



Vol. 66, No. 02 – February 2018

IN THIS ISSUE

01. SFAA PRESIDENT’S NOTE
02. BAY AREA ASTRONOMY EVENTS
03. SFAA NEEDS YOU: VOLUNTEER OPPORTUNITIES
04. *ABOVE THE FOG* OPENING FOR NEW EDITOR
05. “AN EVENING WITH SF AMATEUR ASTRONOMERS” EVENT RECAP
06. JANUARY CITY STAR PARTY – ROETRY IN MOTION
07. 2018 SFAA STAR PARTY SCHEDULE
08. FEBRUARY 20 LECTURE: DAN WILKINS, PH.D., KIPAC
09. UPCOMING SFAA LECTURES: MARCH – RAY 2018
10. NASA JPL SCIENCE NEWS
11. MEMBERSHIP RENEWAL FORM

\* \* \* \* \*

**\*\*\* CALENDAR UPDATE \*\*\***

**\*\* SFAA Mt. Tam Members Night Rescheduled to February 10 \*\***

Because of new State Parks restrictions on after-hour activities on holiday weekends, SFAA has had to reschedule our February Mount Tamalpais Members night star party to Saturday February 10. The previously announced February 17 date is incorrect. There will be no star party on February 17.

We hope you will be able to join us on Mt. Tam on February 10. Please plan to arrive before the Sun sets at 5:45 pm, and remember to bring your State Parks parking pass.

**IMPORTANT:** In order to maintain our Mt. Tamalpais permit, all members **MUST** arrive before sunset. The gate to the parking lot will be locked after sunset.

# 01.

## SFAA PRESIDENT'S NOTE | THE SUPER MOON

This year is particularly unique in that January and March both contain two full moons while February has no full moon.

Astronomers love a good clear night with no moon, and San Francisco area astronomers should be no exception. But February in the Bay Area usually means night after night of endless rain. If there is a clear night in February, the last thing we want is a full Moon. Its bright reflective surface swamps the sky with light, impeding the observation of the deep sky objects that most astronomers like to pursue.

On the other hand, the Moon itself can be a great target for the budding astronomer. Its changing phases show a mutating landscape one night after another, visible even through thin clouds. The choreography of the combined orbits of the Moon around Earth and the Earth's around the Sun can be measured and calculated by following both Kepler's and Newton's laws. By observing, measuring and calculating the movement of the Moon, one can gain an intimate, first hand appreciation for the basics of celestial mechanics, using nothing but one's eyes and the local landscape as tools.

But as they say, familiarity breeds contempt. We see the Moon so often in the night sky, we ignore it and take it for granted. But it can offer a dazzling show on almost any occasion, making a memorable night of what would otherwise be a wasted night of observing, if only we would show it some appreciation.

Don't turn a blind eye to the Moon!

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	Anthony Barreiro	secretary@sfaa-astronomy.org
Directors:	Matthew Jones, Tom Kellogg, Brian Kruse, Jessica Miller, Will Silberman, and Douglas Smith	

### **\*\*\* Note: SFAA Membership Process Has Changed! \*\*\***

Starting immediately, 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.

In the next few weeks, look for an email that will include your profile information, email address/login, and membership status.

## 02. ASTRONOMY EVENTS



### SAN FRANCISCO AMATEUR ASTRONOMERS EVENTS FEBRUARY 10, 2017 – APRIL 22, 2018

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

**Saturday, February 10, 5:30 pm – 2:00 am**  
Mt. Tam Members Night

**Tuesday, February 13, 7:00 pm – 8:30 pm**  
SF Public Library: Presidio Branch Meeting Room / 3150 Sacramento Street, San Francisco  
Quarterly in-person SFAA Board Meeting – All SFAA Members are welcome to attend

**Tuesday, February 20, 7:30 pm – 9:15 pm**  
Meeting and Lecture, Presidio Observation Post

**Saturday, February 24, 7:00 pm – 10:00 pm**  
City Star Party, Presidio Parade Ground

**Saturday, March 17, 6:00 pm – 2:00 am**  
Mt. Tam Members Night

**Tuesday, March 20, 7:30 pm – 9:15 pm**  
Meeting and Lecture, Presidio Observation Post

**Saturday, March 24, 7:00 pm – 10:00 pm**  
City Star Party, Point Lobos

**Saturday, April 14, 7:30 pm – 2:00 am**  
Mt. Tam Members Night

**Tuesday, April 17, 7:30 pm – 9:15 pm**  
Meeting and Lecture, Presidio Observation Post

**Saturday, April 21, 7:30 pm – 11:00 pm**  
Mt. Tam Public Star Party

**Sunday, April 22, 7:00 pm – 10:00 pm**  
City Star Party, Presidio Parade Ground

\* \* \* \* \*  
**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!

