

# ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

Vol. 66, No. 01 – January 2018

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### **\*\*\* 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!

# 01.

## SFAA PRESIDENT'S NOTE | LOOKING FORWARD TO A BRIGHT 2018

As we begin a new year, we tend to look back at significant events in the past, as guideposts for our accomplishments. 2017 was a very good year for popular astronomy and for SFAA. While the Great American Eclipse stands out as the top event in our collective memories, other recent news brought great advancement to the field: gravitational waves produced by a neutron star merger also produced visible, infrared and x-ray observations confirmed around the world; Kepler data was mined for proof of more Earth-like planets in our galaxy than we could have imagined; and an interstellar interloper got the world's attention for a few days, as it entered and left our solar system, leaving us with even more questions.

Our lectures had a pretty good run at the Officer's Club in the Presidio, but the new year brings us some uncertainty: we move temporarily back to our old home at the Observation Post for most of the coming year. We will keep you updated of any changes as we learn of them, but it is possible we will need to find a new home.

With any new beginning filled with uncertainty, we look for familiar sights, familiar faces and places, and the night sky offers some of the most recognizable constellations this time of year. Taurus and Orion rise early in winter, and guide us through the night into dawn. Let us begin 2018 looking with hope for new experiences and knowledge to share together.

Regards,

**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.

## **ELECTION OF SFAA OFFICERS AND DIRECTORS FOR THE 2018 TERM | ANTHONY BARREIRO**

At SFAA's December 19, 2017 general meeting we elected officers and directors for calendar year 2018. The officers and directors constitute the board of directors. Thanks to every member who came out and voted.

President  
**P.J. CABRERA**

Vice President  
**LIZ TRIGGS**

Treasurer  
**SCOTT MILLER**

Secretary  
**ANTHONY BARREIRO**

Directors  
**MATTHEW JONES ● TOM KELLOGG**  
**BRIAN KRUSE ● JESSICA MILLER**  
**WILL SILBERMAN ● DOUGLAS SMITH**

Will and Tom are new board members. PJ is stepping up as President, and Scott is assuming the responsibilities of Treasurer.

Former board members Paul Salazar and Anil Chopra have moved out of the area -- Paul to Germany and Anil to Colorado -- so they are no longer able to serve on the board. During his time on the board Paul organized and presented many outreach and public education activities, including our trip to Jackson Hole, Wyoming for the solar eclipse this past August. Anil ran the telescope loan program and was a very active participant at our public star parties, always happy to share the wonders of the night sky with people of all ages.

After six years on the board, five as Treasurer, and the past two years as President and Treasurer, Michael Patrick is retiring from the board. Michael plans to continue enjoying lectures and star parties, and he has generously offered to help the new officers and directors as needed. Thanks very much for all your service to the club, Michael!

SFAA is an entirely volunteer-run organization, and the officers and directors are our elected leaders. Every board member wants to hear from members about your experience of the club, what's important to you, what you want to get out of your membership, and what you have to offer. Contact information for the officers and directors appears on the SFAA website, <https://www.sfaa-astronomy.org/about/the-board/>. Members are invited to attend our monthly board meetings. The schedule will be posted in our online calendar, <https://www.sfaa-astronomy.org/events/>

# 03. ASTRONOMY EVENTS



## SAN FRANCISCO AMATEUR ASTRONOMERS EVENTS JANUARY 13, 2017 – APRIL 22, 2018

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

**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

**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 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

**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 Officers Club

**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

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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!

## 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>

# 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.

## **TOTAL LUNAR ECLIPSE VISIBLE FROM PACIFIC RIM JANUARY 31, 2018 | ANTHONY BARREIRO**

Very late on the night of Tuesday January 30 to Wednesday January 31 the Moon will pass through Earth's shadow, showing us a total lunar eclipse. Observers on the west coast of North America will be able to see pretty much the entire eclipse, although we will have to get up very early (or stay up very late), and get someplace with a clear view toward the western horizon to see the end of the second partial phase.

