

ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

Vol. 67, No. 03 – March 2019

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01.

SFAA PRESIDENT'S NOTE | SPRING CLEANING

As we began a new year at SFAA, space exploration was off to exciting new locations. The OSIRIS-REx mission arrived at asteroid 101955 Bennu, Hayabusa-2 landed on asteroid 162173 Ryugu for the first of three sample return attempts, and Chang'e 4 successfully landed on the far side of the Moon. And despite the weather, we had a small group gather to watch the lunar eclipse on January 20th. While foul weather continues to taunt us, we wouldn't be San Francisco astronomers if we didn't take it in stride.

The SFAA board met on February 2nd to discuss our agenda for the year. Among subjects discussed were the search for a larger venue for our lectures, member trips to Yosemite, Lick Observatory, and other space- and science-oriented locations, and allocating resources to the ongoing publication of this newsletter. I am grateful for the dedication of our board members to the planning and execution of our mission, as it could not be achieved by any of us by ourselves.

We owe many thanks to Tom Kellogg for taking over newsletter editor duties for this month. In the interim, we are looking for any volunteers interested in being co-editor, to see the task handled by more than 1 person.

We have a great many lectures scheduled for the remainder of the year. And in April, we return for another year of lectures and outreach on Mount Tam. We hope to see you at these, and other activities planned in 2019.

Clear skies,

P.J. Cabrera
President, SFAA

SFAA Board Officers and Directors:

President	P.J. Cabrera	president@sfaa-astronomy.org
Vice President	Liz Triggs	vice-president@sfaa-astronomy.org
Treasurer	Scott Miller	treasurer@sfaa-astronomy.org
Secretary	Bill Kircher	secretary@sfaa-astronomy.org
Directors:	Matthew Jones, Tom Kellogg, Brian Kruse, Jessica Miller, Will Silberman, and Douglas Smith, Kate Cabrera	

***** Note: SFAA Membership Process *****

Starting 2018 current SFAA members can create a login account to the SFAA website to edit personal profile information, view membership status, and renew membership. Members will need the email address that was used to join SFAA as the login username, and members will need to create a password the first time they login.

Instead of staggered June 30 and December 31 renewal dates that were used in the past, memberships will expire one year from the member's join or renewal date.

An auto-renewal process is also in the works to make annual renewals easier and effortless.

The process to join SFAA will also change slightly with new members prompted for their personal profile information in addition to payment details.

02.

SFAA EVENTS



MARCH 2019 – JUNE 2019

Details at: <http://www.sfaa-astronomy.org>

Saturday, March 2, 6:00 pm – 2:00 am
Mt. Tam Members Night (arrive BEFORE sunset)

Saturday, March 16, 7:00 pm – 10:00 pm
City Star Party, Lands End in San Francisco

Wednesday, May 20, 7:30 pm – 9:15 pm
Meeting and Lecture, Randall Museum

Saturday, April 6, 7:30 pm – 2:00 am
Mt. Tam Members Night (arrive BEFORE sunset)

Saturday, April 13, 7:30 pm – 11:00 pm
Mt. Tam Public Star Party (arrive BEFORE sunset)

Sunday, April 14, 7:00 pm – 10:00 pm
City Star Party, Presidio Parade Ground

Wednesday, April 17, 7:30 pm – 9:15 pm
Meeting and Lecture, Randall Museum

Saturday, May 4, 7:30 pm – 2:00 am
Mt. Tam Members Night (arrive BEFORE sunset)

Saturday, May 11, 7:30 pm – 11:00 pm
Mt. Tam Public Star Party (arrive BEFORE sunset)

Sunday, May 12, 7:30 pm – 10:30 pm
City Star Party, Pier 17 Embarcadero

Wednesday, May 15, 7:30 pm – 9:15 pm
Meeting and Lecture, Randall Museum

Saturday, June 1, 8:00 pm – 2:00 am
Mt. Tam Members Night (arrive BEFORE sunset)

Saturday, June 8, 8:00 pm – 11:00 pm
Mt. Tam Public Star Party (arrive BEFORE sunset)

Sunday, June 9, 8:00 pm – 11:00 pm
City Star Party, Lands End in San Francisco

Wednesday, June 19, 7:30 pm – 9:15 pm
Meeting and Lecture, Randall Museum

BAY AREA ASTRONOMY EVENTS

Each month, long-time SFAA member Kenneth Lum assembles and sends out a list of Bay Area Astronomy events.