### 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>

# 03.

## **SFAA NEEDS YOU: VOLUNTEER OPPORTUNITIES | ANTHONY BARREIRO**

### **Volunteers Needed for SFAA Star Parties**

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 Anthony Barreiro at [secretary@sfaa-astronomy.org](mailto:secretary@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](mailto: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](mailto: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!**

# 04.

## **ABOVE THE FOG OPENING FOR NEW EDITOR | LIZ TRIGGS**

After almost 2 years of publishing *Above The Fog*, as the Acting Editor, I need to step down due to schedule and travel conflicts. My final newsletter is this February 2018 edition, so this is truly an immediate opening.

It has been a pleasure to put this document together each month for SFAA members and I hope you all find it to be interesting and informative. It's also a fun way to channel a little creative energy. Along the way, I've had the chance to help update the format, contribute a couple of articles, and introduce new features. Never edited a club newsletter before? Not to worry—it was my first time in the Editor's shoes, too. Managing the newsletter is actually a pretty easy task plus it's a great way to get involved and meet SFAA members!

Please consider taking over at the helm 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!

I will be available to introduce the new Editor to the well-documented process and newsletter template through February 28, 2018. If you are interested, please contact P.J. Cabrera at [president@sfaa-astronomy.org](mailto:president@sfaa-astronomy.org) or Liz Triggs at [vice-president@sfaa-astronomy.org](mailto:vice-president@sfaa-astronomy.org).

\* \* \* \* \*

### **\* \* \* Editor's Note: Introducing a New *Above The Fog* Feature \* \* \***

SFAA Members have some AMAZING telescopes. This new feature puts the spotlight on our Members and their telescopes.

Please share the story of your telescope with other Members—you know they will be interested! Here are a couple of suggestions that might be helpful in putting your submission together:

- History of telescope, i.e. Did you make it?, Who did you get it from?, How long have you had it?
- Size and type of telescope, including magnification
- Noteworthy or favorite objects to view, including the first object you saw through your scope
- Members' own astrophotos are welcome, too
- Include photos of your scopes and a photo of yourself with your scope

Submit your articles and photos to [newslettereditor@sfaa-astronomy.org](mailto:newslettereditor@sfaa-astronomy.org)

### **\* \* \* SFAA Hoodie Design Submissions Due by March 15 \* \* \***

Calling all Designers! The SFAA Board is excited to announce that we are looking to create SFAA Hoodies; the exact item that all well-dressed night sky watchers need! Just three simple steps:

1. Think up a great design idea
2. Draw it
3. Submit it to [president@sfaa-astronomy.org](mailto:president@sfaa-astronomy.org) by March 15, 2018

**We will vote for the winning design submissions at the March 20 meeting and lecture.**

Got more than 1 idea? Fantastic! Repeat steps 1 – 3.

Your design might be the winner. What are you waiting for? The sky's the limit!

# 05.

## “AN EVENING WITH SAN FRANCISCO AMATEUR ASTRONOMERS” EVENT RE-CAP | LIZ TRIGGS

This January, the SFAA made a break with tradition in two ways:

1. We had a “lecture” scheduled in January, rather than taking our usual break after the holidays,
2. The speakers were all amateur astronomer club members rather than astronomy professionals.

It was a large crowd and many of the attendees who were not (yet) SFAA members made a point of sharing how impressed they were by a club whose members would take the time to prepare and deliver such outstanding presentations! Thanks again to our presenters: **Mike Portuesi, Scott Miller** and **Tom Kellogg!**



SFAA President, **P.J. Cabrera**, kicked off the evening by presenting **Linda Mahan** with an SFAA Service Award, to recognize her for her outstanding service to the club, and especially for her tireless efforts in scheduling our monthly speakers.

Linda, from everyone at SFAA, thanks for all you do!