Partial eclipse will begin at 3:48 am PST Wednesday morning, when the full Moon begins to enter Earth's dark umbral shadow, taking a visible bite out of the Moon's disk. From San Francisco, the Moon will be about 40 degrees high in the western sky. More and more of the Moon's surface will disappear into the Earth's shadow until the Moon is totally eclipsed beginning at 4:51 am. At this moment the Moon will still be 27 degrees above the western horizon. Totality will last until 6:08 am, with the Moon only 12 degrees above the horizon. The second partial phase, as the Moon moves out of the Earth's umbral shadow, will end at 7:12 am, just a few minutes before the full Moon sets and the Sun rises.

During this eclipse the Moon will be close to perigee, the closest point in her orbit to Earth, and she will pass close to the center of the Earth's shadow, so this will be a relatively long eclipse, with totality lasting an hour and a quarter. Depending on the quality of light refracting through Earth's atmosphere, this may be a very dark and dramatically colored eclipse.

The Moon hasn't been totally eclipsed since September 2015, and the next total lunar eclipse, on July 27, 2018, won't be visible from North America. So if the weather is clear Tuesday night January 30, set your alarm, bundle up, and go watch the Moon slide through the Earth's shadow.

The January 2018 print and digital editions of Sky and Telescope magazine feature a well-illustrated observing guide for this eclipse by S.N. Johnson-Roehr. Kelly Beatty has posted a guide to all the lunar and solar eclipses of 2018 on the S&T website, at <http://www.skyandtelescope.com/astronomy-news/observing-news/solar-and-lunar-eclipses-in-2018/>

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

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**Three simple steps:**

- 4. Think up a great design idea**
- 5. Draw it**
- 6. 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!**



# 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

# 08.

## SFAA LOANER TELESCOPE PROGRAM | DOUGLAS SMITH

Did you know that the SFAA has a telescope loaning program? The club has a variety of telescopes available for members to borrow. In exchange we ask that the borrower share the scope at one of our public star parties, or at another public event.

We have large and small scopes. For those with some room, we have a 15" Obsession. It's a large scope but is a truss-tube design. We've confirmed it fits into a Prius! Another Dobsonian we have is a 10" homemade telescope. On the medium and smaller sizes, we have a variety of Mead and Orion scopes. We have a series of eyepieces and accessories to go with each telescope loan, so you're all set after you find that dark location.

Additionally, we're on the lookout for telescope donations – if you know of someone who wants to pass on their telescope, we can give it a good home. Or if you come across a great deal on a used telescope, pass on the information – the club may be interested in purchasing it. We like to give members a chance to try various telescopes before they commit to buying one. Or, for members who just want to utilize one now and then, this is a perfect program!

If you'd like to borrow a telescope, send an email to [telescopes@sfaa-astronomy.org](mailto:telescopes@sfaa-astronomy.org), or contact Douglas Smith who is managing the loaning program. Currently the majority of the telescopes are out on loan; some are expected back soon. We will be updating the borrowing process soon – you'll be able to see on the web site what scopes are available; so stay tuned for some updates online!

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

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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!

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### CITY STAR PARTY HIGHLIGHTS

by Scott Miller

\* \* \* \* \*

Saturday, December 9 @ Point Lobos

Approximately 30 stargazers attended the December 9th SFAA City Star Party at Point Lobos. Stargazers were able to view the Pleiades, globular cluster M13, the Andromeda galaxy and the planet Uranus with telescopes provided by SFAA members Liz Triggs, PJ and Kate Cabrera, George Teiber and Scott Miller.