As each month unfolds, check the following link for information regarding additional events:

<http://tech.groups.yahoo.com/group/bayastro/?v=1&t=directory&ch=web&pub=groups&sec=dir&slk=94>

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**GET REAL, LIVE HELP
WITH YOUR TELESCOPE!**
* * * * *

Are you a new telescope owner?

Or perhaps you could use some help with alignment, collimation or other adjustments?

Collimating a reflector, like playing guitar or dancing the tango, can, with great effort, be learned from reading, but it is much easier and more enjoyable to learn hands-on from somebody who already knows how to do it.

Bring your telescope to a Star Party – we'll be happy to help!

03.

NEW SFAA LECTURES ADMISSIONS PROCEDURE

PJ CABRERA

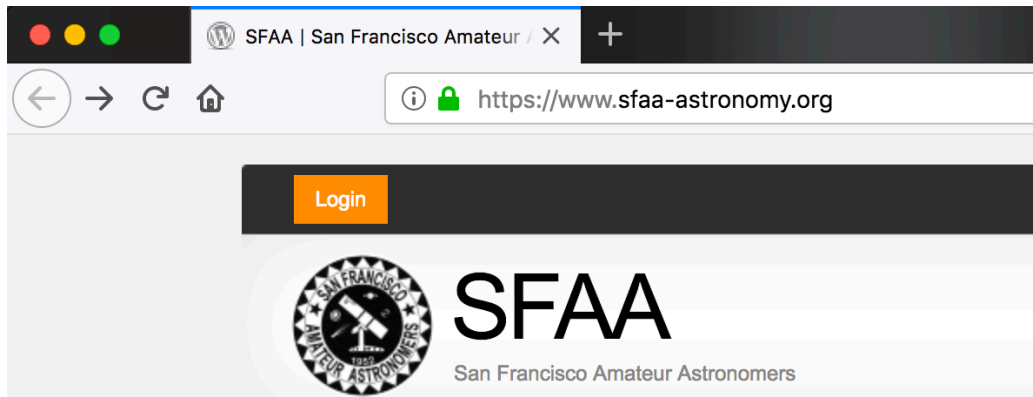
Admissions

Beginning with the March 2019 lecture, we will be starting a new procedure with regards to admissions to the lectures. As announced at the February 2019 lecture and meeting, we will ask SFAA members to show proof of membership prior to seating. Non-members must present an Eventbrite ticket prior to seating. SFAA members will be allowed to sit in the theater first, followed by non-members. Anyone without membership or Eventbrite tickets will be seated last as the month's announcements start. No one will be turned away, and entrance remains free of cost.

For the first couple of months, we will not strictly enforce this, as we all get used to the new procedure. SFAA board members will be at the entrance to the theater. Please let your opinion be known to us, so that we may be aware if any changes are needed.

Getting your membership card

To obtain your membership card, please visit [sfaa-astronomy.org](https://www.sfaa-astronomy.org), and log in using the orange login button on the upper left corner, as shown in the screenshot below. Log in with the email and password you created when you joined SFAA.



Once logged in, you can see your membership card, as well as other membership information, as shown below. You can print out this page and cut out the card to present it at lectures.



04. SFAA NEEDS YOU: VOLUNTEER OPPORTUNITIES | WILL SILBERMAN

Volunteer Opportunities

Throughout the year SFAA provides two or three star parties a month. Every month of the year we do a City Star Party at various locations in San Francisco and a members night on Mount Tamalpais. From April through October, in collaboration with Mt. Tam State Park, the Friends of Mt. Tam, and Wonderfest, SFAA provides telescope observing as part of the monthly public astronomy program. That's a total of 31 star parties a year! We need a couple of experienced SFAA members to serve as contact people for each of these events. If you've been to at least a few star parties, you're familiar with the procedures, and you're able to commit to attending a specific star party, we need your help.

Star party contact persons check the weather forecast during the days before a star party, keep in touch with the other contact person, and make a decision whether or not to cancel the event because of rain, or because of high fire danger on Mt. Tam. On the day of the star party, contact people arrive early, welcome and orient members, and hold a brief huddle for all the telescope operators to review procedures and answer questions. On Mount Tamalpais contact people make sure that every vehicle belongs to an SFAA member and has a parking pass. For the Mt. Tam public astronomy program, SFAA contact people coordinate with the Friends of Mount Tam volunteers who manage the visitor parking area. Contact people always have plenty of time to set up and use their own equipment and to enjoy the star party. At the end of the night on Mt. Tam, the contact persons need to make sure members know to lock the gate behind them on the way out.

