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### **\*\*\* SFAA 2018 Board Election at December Meeting \*\*\***

SFAA will have several openings on the Board and possibly two for Officers. The SFAA needs a full complement of Board and Officers to be able to keep events going and expanding into new areas.

If you have ever thought about wanting to pitch in and help the SFAA grow into something even more interesting, educational and community oriented, please contact Michael Patrick at [president@sfaa-astronomy.org](mailto:president@sfaa-astronomy.org) or any of the Officers or Board members you may know. Our email addresses are listed on our website.

# 01.

## SFAA PRESIDENT'S NOTE | A FEW HOURS A WEEK

At our December meeting / lecture members will vote for a slate of Officers and Board of Directors for 2018. I urge members to take the time to vote and thereby show your support for the people who keep the SFAA running and moving forward into the future. While at it, step up and offer to volunteer a few hours a week to help with one of our ongoing projects. The more members we have involved and contributing some time and talent, the more the SFAA can offer.

Having served on the Board for six years, Treasurer for five and President for two (President and Treasurer concurrently) I am stepping down from all these roles and make room for others. This is my last President's Notes. I have enjoyed my participation and interaction with other Officers, Board Members, Lecture Chair, regular members, Presidio staff and general public tremendously and a heartfelt thanks to everyone for their efforts. I will, of course, continue to see everyone and help being a regular member. After all, it is only a few hours a week.

Dark, clear and stable skies,

**Michael Patrick**  
President / Treasurer, SFAA

### **SFAA Board Officers and Directors:**

President	Michael Patrick	<a href="mailto:president@sfaa-astronomy.org">president@sfaa-astronomy.org</a>
Vice President	Liz Triggs	<a href="mailto:vice-president@sfaa-astronomy.org">vice-president@sfaa-astronomy.org</a>
Treasurer	Michael Patrick	<a href="mailto:treasurer@sfaa-astronomy.org">treasurer@sfaa-astronomy.org</a>
Secretary	Anthony Barreiro	<a href="mailto:secretary@sfaa-astronomy.org">secretary@sfaa-astronomy.org</a>
Directors:	PJ Cabrera, Anil Chopra, Brian Kruse, Matthew Jones, Jessica Miller, Scott Miller, Douglas Smith, Paul Salazar	

### **\*\*\* Call For Design Submissions \*\*\***

**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!**

**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)**

**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!**

# 02.

## **SFAA BOARD OF DIRECTORS ELECTION FOR 2018 | ANTHONY BARREIRO**

SFAA elects our Directors and Officers every December for the upcoming calendar year. The Officers and Directors constitute the Board of Directors, which is SFAA's governing body. The Board maintains our membership roster, manages the club's funds, organizes and publicizes our activities, coordinates member volunteers, and communicates on the club's behalf with the larger community. Fortunately the club has a stable cash flow and adequate reserves. Members' dues fund all of our activities, so (unlike many non-profit organizations) Board members don't have to do any fundraising.

The board meets once a month. Our first meeting of the year is a day retreat to plan for the year ahead. The remaining meetings are on weekday evenings, usually two online meetings and an in-person meeting each quarter.

Any current member of SFAA is eligible to run for the Board. Some of our current board members will not be able to serve another term, so we need new people to run to fill the available seats. We're looking for fresh ideas and perspectives to enhance the events and communications SFAA offers to members and the broader public. If you have been participating in club activities and you have time and energy to commit to helping direct the club's affairs, please consider running for the Board.

The responsibilities of the SFAA Officers and Directors are described in more detail in the Bylaws page on the SFAA website at: <http://www.sfaa-astronomy.org/sfaa-bylaws/>

If you are willing to run for the Board, if you have questions, or if you would like to nominate another member, please contact Anthony Barreiro at [secretary@sfaa-astronomy.org](mailto:secretary@sfaa-astronomy.org)

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### **\* \* \* SFAA 2018 Board Election at December Meeting \* \* \***

SFAA will have several openings on the Board and possibly two for Officers. The SFAA needs a full complement of Board and Officers to be able to keep events going and expanding into new areas.