\* \* \* \* \*

### **\*\*\* Fun Links For Your Night Sky Viewing \*\*\***

**SPOT THE STATION:** see the International Space Station! As the third brightest object in the sky the space station is easy to see if you know when to look up.

#### **Sighting Opportunities**

Sighting Opportunities. Find your next opportunity for spotting the station.

#### **Subscribe to Spot The Station Alerts**

Subscribe to email or text notifications and get alerts when the space station will be passing overhead in your area

**IRIDIUM FLARES:** Most Iridium satellites are still controlled, so their flares can be predicted. The Iridium communication satellites have a peculiar shape with three polished door-sized antennas, 120° apart and at 40° angles with the main bus. The forward antenna faces the direction the satellite is traveling. Occasionally, an antenna reflects sunlight directly down at Earth, creating a predictable and quickly moving illuminated spot on the surface below of about 10 km (6.2 mi) diameter. To an observer this looks like a bright flash, or flare in the sky, with a duration of a few seconds.

**Iridium Flares Sighting Schedule**, courtesy of Heavens Above

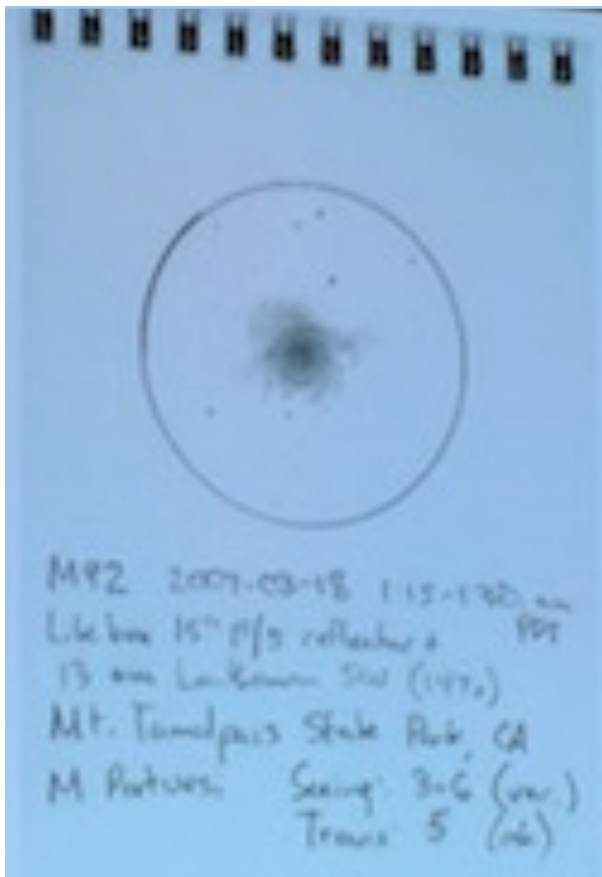
## “AN EVENING WITH SAN FRANCISCO AMATEUR ASTRONOMERS” EVENT RE-CAP (CONTINUED)



Past SFAA President, **Mike Portuesi**, shared insights on how to make the most of your evenings under the stars, with his presentation, “The Simple Guide To Better Observing Sessions”. His talk included references for planning your night of observing.

He shared these links for his presentation slides:  
<https://goo.gl/RMtdXW>

and for the resource list he has compiled:  
<https://goo.gl/3rJHiR>



Mike also enjoys sketching while at his scope. He shared tips on the supplies he keeps on hand, the details he captures with each sketch, and one of his sketches of Messier 92, a globular cluster of stars in the constellation of Hercules.

A tip to anyone who wants to give sketching a try...Mike says the more you draw, the better you get at it, so don't be discouraged if you don't love your first attempts.



## “AN EVENING WITH SAN FRANCISCO AMATEUR ASTRONOMERS” EVENT RE-CAP (CONTINUED)

SFAA Treasurer, **Scott Miller**, shared the future of amateur astronomy with 3-D printed telescopes and the newest technologies. He had two of the scopes he built on display at the back of the room.

Everyone was impressed by Scott’s design and comments on the scope he built, but he really wowed the crowd when he showed the clarity of the revolutionary Unistellar eVscope!