## JANUARY 16<sup>TH</sup> LECTURE | “AN EVENING WITH SAN FRANCISCO AMATEUR ASTRONOMERS”

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

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*





# 10.

## 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

**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**



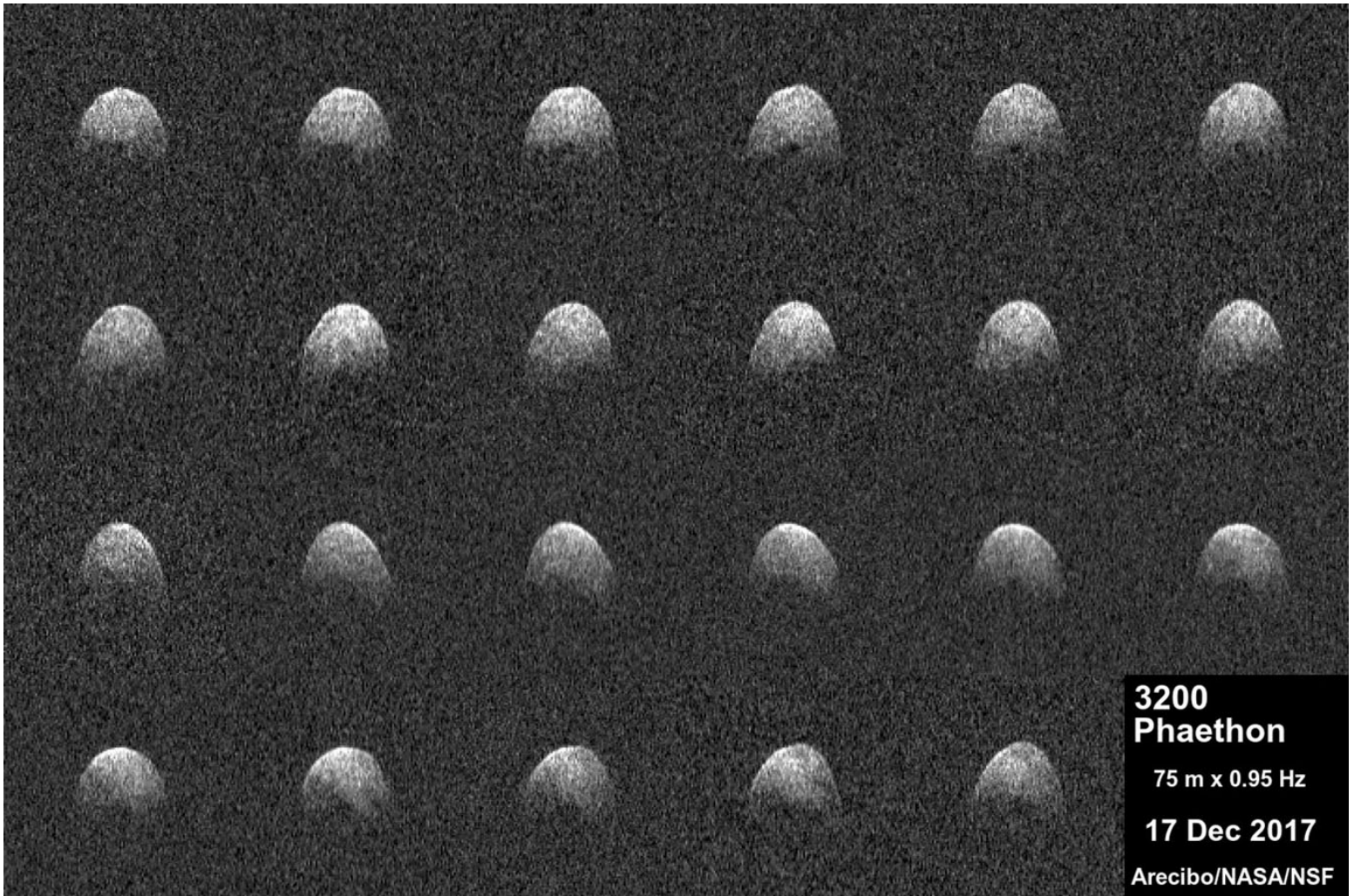
### "IT RAINS DIAMONDS ON "ICE GIANT" PLANETS"

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.

## ARECIBO RADAR RETURNS WITH ASTEROID PHAETHON IMAGES



*These radar images of near-Earth asteroid 3200 Phaethon were generated by astronomers at the National Science Foundation's Arecibo Observatory on Dec. 17, 2017. Observations of Phaethon were conducted at Arecibo from Dec. 15 through 19, 2017. At time of closest approach on Dec. 16 at 3 p.m. PST (6 p.m. EST, 11 p.m. UTC) the asteroid was about 6.4 million miles (10.3 million kilometers) away, or about 27 times the distance from Earth to the moon. The encounter is the closest the asteroid will come to Earth until 2093.*