If you have ever thought about wanting to pitch in and help the SFAA grow into something even more interesting, educational and community oriented, please contact Michael Patrick at [president@sfaa-astronomy.org](mailto:president@sfaa-astronomy.org) or any of the Officers or Board members you may know. Our email addresses are listed on our website.

# 03. ASTRONOMY EVENTS



## SAN FRANCISCO AMATEUR ASTRONOMERS EVENTS DECEMBER 9, 2017 – MARCH 24, 2018

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

**Saturday, December 9, 5:30 pm – 10:00 pm**  
City Star Party, Point Lobos

**Saturday, December 16, 4:30 pm – 2:00 am**  
Mt. Tam Members Night

**Tuesday, December 19, 7:30 pm – 9:15 pm**  
Meeting and Lecture, Presidio Officers Club

**Saturday, January 13, 5:30 pm – 2:00 am**  
Mt. Tam Members Night

**Tuesday, January 16, 7:30 pm – 9:15 pm**  
Meeting and Lecture, Presidio Officers Club

**Saturday, January 27, 7:00 pm – 10:00 pm**  
City Star Party, Presidio Parade Ground

**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

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

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

**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 Officers Club

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

## 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!

# 04.

## **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!**

# 05.

## **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 will be the February 2018 edition (that's just two more newsletters), so this is truly an immediate opening. I will be available to help with the transition through the end of February.

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 the opportunity for you! To quote our president, Michael Patrick, "it is only a few hours".

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 Michael Patrick 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).

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

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**After attending several SFAA Star Parties, I have seen that our 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)**

# 06.

## FOCUS ON SFAA MEMBERS' SCOPES: UNCLE PHIL – MY 14 INCH DOBSONIAN | REX BELL

Ever since I was 7 years old I wanted a telescope. I had this inexplicable fascination with outer space and everything in it. But I was the only child of a single mother and in no way was a telescope in the cards for me. I satisfied my curiosity by spending hours reading astronomy-related topics in World Book Encyclopedia and anything else I could find and comprehend. One day when I was about 12, I learned that you could actually make a telescope. That was to be the solution to my problem!

I pestered my mom to drive me to a place in Oakland (which no longer exists) called “Optica b/c” (b/c stood for binoculars/cameras). They also sold telescopes of all sizes, mirror making kits, and a full line of telescope parts and accessories. When we got there I described to the man behind the counter what I wanted to do. He pulled a 6-inch mirror kit and a book on telescope making off the shelf. I was set! Excited about the prospects, after I got home I opened the kit and looked at the contents – Pyrex mirror blank, plate glass tool, abrasives, cerium oxide, and pitch for polishing. A little intimidated, but encouraged, I began reading the book. It was written in the 1940s, dry and overly complex, and described building an equatorially mounted Newtonian with machined parts. It was way too much for my 12 year-old brain. I understood very little of what I read but tried grinding my 6 inch blank anyway. Needless to say, I failed.



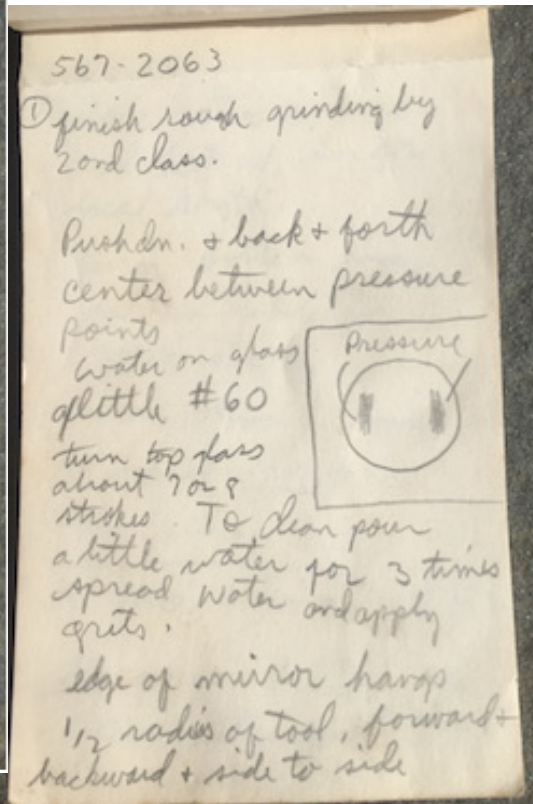
Years went by and still no telescope. Then in 1973 when I was a junior in high school, I learned about a telescope making class offered in the evening at the Academy of Sciences in Golden Gate Park and taught by a guy named John Dobson. My favorite uncle (Phil), who was my mentor and role model, enrolled in the class with me. On the first day, Dobson talked about getting the glass for the mirror blank and tool. He said that we could buy from his stock of old ship portholes or get them from any other source we knew of. My Uncle Phil was a foreman at Hunters Point Naval Shipyard. A few days later he presented me with 2 large disks of porthole glass – 14 inches in diameter and 1 inch thick. One was to be my mirror and the other the tool. Not only was I now going to have a telescope, I would have a big one! I was thrilled!