SFAA Board Member, **Tom Kellogg**, wrapped up the evening with a talk about Sidewalk Astronomy in San Francisco. He discussed his “portable” sidewalk astronomy cart, which includes his 13” Dobsonian scope, numerous astronomical reference charts, and that handsome SFAA sign that he made, which you can see just below the projection screen at his right.

Tom also showed a brief video of John Dobson, the man, the legend. Dobson was best known for the Dobsonian telescope, a portable, low-cost Newtonian reflector telescope, and he was also the co-founder of the San Francisco Sidewalk Astronomers.

The evening was a lot of fun and I hope we can schedule more events like this. If you don’t know Mike, Scott and Tom, I encourage you to introduce yourself and strike up a conversation. These gentlemen really know their stuff and have had articles and pictures published in ***Sky & Telescope***.



# 06.

## JANUARY CITY STAR PARTY – POETRY IN MOTION | TOM KELLOGG

**Anthony Barreiro** (our club secretary) led a large group on a tour of the sky tonight then they all swarmed about the telescopes at the Presidio parade grounds (1/27/2018). **Rex Bell, Anthony de la Cruz, Parker Holt, Bing Quoc, George Teiber, P.J. Cabrera, Kate Cabrera, Scott Miller, Liz Triggs and I** set up telescopes and over 250 eager space travelers were lining up to see the sights at the eyepieces.

I'd expected the waxing gibbous moon to wash out all dark sky objects but was proven wrong. We had views of The Great Orion Nebula (M42-43), the 7 sisters Pleiades star cluster in Taurus (just 10 degrees away from the blasting bright moon), an open star cluster M-35 in Gemini and even Andromeda Galaxy (M31-32), our Milky Way's closest neighbor at a mere 2.5 million light years—the light of hundreds of billions of stars were clearly visible in spite of wispy cloudiness and the bright moon light washing all over the celestial sphere.

I noticed a few 5- or 6-year old girls bouncing around the grass so I suggested they crank the music box I have mounted on my SFAA sign. They had a grand time churning out beautiful music and the thoughts of Jiminy Cricket's\*\* poetry were added to the whole group gathered under the stars:

*When you wish upon a star, makes no difference who you are  
Anything your heart desires, will come to you.  
If your heart is in your dream, no request is too extreme  
When you wish upon a star, as dreamers do.  
Like a bolt out of the blue, fate steps in and sees you through  
When you wish upon a star, your dreams come true.  
If your heart is in your dream, no request is too extreme  
When you wish upon a star, as dreamers do.  
When you wish upon a star, your dreams come true.*

With our ears soothed with the tinkling notes of the music box wafting in the air and our eyes feasting on galaxies, nebula, star clusters and lunar craters a woman told me that the music was stirring up emotions. Emotions, connecting with light from millions of years ago, fascinating questions all added up to a wonderful night. Perhaps there was a group gathered under starry skies on a planet in the Andromeda Galaxy who, at the same time, were saying "WOW!" when they saw the Milky Way Galaxy as they looked through telescopes.

As I was driving to the Presidio I navigated around a half dozen double-parked cars in the first few blocks. In my mid-sixties driving at night is challenging to be able to see pedestrians, etc. I was thinking, "This will be my last star party. This driving in the dark is for the younger generation". I'm so glad I slowly and carefully forged ahead and got to experience another star party.

*\*\* "When You Wish Upon a Star" is a song written by Leigh Harline and Ned Washington for Walt Disney's 1940 adaptation of Pinocchio. The original version was sung by Cliff Edwards in the character of Jiminy Cricket, and is heard over the opening credits and in the final scene of the film. The song has since become the representative song of The Walt Disney Company. (Source: Wikipedia)*

# 07.

## 2018 SFAA STAR PARTY SCHEDULE | ANTHONY BARREIRO 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 Anthony, [secretary@sfaa-astronomy.org](mailto:secretary@sfaa-astronomy.org). You'll get a monthly email asking for volunteers for the upcoming events.

The recent north bay wildfires have had a huge impact on State Parks operations, so the permits for the Mt. Tam members nights and Mt. Tam public astronomy programs are still pending. We are confident the permits will be approved as requested. City star party dates at the Presidio also need to be finalized with the Presidio Trust, so these dates are tentative. If there are any changes, we will announce them in Above the Fog and on the website.

