indicated below if you are interested in borrowing one of the telescopes.

- 1) 6" f/10.3 Dobsonian/Ken Frank [ken@sfaa-astronomy.org](mailto:ken@sfaa-astronomy.org)
- 2) 8" f/7 Dobsonian/Pete Goldie
- 3) 8.5" f/6 Dobsonian/Pete Goldie
- 4) 10" f/8 Dobsonian/Pete Goldie
- 5) 114mm f/4 Newtonian StarBlast/Pete Goldie
- 6) 8" f/10 Celestron SCT/ Ken Frank [ken@sfaa-astronomy.org](mailto:ken@sfaa-astronomy.org)
- 7) 8" f/10 Meade SCT/Stefanie Ulrey/[treasurer@sfaa-astronomy.org](mailto:treasurer@sfaa-astronomy.org)
- 8) 9.5" f/5.6 Celestron Newtonian/Ken Frank/ [ken@sfaa-astronomy.org](mailto:ken@sfaa-astronomy.org)

## CLUB ASTRONOMY VIDEOS

The SFAA owns a series of astronomy videotapes featuring Alex Filippenko, a world-renowned professor of astronomy at UC Berkeley. The videotapes provide an introduction to astronomy and cover topics such as the Solar System, the lifecycles of stars, the nature of galaxies, and the birth of the Universe. The SFAA loans the tapes free to all members. If you are interested in viewing these tapes, you may check them out at any of the SFAA General Meetings. These tapes were kindly donated to the SFAA by Bert Katzung. For information on the course tapes themselves:

<http://www.teach12.com/ttc/assets/coursedescriptions/180.asp>

## MEMBERSHIP DUES

Membership is billed for each upcoming year on June 30. Members may receive no more than one bulletin after the expiration of membership.

## SFAA WEBSITE AND ONLINE SERVICES

The SFAA web site at [sfaa-astronomy.org](http://sfaa-astronomy.org) is provided to our members and the general public for the sharing of club information and services. The web site contains links for club [star parties](#), [events](#), [newsletters](#), [lectures](#) and [meetings](#). If you wish to interact with other people who are interested in astronomy, the SFAA web site offers public and members only [bulletin board forums](#). If you wish to remain up-to-date on club activities, then we encourage you to subscribe to one or both of our public [mailing lists](#), which will allow you to receive our newsletter and/or club announcements via email. Other useful and interesting information and services are available on the site such as [observing location reviews](#), member [astronomy photos](#), and [members only telescope loans](#). Information about SFAA's membership, organization and by-laws are available at the club's online public document [archive](#). If you need to contact a representative of the SFAA, then please visit our [contacts](#) page to help in finding the right person to answer your questions.

**Above the Fog** is the official bulletin of the San Francisco Amateur Astronomers. It is the forum in which club members may share their experiences, ideas, and observations. We encourage you to participate by submitting your articles, announcements, letters, photos and drawings. We would also like to hear from our new members. Tell us about yourself – what you have done in the past and what other clubs you have joined. **The deadline for the next issue is the 25th day of the month.** Send your articles to [Editor@sfaa-astronomy.org](mailto:Editor@sfaa-astronomy.org)

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**San Francisco Amateur Astronomers**  
P.O. Box 15097  
San Francisco, CA 94115



Information Hotline: (415) 289-6636

Web Page: [www.sfaa-astronomy.org](http://www.sfaa-astronomy.org)

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