*Left: This is a pic of my uncle Phil (after whom my scope is named) when he was in the Navy during WW2.  
Photo credit: Rex Bell*

As the weeks went by, Dobson would regularly berate people in the class. Anyone who asked a dumb question or made a mistake in the grinding process was the focus of his ridicule. Well one day I asked what must have been a dumb question and got berated by Dobson myself. It was bad enough having to sit through 8 hours of intimidating teachers at school earlier in the day, but I didn't want to repeat the feeling again in the evening doing something that was supposed to be fun. All I wanted was to learn how to make a telescope! After about a month into the class, my uncle and I stopped going. I was now 0 for 2 in telescope mirror making.

Many years went by, and through multiple moves, I dragged my unfinished 14-inch porthole glass mirror with me.

In the early '90s when I was in my 30s, I found a book called “Build Your Own Telescope” by Richard Berry. It was clearly written, well illustrated, and had an encouraging tone. I went back to Optica, bought another 6-inch mirror kit, and started grinding. The book, coupled with the experience of my prior failed attempts, gave me the knowledge I felt I would need to finally grind and polish a mirror. On my third attempt – SUCCESS!!! I produced an outstanding 6” f/8 mirror. I followed Berry's design for a square plywood tube and mount. It worked superbly! I was elated at finally having a telescope - in



addition to making it myself. It was a great feeling! I now had the telescope-making bug. Knowing I could do it again, in 1992 I completed a 10-inch f/6 mirror and built a tube and mount of the same plywood design as my 6-inch. I just scaled it up. The 10-inch serves me very well and shows fantastic images.