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 January 13, Mt. Tam members night, waning crescent Moon, sunset 5:15 pm PST
- Saturday January 27, 7:00 to 10:00 pm, City star party, Presidio, waxing gibbous Moon
- Saturday February 10, Mt. Tam members night, waning crescent Moon, sunset 5:43 pm PST
- Saturday February 24, 7:00 to 10:00 pm, City star party, Presidio, waxing gibbous Moon
- Saturday March 17, Mt. Tam members night, new Moon, sunset 7:20 pm PDT
- Saturday March 24, 7:00 to 10:00 pm, City star party, Land's End, waxing quarter Moon
- Saturday April 14, Mt. Tam members night, new Moon, sunset 7:45 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

**FEBRUARY 20<sup>TH</sup> LECTURE | “FLARES AND FIREWORKS FROM BLACK HOLES”****THE PRESIDIO . OBSERVATION POST, BUILDING 211**

211 Lincoln Boulevard, San Francisco

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

SFAA'S GENERAL MEETINGS OCCUR ON THE 3<sup>RD</sup> TUESDAY OF EACH MONTH**“FLARES AND FIREWORKS FROM BLACK HOLES”****DAN WILKINS, PH.D.,  
KAVLI INSTITUTE FOR PARTICLE  
ASTROPHYSICS AND COSMOLOGY  
(KIPAC) AT STANFORD UNIVERSITY**

Black holes are some of the most exotic and extreme objects in the universe. Though they sound like the stuff of science fiction, they are real and much more common than you might think. Every galaxy has a black hole lurking at its center! Black holes are not actually black, because matter falling into black holes releases energy that can power some of the brightest objects we see in the night sky.

In this lecture you will find out exactly what a black hole is, how we can find them, and how they can flare intensely - giving rise to impressive firework displays and launching vast jets of plasma at close to the speed of light.

**Brief Bio**

*Dan Wilkins is an astrophysicist in the Kavli Institute for Particle Astrophysics and Cosmology (KIPAC) at Stanford University. He received his PhD from the University of Cambridge in 2013. He held a postdoctoral position in Halifax, Nova Scotia, under a fellowship from the Canadian Institute for Theoretical Astrophysics. In 2016, he joined KIPAC as a NASA-supported Einstein Fellow. Wilkins works on both observational and theoretical aspects of black hole physics to understand exactly how the most extreme objects in the Universe work and is member of teams at NASA and the Japanese Space Agency (JAXA) that are developing next-generation X-ray observatories to study energetic cosmic sources powered by black holes.*

# 09.

## UPCOMING SFAA LECTURES 2018

**THE PRESIDIO . OBSERVATION POST, BUILDING 211**

**211 Lincoln Boulevard, San Francisco**

**7:00 pm Doors Open & Light Refreshments | 7:30 pm Club Announcements | 7:45 pm Speaker**  
**SFAA'S GENERAL MEETINGS OCCUR ON THE 3<sup>RD</sup> TUESDAY OF EACH MONTH**

**MARCH 20TH | SIEGRIED GLENZER, DIRECTOR,  
HIGH ENERGY DENSITY SCIENCE DIVISION, SLAC**



### "IT RAINS DIAMONDS ON "ICE GIANT" PLANETS"

A new experiment at SLAC National Accelerator Laboratory reveals how large diamonds may be formed with just hydrogen and carbon, in the deep interior of ice giant planets such as Uranus and Neptune. Experimental simulations using high-powered optical lasers revealed "diamond rain" forming in real time.

Scientists predict that diamond crystals would be much larger, and likely to slowly sink down to the planet core over thousands of years. Professor Glenzer said, "For this experiment we had LCLS, the brightest X-ray source in the world, and intense, fast pulses of X-rays are needed to unambiguously see the structure of these diamond".

These experiments help provide us with better insight into the structure of exoplanets.

**APRIL 17TH | GIBOR BASRI, PH.D.,  
UNIVERSITY OF CALIFORNIA, BERKELEY  
CO-INVESTIGATOR ON THE KEPLER MISSION**



### "ARE RED DWARF PLANETS HABITABLE?"

Most of the news about exoplanets this past year has revolved around the discovery of "Earth-sized" planets in the "habitable zone" of "red dwarf" stars. This is partly due to the fact that such planets are more easily found, partly because most stars are red dwarfs (cooler and smaller than the Sun), and partly because smaller stars apparently tend to have smaller planets. Basri will talk about these discoveries, give a background on red dwarfs, and concentrate on the current thinking about whether a planet around 2027, a red dwarf, could in fact actually harbor life. This question is still a very active one; 15 years ago most astronomers would have just answered "no". He will explain why, and how our thinking is evolving.