*Image credit: Arecibo Observatory/NASA/NSF*

After several months of downtime since Hurricane Maria struck the island of Puerto Rico, the Arecibo Observatory Planetary Radar has returned to normal operation, providing the highest-resolution images to date of near-Earth asteroid 3200 Phaethon during its December 2017 close approach to Earth. The radar images, which are subtle at the available resolution, reveal the asteroid is spheroidal (roughly ball-shaped) and has a large concavity, or depression, at least several hundred meters in extent near its equator, and a conspicuous dark, circular feature near one of the poles. Arecibo's radar images of Phaethon have resolutions as fine as about 250 feet (75 meters) per pixel.



"These new observations of Phaethon show it may be similar in shape to asteroid Bennu, the target of NASA's OSIRIS-REx spacecraft, but more than 1,000 Bennus could fit inside of Phaethon," said Patrick Taylor, a Universities Space Research Association (USRA), Columbia, Maryland, scientist and group leader for Planetary Radar at Arecibo Observatory. "The dark feature could be a crater or some other topographic depression that did not reflect the radar beam back to Earth."

Radar images obtained by Arecibo indicate Phaethon has a diameter of about 3.6 miles (6 kilometers) -- roughly 0.6 miles (1 kilometer) larger than previous estimates. Phaethon is the second largest near-Earth asteroid classified as "Potentially Hazardous." Near-Earth objects are classified as potentially hazardous asteroids (PHAs), based on their size and how closely they can approach Earth's orbit.

Tracking and characterizing PHAs is a primary mission of NASA's Planetary Defense Coordination Office. Radar is a powerful technique for studying asteroid sizes, shapes, rotation, surface features and roughness, and for more precise determination of their orbital path, when they pass relatively close to Earth.

"Arecibo is an important global asset, crucial for planetary defense work because of its unique capabilities," said Joan Schmelz of USRA and deputy director of Arecibo Observatory. "We have been working diligently to get it back up and running since Hurricane Maria devastated Puerto Rico."

The Arecibo Observatory has the most powerful astronomical radar system on Earth. On Sept. 20, the telescope suffered minor structural damage when Maria, the strongest hurricane to hit the island since 1928, made landfall. Some days after the storm, the observatory resumed radio astronomy observations, while also serving as a base for relief efforts to surrounding communities. Radar observations, which require high power and diesel fuel for generators at the site, resumed operations in early December after commercial power returned to the observatory and the generators could then be used exclusively for the radar.

Asteroid 3200 Phaethon was discovered on Oct. 11, 1983, by NASA's Infrared Astronomical Satellite (IRAS), and the planetary dust that produces the annual Geminid meteor shower originates from this asteroid. Observations of Phaethon were conducted at Arecibo from Dec. 15 through 19, 2017, using the NASA-funded planetary radar system. At time of closest approach on Dec. 16 at 3 p.m. PST (6 p.m. EST, 11 p.m. UTC) the asteroid was about 6.4 million miles (10.3 million kilometers) away, or about 27 times the distance from Earth to the moon. The encounter is the closest the asteroid will come to Earth until 2093, but it came a little closer in 1974 and about half this distance back in 1931 before its existence was known.

The Arecibo Planetary Radar Program is funded by NASA's Near-Earth Object Observations Program through a grant to Universities Space Research Association (USRA), from the Near-Earth Object Observations program. The Arecibo Observatory is a facility of the National Science Foundation operated under cooperative agreement by SRI International, USRA, and Universidad Metropolitana.

NASA's Planetary Defense Coordination Office is responsible for finding, tracking and characterizing potentially hazardous asteroids and comets coming near Earth, issuing warnings about possible impacts, and assisting coordination of U.S. government response planning, should there be an actual impact threat.

More information about the National Science Foundation's Arecibo Observatory can be found at:

<http://www.naic.edu>

More information about asteroids and near-Earth objects can be found at:

<https://cneos.jpl.nasa.gov>

<https://www.jpl.nasa.gov/asteroidwatch>



For more information about NASA's Planetary Defense Coordination Office, visit:

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

For asteroid and comet news and updates, follow AsteroidWatch on Twitter:

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**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



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