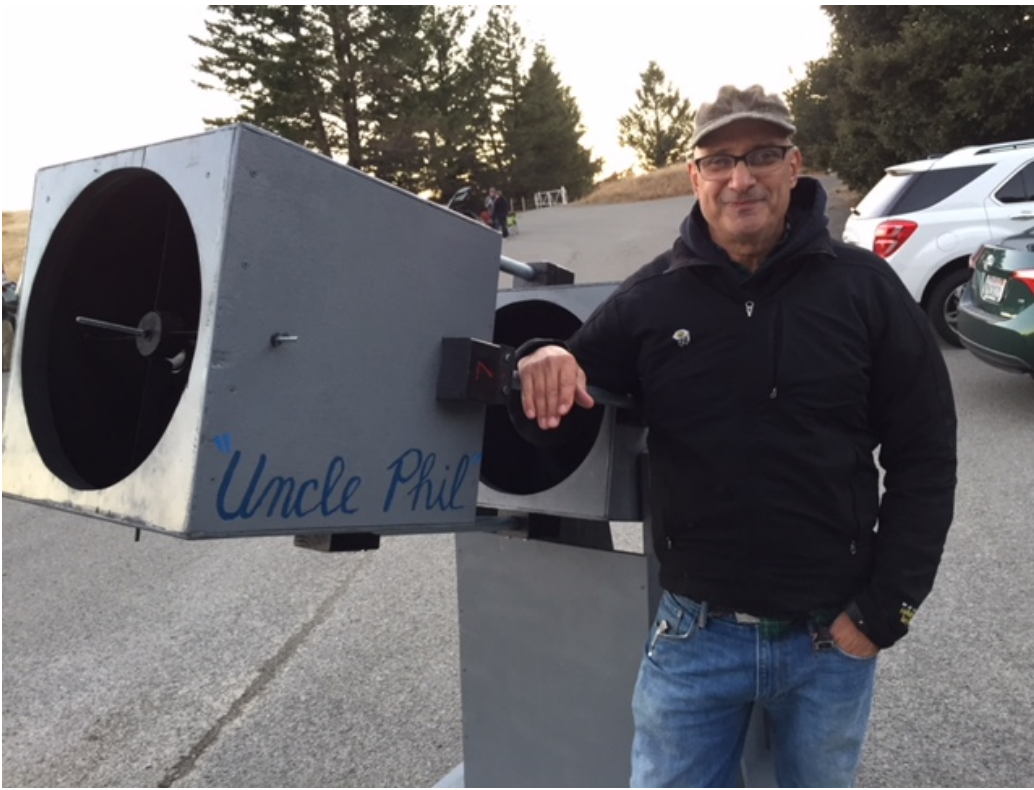
*Left: This is the cover of the note pad I used during Dobson's telescope making class at the Academy of Sciences in GG Park. Center: This is the first page of my notes from the class, including Dobson's phone number in 1973. Photo credits: Rex Bell*

I recently retired. One day, I dragged out the 14-inch porthole glass my uncle had given me decades ago and checked the figure. Back in 1973, I had taken it through polishing but never read the curve. It had a terrible turned-down edge. So bad in fact, that I decided to return to fine grinding. I repeated the fine grinding then polishing process using a sub-diameter 10-inch tool. When polishing was done and after parabolizing for a while, I star tested using Dobson's simple inside and outside of focus image comparison. Satisfied with the result, I drove the mirror to Bob Fies (Alcoat) in San Carlos for aluminizing. (Fies aluminized most of Dobson's mirrors). The mount I built for my 14-inch is an even larger version of my first two telescopes, following Richard Berry's design. To enhance portability I built the tube in 2 sections connected by 4 poles and wood clamps. It's also a great performer and because of the large 14-inch aperture and f/6 focal ratio, shows incredible detail on the moon and planets (my main interests).



*Right: This is me with my 14 inch Dobsonian at a Mt. Tam SFAA Members Night. Photo credit: Liz Triggs*





*Left: This is me with "Uncle Phil", my 14-inch Dobsonian  
Photo credit: Liz Triggs*

*Below: This is an enhanced pic of the moon I took this month using my newly completed 14 inch telescope.  
Photo credit: Rex Bell*

Finally this year, at 61 years old, I completed the telescope I had started back in 1973 when I was a junior in high school. This "light bucket" was a "bucket list" item for me! After I painted it my customary battleship gray, I stood back, looked at it, and thought about my Uncle Phil who had generously provided me with the glass, support, and encouragement to build the telescope of my dreams. I felt it fitting to name my recently completed 14-inch scope after him.

Here's what I tell people about my telescope - "No bells or whistles, drives or motors, lights or lasers, fans or propellers. This scope is simply made of plywood, polished glass, paint, passion, and perseverance".



# 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 17, Mt. Tam members night, waxing crescent Moon, sunset 5:50 pm
- 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, 8 Mt. Tam members night, new Moon, sunset 7:30 pm
- 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