## AMATEUR ASTRONOMER HELPS RECOVER LOST NASA IMAGE SATELLITE

### Original Story - Jan. 26, 2018: Attempting to Contact NASA's IMAGE

In mid-January, an amateur astronomer reported they believed they had made contact with a NASA satellite called Imager for Magnetopause-to-Aurora Global Exploration (IMAGE). IMAGE launched on March 25, 2000, and contact was unexpectedly lost on Dec. 18, 2005. NASA's Goddard Space Flight Center in Greenbelt, Maryland, has acquired time on the Deep Space Network (DSN) to focus on the source and determine whether the signal is indeed IMAGE. This process must take into consideration the vintage nature of the spacecraft, and includes locating appropriate software and commands to potentially operate the mission. We will share more information as it becomes available.

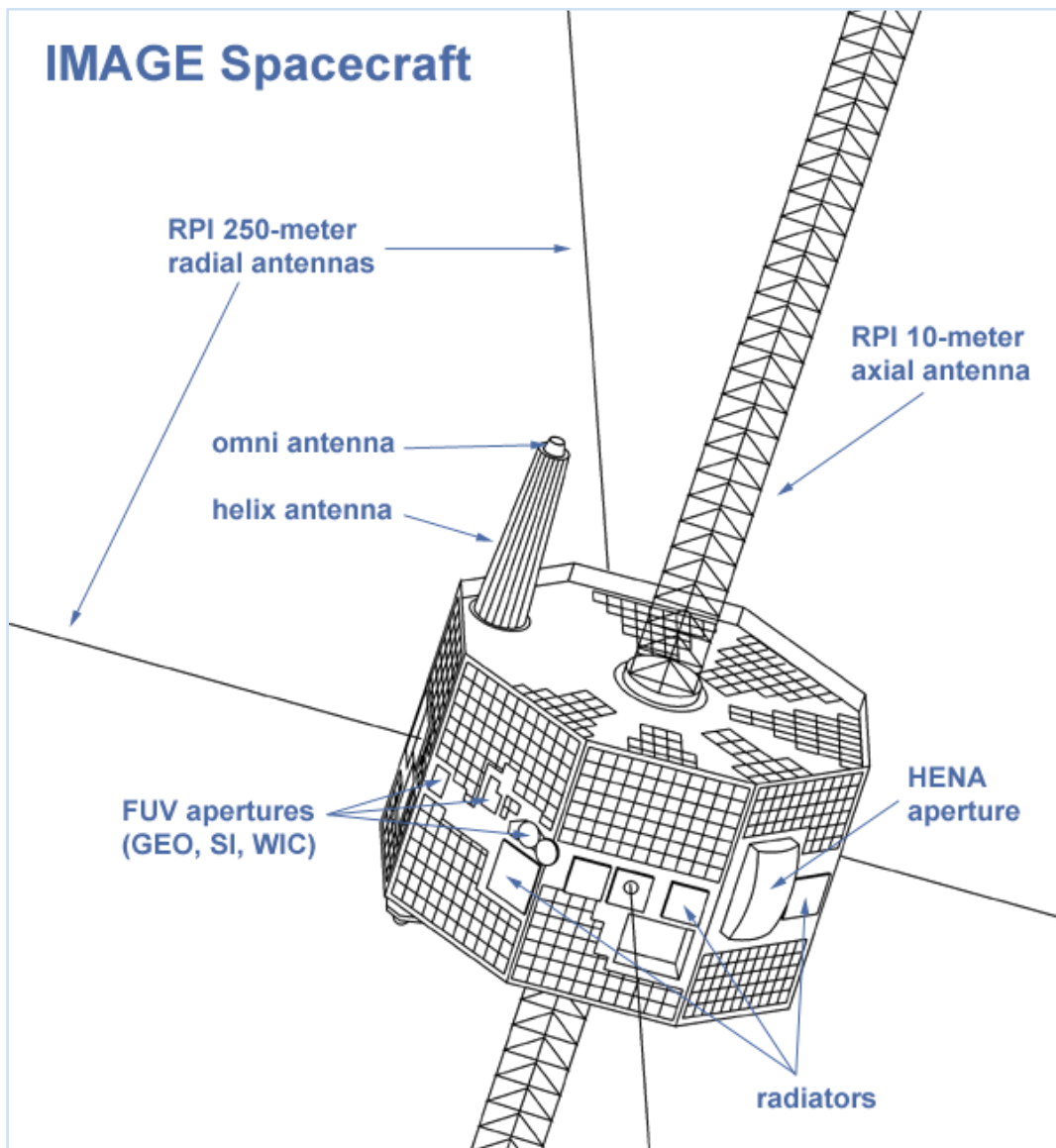


Diagram of  
NASA's  
IMAGE  
spacecraft

Image credit:  
NASA

## Jan. 29, 2018, Update

After an amateur astronomer recorded observations of a satellite in high Earth orbit on Jan. 20, 2018, his initial research suggested it was the Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) — a NASA mission launched into orbit around Earth on March 25, 2000.

Seeking to ascertain whether the signal indeed came from IMAGE, NASA's Goddard Space Flight Center in Greenbelt, Maryland, coordinated the use of five separate antennas to acquire radio frequency signals from the object.

As of Monday, Jan. 29, observations from all five sites were consistent with the radio frequency characteristics expected of IMAGE. Specifically, the radio frequency showed a spike at the expected center frequency, as well as side bands where they should be for IMAGE. Oscillation of the signal was also consistent with the last known spin rate for IMAGE.

IMAGE was designed to image Earth's magnetosphere and produce the first comprehensive global images of the plasma populations in this region. After successfully completing and extending its initial two-year mission in 2002, the satellite unexpectedly failed to make contact on a routine pass on Dec. 18, 2005. After a 2007 eclipse failed to induce a reboot, the mission was declared over.



*The IMAGE spacecraft undergoing launch preparations in early 2000. Image credit: NASA*

## **Jan. 30, 2018, Update**

The identity of the satellite re-discovered on Jan. 20, 2018, has been confirmed as NASA's IMAGE satellite.