A small number of SFAA members have been serving as contact people for all our star parties. It would be great to have a larger pool of volunteers, so that we could all take turns. If you sign up you will receive one email a month asking people to volunteer for upcoming star parties.

If you're willing to help out, or if you have questions, please contact Will Silberman at volunteer@sfaa-astronomy.org.

Snack Volunteers Needed

SFAA also needs members to volunteer to bring **light refreshments** to our monthly **meetings and lectures** at the Presidio Officers Club, on the **Third Tuesday of Each Month**. Refreshments help to create a welcoming, sociable atmosphere for members and guests. If a few members each bring something, there's less burden on any one member, and we'll have a good variety of snacks and beverages. You may donate snack items or simply provide receipts to be reimbursed for your expenses, and your fellow members will be grateful to you! If you can bring refreshments, please send an email to Linda Mahan, speakerchair@sfaa-astronomy.org. Let Linda know which month or months you can help with, and what you would like to bring.

Ongoing Opportunities to Participate in our SFAA Club

SFAA is also looking for volunteers to help in these areas:

- **Star Parties** – both on Mt. Tam and for City Star Parties
- **Marketing** – we can use help posting SFAA event updates to SFGate, SF FunCheap, Eventful, Bay Area Science, etc.
- **Above The Fog** – submit an occasional article, astrophoto and/or serve as a member of the editorial team.

Please send an email to Michael Patrick at president@sfaa-astronomy.org if you're interested.

On behalf of the board of directors and your fellow SFAA members, thank you for your willingness to help out!

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05. **ABOVE THE FOG OPENING FOR NEW CO-EDITOR |** **TS KELLOGG**

After 6 months gap of publishing *Above the Fog*, SFAA board member Tom Kellogg has stepped up to fill the role of Acting Editor, starting and ending with the March issue 2019. Tom needs to find another person to take over since he is moving to Santa Cruz county.

Editing *Above the Fog* is a fun way to channel a little creative energy, bringing informative and interesting content to SFAA members. Never edited a club newsletter before? Not to worry—managing the newsletter is actually a pretty easy task plus it's a great way to get involved and meet SFAA members!

Please consider replacing Tom so that the SFAA membership will be able to continue to get important program updates through our established monthly cadence. If you have been thinking about getting more involved with the club and have a little time each month, this is for you!

* * * * *

06.

2019 SFAA STAR PARTY SCHEDULE | WILL SILBERMAN AND SCOTT MILLER

The Each year SFAA presents 31 star parties -- a monthly members night on Mount Tamalpais, a monthly public star party at different locations in San Francisco, and, in association with the Friends of Mount Tamalpais and Wonderfest, we provide public telescope viewing at the Mount Tamalpais Public Astronomy Program. The dates of our 2018 star parties are listed below.

Mt. Tam Members nights are held at the Rock Springs parking area and are open only to current members of SFAA and their guests. Each vehicle must have a State Parks parking pass. When you renew your SFAA membership, be sure to request a parking pass and provide your current mailing address. The Treasurer will send you a parking pass valid for one year. We schedule Members nights on the Saturday closest to the new Moon, to provide the darkest possible deep sky viewing.

City star parties are open to the public. We move around among the Presidio Main Parade Ground, Land's End, and the Embarcadero at Pier 17 (outside the Exploratorium). To make sure there will be at least one object visible through urban light pollution, the Moon is always up during City star parties. Start and end times are determined by when the Moon will be high enough for good viewing.

The Mount Tam Public Astronomy Programs are held monthly from April through October. There's a lecture by a professional astronomer in the Mountain Theater followed by telescope viewing in the Rock Springs parking area. Visitors need to leave by 11:00 pm. SFAA members with parking passes can stay as late as we like. The speakers and their topics will be announced on the Friends of Mt. Tam website, <http://www.friendsofmontam.org/astronomy.html> .

You don't need to have a telescope to come to a star party. Other members will be happy to let you look through theirs. If you're considering getting a telescope (or another telescope) star parties are a great opportunity to check out other members' scopes and get their opinions and advice. At public star parties, even if you don't have any equipment, if you know the sky you can help visitors get oriented, show them some constellations, and tell them about what they'll be looking at through the telescopes.