# 08.

## SFAA LECTURE SCHEDULE 2017

### DECEMBER 19<sup>TH</sup> LECTURE | **BARRY WELSH, UC BERKELEY** **SPACE SCIENCES LABORATORY**

**THE PRESIDIO . PRESIDIO OFFICERS' CLUB, BUILDING 50 . MORAGA HALL**

**50 Moraga Avenue, 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**

#### **"EXOCOMETS: NOW YOU SEE THEM, NOW YOU DON'T"**



#### **BARRY WELSH, PH. D. UC BERKELEY, SPACE SCIENCES LABORATORY**

Minor bodies such as Kuiper Belt Objects, comets and asteroids constitute the rocky, icy debris left over from the planet building phase of our solar system. The existence of reservoirs of small rocky bodies (i.e. asteroids/planetesimals) in orbit around young stellar systems is now well established. The initial proto-planetary disks that contain the reservoir of dust and gas required to form exoplanets are short lived ( $\ll 1$  Myr). The circumstellar debris disk observed around young stars of ages 10-50 Myr are continually replenished by collision and evaporation amongst planetesimals. The gravitational field can potentially enable large numbers of kilometer-sized icy bodies into trajectories directed toward the young central star.

Using high resolution spectrographs mounted on large aperture ground based telescopes, we have discovered 15 young stars that harbor swarms of exocomets. This lecture will describe attributes of comets in our solar system, and observing techniques to detect evaporating exocomets around young stars. The relevance of Kepler's discovery of "Tabby's Star" will also be discussed.

#### **Brief Bio**

*Dr. Barry Welsh received his PhD from University College of London, and studied Far IR Astronomy. Researched UV Astronomy and Instrumentation at London and Oxford University. Researched physics and early mapping of the Interstellar Medium at the Space Sciences Laboratory, UC Berkeley. He was project manager on UV detector systems for NASA SOHO, FUSE, GALEX and HST-COS missions. He is now discovering exocomet systems and carrying out a search for optical laser pulses from exoplanet systems.*

**THE PRESIDIO . PRESIDIO OFFICERS' CLUB, BUILDING 50 . MORAGA HALL**

50 Moraga Avenue, 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**JANUARY 16TH | "AN EVENING WITH SAN FRANCISCO AMATEUR ASTRONOMERS"**

Join us in our 66th year for a special evening with SFAA. Enjoy extra time for snacks and meet & greet, as we share our experiences with you in a more informal setting.

Hear short talks on what is in the future for amateur astronomy, discover how to share your dark sky experiences, get tips on how to plan observing sessions, and much more. Meet the people who help make SFAA such a great organization, and plan to join us for the exciting activities planned in 2018.

The speakers are SFAA members Tom Kellogg, Scott Miller and Michael Portuesi. Tom Kellogg who will speak on Sidewalk Astronomy. Scott Miller is speaking on the exciting future of amateur astronomy with his 3-D printed telescope and also the new Unistellar Telescope. Past SFAA president, Mike Portuesi will speak about planning a night of observing and if there is time, he may also talk a bit about sketching at the eyepiece.



*Left: Tom Kellogg gives a boost to a young sidewalk astronomer.  
Photo credit: Tom Kellogg*

*Right: Mike Portuesi with his Dobsonian scope.  
Photo credit: Mike Portuesi*

*Below: Scott Miller shares the wonder of astronomy with a young visitor at a City Star Party at the Presidio Parade Ground.  
Photo credit: Presidio Trust*



# 09.

## UPCOMING SFAA LECTURES 2018 (Continued)

**THE PRESIDIO . PRESIDIO OFFICERS' CLUB, BUILDING 50 . MORAGA HALL**

**50 Moraga Avenue, 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**

**FEBRUARY 20TH | DAN WILKINS, PH.D., KAVLI INSTITUTE FOR PARTICLE ASTROPHYSICS AND COSMOLOGY (KIPAC) AT STANFORD UNIVERSITY**



### " FLARES AND FIREWORKS FROM BLACK HOLES"

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.