On the afternoon of Jan. 30, the Johns Hopkins Applied Physics Lab in Laurel, Maryland, successfully collected telemetry data from the satellite. The signal showed that the space craft ID was 166 — the ID for IMAGE.

The NASA team has been able to read some basic housekeeping data from the spacecraft, suggesting that at least the main control system is operational.

Scientists and engineers at NASA's Goddard Space Flight Center in Greenbelt, Maryland, will continue to try to analyze the data from the spacecraft to learn more about the state of the spacecraft. This process will take a week or two to complete as it requires attempting to adapt old software and databases of information to more modern systems.

### **Related:**

Archived NASA mission website for IMAGE:

<https://image.gsfc.nasa.gov>

NASA's final report on IMAGE spacecraft loss (PDF):

[https://image.gsfc.nasa.gov/publication/document/IMAGE\\_FRB\\_Final\\_Report.pdf](https://image.gsfc.nasa.gov/publication/document/IMAGE_FRB_Final_Report.pdf)

## **Feb. 2, 2018, Update: Latest Data From IMAGE Indicates Spacecraft's Power Functional**

New data regarding IMAGE provides some additional — though not yet complete — information on how the spacecraft began to transmit signals again.

On Thanksgiving Day in 2004, the IMAGE spacecraft — at that time still fully functioning — underwent an unexpected power distribution reboot, after which the power returned only on one side — labeled the B side — of the unit. (Satellites are usually built with redundant hardware, often called "A sides" and "B sides." In the event one half fails, operators can switch to the other with minimal effect to the mission.) Scientists involved in the mission concluded that the A side had failed, and proceeded for the rest of the mission exclusively with the B side.

However, data from today's telemetry with IMAGE indicate that the spacecraft's power unit is now operating back on its A side. The ultimate cause of the reboot is still not known, but these recent findings suggest that a reboot in some form has, in fact, occurred.

By: Miles Hatfield

Editor: Rob Garner

NASA's Goddard Space Flight Center, Greenbelt, Md.

<https://www.nasa.gov/goddard>





**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.