Star parties may be cancelled because of weather -- clouds, rain, or, on Mt. Tam, high fire danger. Please check the SFAA website at <http://www.sfaa-astronomy.org/> before you leave home! Cancellations will be announced on the main page.

Please plan to arrive at a star party before sunset. If you're bringing a telescope you'll have time to set up in the light of day and be ready to observe when the sky gets dark, rather than struggling with and cursing at your equipment in the dark. Whether or not you have a telescope, driving into a star party after dark with your headlights on will obliterate everyone else's night vision. And if you try to drive in with your lights off you're liable to run over somebody. Just arrive before sunset and everybody will be safe and happy.

In order to maintain dark-adapted vision, please be very careful with any lights. Turn off the lights inside your car. Use a dim red flashlight only when needed. If you're not used to being outside in the dark, you may be surprised at how well you can see once your eyes are fully adapted to the dark. And please be careful with laser pointers -- don't shine them in people's faces or near airplanes. If other members are taking astrophotographs they may ask you not to use your laser pointer at all, to prevent green streaks in their images.

When you're ready to leave, please let the other members know before you start packing up. Try to leave in groups, rather than one by one. Especially on Mt. Tam, that's safer for everybody, and minimizes the disruption caused by people turning on their car lights.

If you've been to a few star parties and you're interested in serving as a contact person for one or more upcoming star parties, please send an email to volunteer@sfaa-astronomy.org. You'll get a monthly email asking for volunteers for the upcoming events.

Without further ado, here are the dates for our 2018 star parties, with Moon phase and sunset time, plus starting and ending times for City star parties.

- Saturday March 2, Mt. Tam members night, sunset 6:04 pm PDT
- Saturday March 16, 7:00 to 10:00 pm, City star party, Land's End, waxing quarter Moon
- Saturday April 6, Mt. Tam members night, sunset 7:40 pm
- Saturday April 21, Mt. Tam public program, waxing quarter Moon, sunset 7:50 pm
- Sunday April 22, 7:00 to 10:00 pm, City star party, Presidio, waxing quarter Moon
- Saturday May 12, Mt. Tam members night, waning crescent Moon, sunset 8:10 pm
- Saturday May 19, Mt. Tam public program, waxing crescent Moon, sunset 8:15 pm
- Thursday May 24, 7:30 to 10:30 pm, City star party, Embarcadero, waxing gibbous Moon
- Saturday June 9, Mt. Tam members night, waning crescent Moon, sunset 8:30 pm
- Saturday June 16, Mt. Tam public program, waxing crescent Moon, sunset 8:35 pm
- Thursday June 21, 8:00 to 11:00 pm, City star party, Presidio, waxing gibbous Moon
- Saturday July 7, Mt. Tam members night, waning crescent Moon, sunset 8:35 pm
- Saturday July 14, Mt. Tam public program, waxing crescent Moon, sunset 8:30 pm
- Saturday July 21, 8:00 to 11:00 pm, City Star Party, Land's End, waxing gibbous Moon
- Saturday August 11, members night, new Moon, sunset 8:05 pm
- Saturday August 18, Mt. Tam public program, waxing quarter Moon, sunset 8:00 pm
- Sunday August 19, 8:00 to 11:00 pm, City star party, Land's End, waxing quarter Moon
- Saturday September 15, Mt. Tam public program, waxing quarter Moon, sunset 7:15 pm
- Thursday September 20, 7:30 to 10:30 pm, City star party, Presidio, waxing gibbous Moon
- Saturday October 6, Mt. Tam members night, waning crescent Moon, sunset 6:45 pm
- Saturday October 13, Mt. Tam public program, waxing crescent Moon, sunset 6:35 pm
- Saturday October 20, 7:30 to 10:30 pm, City star party, Embarcadero, waxing gibbous Moon
- Saturday November 3, Mt. Tam members night, waning crescent Moon, sunset 6:10 pm
- Saturday November 17, 7:00 to 10:00 pm, City star party, Land's End, waxing gibbous Moon
- Saturday December 8, Mt. Tam members night, waxing crescent Moon, sunset 4:50 pm
- Saturday December 15, 7:00 to 10:00 pm, City star party, Presidio, waxing quarter moon

07.