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



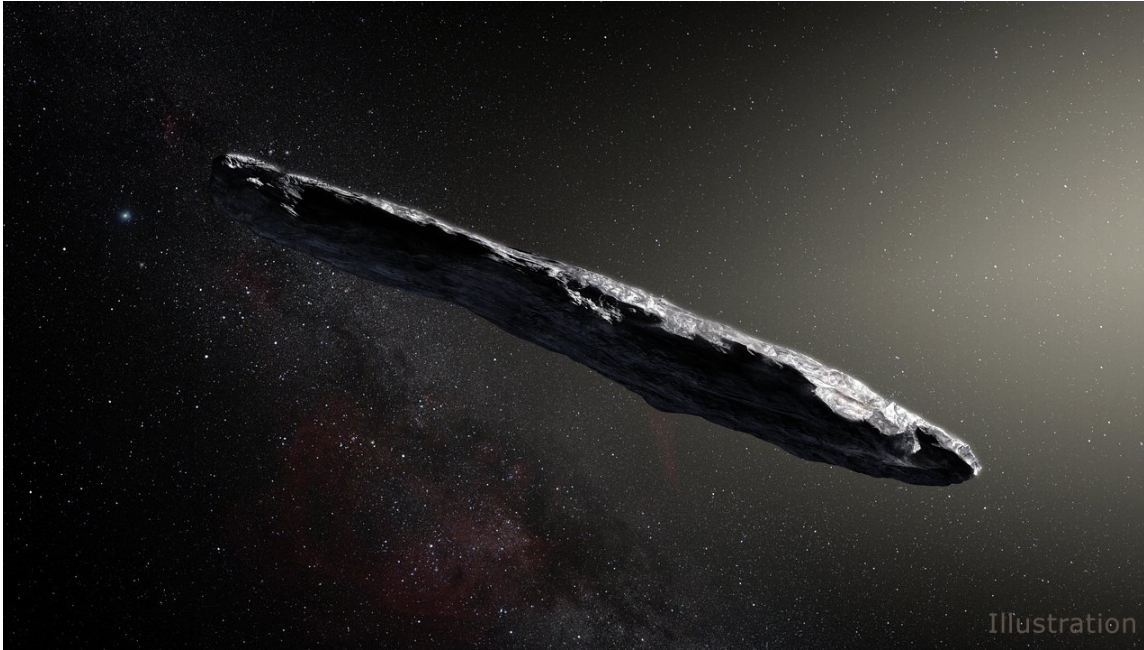
### "IT RAINS DIAMONDS ON "ICE GIANT" PLANETS"

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.

## SOLAR SYSTEM'S FIRST INTERSTELLAR VISITOR DAZZLES SCIENTISTS



*Artist's concept of interstellar asteroid 1I/2017 U1 ('Oumuamua) as it passed through the solar system after its discovery in October 2017. The aspect ratio of up to 10:1 is unlike that of any object seen in our own solar system.*

*Image credit: European Southern Observatory / M. Kornmesser*

Astronomers recently scrambled to observe an intriguing asteroid that zipped through the solar system on a steep trajectory from interstellar space—the first confirmed object from another star.

Now, new data reveal the interstellar interloper to be a rocky, cigar-shaped object with a somewhat reddish hue. The asteroid, named 'Oumuamua by its discoverers, is up to one-quarter mile (400 meters) long and highly-elongated—perhaps 10 times as long as it is wide. That aspect ratio is greater than that of any asteroid or comet observed in our solar system to date. While its elongated shape is quite surprising, and unlike asteroids seen in our solar system, it may provide new clues into how other solar systems formed.

The observations and analyses were funded in part by NASA and appear in the Nov. 20 issue of the journal *Nature*. They suggest this unusual object had been wandering through the Milky Way, unattached to any star system, for hundreds of millions of years before its chance encounter with our star system.

"For decades we've theorized that such interstellar objects are out there, and now - for the first time - we have direct evidence they exist," said Thomas Zurbuchen, associate administrator for NASA's Science Mission Directorate in Washington. "This history-making discovery is opening a new window to study formation of solar systems beyond our own."

Immediately after its discovery, telescopes around the world, including ESO's Very Large Telescope in Chile, were called into action to measure the object's orbit, brightness and color. Urgency for viewing from ground-based telescopes was vital to get the best data.

Combining the images from the FORS instrument on the ESO telescope using four different filters with those of other large telescopes, a team of astronomers led by Karen Meech of the Institute for Astronomy in Hawaii found that 'Oumuamua varies in brightness by a factor of 10 as it spins on its axis every 7.3 hours. No known asteroid or comet from our solar system varies so widely in

brightness, with such a large ratio between length and width. The most elongated objects we have seen to date are no more than three times longer than they are wide.