SFAA LECTURE SCHEDULE 2018

MARCH 20TH LECTURE | “ANOTHER PALE BLUE DOT: INSIDE THE SETI INSTITUTE’S SEARCH FOR EXOPLANETS”

Randall Museum

199 Museum Way, San Francisco, CA 94114

7:00 pm Doors Open & Light Refreshments | 7:30 pm Club Announcements | 7:45 pm Speaker

SFAA’S GENERAL MEETINGS OCCUR ON THE 3RD Wednesday OF EACH MONTH

“ANOTHER PALE BLUE DOT: INSIDE THE SETI INSTITUTE’S SEARCH FOR EXOPLANETS”



FRANCK MARCHIS, PHD, SENIOR PLANETARY ASTRONOMER, EXOPLANET RESEARCH GROUP DIRECTOR, SETI INSTITUTE

Dr. Marchis presents *Another Pale Blue Dot: Inside the SETI Institute’s Search for Exoplanets*, a talk on the search for planets beyond our solar system –referred to as exoplanets. In only two decades, scientists have gone from the mere speculation about exoplanets to being able to observe them through a variety of methods. Dr. Marchis will discuss new and sophisticated projects designed to provide images of these exoplanets. Future instruments could soon deliver an image of a cousin of Earth, or another Pale Blue Dot, a planet similar to our own. The talk will be followed by a demonstration of the Unistellar eVscope, an innovative robotic telescope developed in partnership with the SETI Institute.

Brief Bio

Dr. Franck Marchis is a Senior Scientist and Exoplanet Research Thrust Chair at the SETI Institute and Chief Scientific Officer at Unistellar. Marchis earned his PhD in Astrophysics at the Université Paul Sabatier, France, in 2000. He is a planetary astronomer with 22 years of experience in academic, international and non-profit scientific institutions and has conducted multiple research projects in a wide range of areas. He is best known for his discovery and characterization of multiple asteroids, his study of Io volcanism and imaging of exoplanets, planets around other stars. In April 2007, the asteroid numbered 1989SO8 was named “(6639) Marchis” in honor of his work in the field of multiple asteroids.

08.

UPCOMING SFAA LECTURES 2018

Randall Museum

199 Museum Way, San Francisco, CA 94114

7:00 pm Doors Open & Light Refreshments | 7:30 pm Club Announcements | 7:45 pm Speaker

SFAA'S GENERAL MEETINGS OCCUR ON THE 3RD Wednesday OF EACH MONTH

APRIL 17TH | DANIEL WEISZ

UNIVERSITY OF CALIFORNIA, BERKELEY
CO-INVESTIGATOR ON THE KEPLER MISSION

“RESOLVING THE LOCAL UNIVERSE WITH THE HUBBLE AND HAMES WEBB SPACE TELESCOPE”

The pinnacle of Hubble observations is the Panchromatic Hubble Andromeda Treasury, (PHAT) an 800 hour survey of our sibling galaxy, Andromeda – one of the largest Hubble programs ever conducted. Hubble’s successor, The James Webb Space Telescope, scheduled to launch in 2021, will also be discussed.

MAY 15TH | PHIL MARSHALL, SLAC, DEPUTY DIRECTOR, LSST OPERATIONS

“Exploring the final frontier with the Large Synoptic Survey Telescope”

Currently under construction in Chile, LSST will survey the entire visible southern sky every few days for a decade – the widest, faintest and deepest view of the night sky ever observed. Much of the data archive will also be available to educators, amateur astronomers and members of the public interested in “citizen science” projects.

JUNE 19TH | KIMBERLY ENNICO SMITH, RESEARCH SCIENTIST, NASA AMES

“Seeing our universe in new ways – the infrared sky re-imaged”

This talk takes us on a local tour of our Milky Way and highlights recent observations of our many “infrared eyes on the sky”, enabled by telescopes on mountain tops, airplanes, balloons, rockets and orbital satellites. Will these new observations get us closer to learning how our universe works and where we come from?

In Colliding Galaxies, a Pipsqueak Shines Bright



Bright green sources of high-energy X-ray light captured by NASA's NuSTAR mission are overlaid on an optical-light image of the Whirlpool galaxy (in the center of the image) and its companion galaxy, M51b (the bright greenish-white spot above the Whirlpool).

Image credit: taken by the Sloan Digital Sky Survey. Credit: NASA/JPL-Caltech, IPAC

In the nearby Whirlpool galaxy and its companion galaxy, M51b, two supermassive black holes heat up and devour surrounding material. These two monsters should be the most luminous X-ray sources in sight, but a new study using observations from NASA's NuSTAR (Nuclear Spectroscopic Telescope Array) mission shows that a much smaller object is competing with the two behemoths.

The most stunning features of the Whirlpool galaxy - officially known as M51a - are the two long, star-filled "arms" curling around the galactic center like ribbons. The much smaller M51b clings like a barnacle to the edge of the Whirlpool. Collectively known as M51, the two galaxies are merging.

At the center of each galaxy is a supermassive black hole millions of times more massive than the Sun. The galactic merger should push huge amounts of gas and dust into those black holes and into orbit around them. In turn, the intense gravity of the black holes should cause that orbiting material to heat up and radiate, forming bright disks around each that can outshine all the stars in their galaxies.

But neither black hole is radiating as brightly in the X-ray range as scientists would expect during a merger. Based on earlier observations from satellites that detect low-energy X-rays, such as NASA's Chandra X-ray Observatory, scientists believed that layers of gas and dust around the black hole in the larger galaxy were blocking extra emission. But the new study, published in the *Astrophysical Journal*, used NuSTAR's high-energy X-ray vision to peer below those layers and found that the black hole is still dimmer than expected.

"I'm still surprised by this finding," said study lead author Murray Brightman, a researcher at Caltech in Pasadena, California. "Galactic mergers are supposed to generate black hole growth, and the evidence of that would be strong emission of high-energy X-rays. But we're not seeing that here."

Brightman thinks the most likely explanation is that black holes "flicker" during galactic mergers rather than radiate with a more or less constant brightness throughout the process.

"The flickering hypothesis is a new idea in the field," said Daniel Stern, a research scientist at NASA's Jet Propulsion Laboratory in Pasadena and the project scientist for NuSTAR. "We used to think that the black hole variability occurred on timescales of millions of years, but now we're thinking those timescales could be much shorter. Figuring out how short is an area of active study."

Small but Brilliant

Along with the two black holes radiating less than scientists anticipated in M51a and M51b, the former also hosts an object that is millions of times smaller than either black hole yet is shining with equal intensity. The two phenomena are not connected, but they do create a surprising X-ray landscape in M51.

The small X-ray source is a neutron star, an incredibly dense nugget of material left over after a massive star explodes at the end of its life. A typical neutron star is hundreds of thousands of times smaller in diameter than the Sun - only as wide as a large city - yet has one to two times the mass. A teaspoon of neutron star material would weigh more than 1 billion tons.

Despite their size, neutron stars often make themselves known through intense light emissions. The neutron star found in M51 is even brighter than average and belongs to a newly discovered class known as ultraluminous neutron stars. Brightman said some scientists have proposed that strong magnetic fields generated by the neutron star could be responsible for the luminous emission; a previous paper by Brightman and colleagues about this neutron star supports that hypothesis. Some of the other bright, high-energy X-ray sources seen in these two galaxies could also be neutron stars.

NuSTAR is a Small Explorer mission led by Caltech and managed by JPL for NASA's Science Mission Directorate in Washington. NuSTAR was developed in partnership with the Danish Technical University and the Italian Space Agency (ASI). The spacecraft was built by Orbital Sciences Corporation in Dulles, Virginia (now part of Northrop Grumman). NuSTAR's mission operations center is at UC Berkeley, and the official data archive is at NASA's High Energy Astrophysics Science Archive Research Center. ASI provides the mission's ground station and a mirror archive. Caltech manages JPL for NASA

For more information about NuSTAR, visit:

https://www.nasa.gov/mission_pages/nustar/main/index.html

News Media Contact

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2019-028



Application for New or Renewing Membership

1. Memberships, with dues payment, are for one year running from the member's join or renewal date.
2. New or renewal memberships sent in via USPS mail will have membership start date based on postmark date.
3. SFAA is a 501(c)(3) nonprofit organization. Membership dues are tax-deductible, as allowed by law.

This application is for:

New

Renewing

Name: _____

Address: _____

Email: _____

Contact phone (optional): _____

Membership Type: Individual \$25.00 Family \$30.00 Student \$10.00
 Supporting \$75.00 Institutional \$40.00
(All dues tax-deductible as allowed by law.)

Please mail to me a Mt. Tamalpais Parking Permit (1 per membership)

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

Both new and renewing members will receive a verifying email from the SFAA upon completion of the membership process.