"This unusually big variation in brightness means that the object is highly elongated: about ten times as long as it is wide, with a complex, convoluted shape," said Meech. "We also found that it had a reddish color, similar to objects in the outer solar system, and confirmed that it is completely inert, without the faintest hint of dust around it."

These properties suggest that 'Oumuamua is dense, composed of rock and possibly metals, has no water or ice, and that its surface was reddened due to the effects of irradiation from cosmic rays over hundreds of millions of years.

A few large ground-based telescopes continue to track the asteroid, though it's rapidly fading as it recedes from our planet. Two of NASA's space telescopes (Hubble and Spitzer) are tracking the object the week of Nov. 20. As of Nov. 20, 'Oumuamua is traveling about 85,700 miles per hour (38.3 kilometers per second) relative to the Sun. Its location is approximately 124 million miles (200 million kilometers) from Earth -- the distance between Mars and Jupiter - though its outbound path is about 20 degrees above the plane of planets that orbit the Sun. The object passed Mars's orbit around Nov. 1 and will pass Jupiter's orbit in May of 2018. It will travel beyond Saturn's orbit in January 2019; as it leaves our solar system, 'Oumuamua will head for the constellation Pegasus.

Observations from large ground-based telescopes will continue until the object becomes too faint to be detected, sometime after mid-December. NASA's Center for Near-Earth Object Studies (CNEOS) continues to take all available tracking measurements to refine the trajectory of 1I/2017 U1 as it exits our solar system.

This remarkable object was discovered Oct. 19 by the University of Hawaii's Pan-STARRS1 telescope, funded by NASA's Near-Earth Object Observations (NEOO) Program, which finds and tracks asteroids and comets in Earth's neighborhood. NASA Planetary Defense Officer Lindley Johnson said, "We are fortunate that our sky survey telescope was looking in the right place at the right time to capture this historic moment. This serendipitous discovery is bonus science enabled by NASA's efforts to find, track and characterize near-Earth objects that could potentially pose a threat to our planet."

Preliminary orbital calculations suggest that the object came from the approximate direction of the bright star Vega, in the northern constellation of Lyra. However, it took so long for the interstellar object to make the journey - even at the speed of about 59,000 miles per hour (26.4 kilometers per second) -- that Vega was not near that position when the asteroid was there about 300,000 years ago.

While originally classified as a comet, observations from ESO and elsewhere revealed no signs of cometary activity after it slingshotted past the Sun on Sept. 9 at a blistering speed of 196,000 miles per hour (87.3 kilometers per second).

The object has since been reclassified as interstellar asteroid 1I/2017 U1 by the International Astronomical Union (IAU), which is responsible for granting official names to bodies in the solar system and beyond. In addition to the technical name, the Pan-STARRS team dubbed it 'Oumuamua (pronounced oh MOO-uh MOO-uh), which is Hawaiian for "a messenger from afar arriving first."

Astronomers estimate that an interstellar asteroid similar to 'Oumuamua passes through the inner solar system about once per year, but they are faint and hard to spot and have been missed until now. It is only recently that survey telescopes, such as Pan-STARRS, are powerful enough to have a chance to discover them.

"What a fascinating discovery this is!" said Paul Chodas, manager of the Center for Near-Earth Object Studies at NASA's Jet Propulsion Laboratory, Pasadena, California. "It's a strange visitor from a faraway star system, shaped like nothing we've ever seen in our own solar system neighborhood."



For more on NASA's Planetary Defense Coordination Office:

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

To watch a NASA Planetary Defense video on International Asteroid Day:

[https://www.youtube.com/watch?v=VYO-mpoC8\\_s](https://www.youtube.com/watch?v=VYO-mpoC8_s)

Click here for interstellar asteroid FAQs:

<https://www.nasa.gov/planetarydefense/faq/interstellar>

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## **\*\*\* 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 travelling. 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



## 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. SFAA is a 501(c)(3) nonprofit organization. Membership dues are tax-deductible, as allowed by law.
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  
 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.