

# ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

Vol. 61, No. 4/5 - April-May 2013

## GENERAL MEETINGS

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

**Randall Museum . 199 Museum Way . San Francisco**

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

**APRIL 17, 2013**

**GASPARD DUCHENE  
UC BERKLEY**

### **PLANET FORMATION AND STELLAR MULTIPLICITY: INSIGHTS FROM RECENT SURVEYS AND PERSPECTIVES**



While the prevalence of stellar multiplicity has been known for many decades, it is now becoming increasingly clear that planetary systems are also frequent around Main Sequence stars. This raises the natural question of the connection between stellar multiplicity and planet formation, a topic that was mostly ignored until the last few years. Does the presence of a stellar companion alter, prevent or promote the formation of planets? In which way? Characterizing observational trends as a function of the stellar companion's mass and orbital properties can help identify the most important physical effects induced by the companion, if any. In this talk, I will review some key results from a number of recent surveys based on the Spitzer, Kepler and Herschel space observatories, as well as ground-based facilities. Building on these surveys, I will draw a global picture of our current understanding of the subject and will propose that, while planetary systems exist in a very diverse range of multiple stellar systems, they may not all form through the same process.

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*Gaspard Duchene has been studying stellar multiplicity and planet-forming disks, and particularly the inter-connection between both aspects, using a broad variety of observational approaches. While the prevalence of stellar multiplicity has been established for many decades, the discovery of extrasolar planets is one of the most*

*exciting findings of modern astronomy. It is now becoming increasingly clear that planetary systems are frequent around Main Sequence stars. Duchene will discuss some key results on protoplanetary disks and mature planetary systems from a number of recent surveys based on the Spitzer, Kepler and Herschel space observatories.*

**MAY 15, 2013**

**ANTHONY AGUIRRE**

**Assistant Professor of Physics, UC Santa Cruz**

### **MULTIPLE UNIVERSES & COSMIC INFLATION THE QUEST TO UNDERSTAND OUR UNIVERSE (AND FIND OTHERS)**

About a decade ago, scientists completed a great transformation in the understanding of our cosmos, establishing a broad and deep understanding of how the observable universe has evolved from a hot, dense state 13.7 billion years ago. Yet a second, even bigger transformation may now be taking place, because this understanding points to an early epoch during which the universe expanded at a stupendous rate to create the vast amount of space we can observe.

Cosmologists are now coming to believe that this "cosmic inflation" may do much more: In many versions, inflation goes on forever, generating not just our observable universe but also infinitely many such regions with similar or different properties, together forming a staggeringly complex and vast "multiverse". Dr. Aguirre will trace the genesis of this idea, explore some of its implications, and discuss how cosmologists are currently seeking ways to test this idea by actually searching for hints of other universes. Don't miss this introduction to one of the most mind-boggling parts of modern astronomy.

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*Anthony Aguirre received his PhD in Astronomy from Harvard University*

**This April-May publication in late April is the consequence of computer equipment failure. Because the newsletter also serves as a historical repository of club activities and events, lecture information for April (post-event) along with May is included in this joint issue. Ed.**

I want to start out this April/May letter with a nod to all of our club volunteers, past and present. Thanks to those of you whom have filled a role, run a program, set up a scope and offered views to the public, brought snacks, volunteered for an hour or two where needed, or offered a friendly helping hand. We have a large number of individuals who dedicate evenings, afternoons, lunch hours, etc. to make the club run and to offer the programs that we do. The man-hours dedicated are difficult to add up! Yes, I actually tried to add them up in a spreadsheet and it was hard.

April marked the kickoff of the Mt. Tam Public Astronomy nights, which run monthly from April through October. Bravo to you members who set up scopes and showed views in the cold wind on April 13<sup>th</sup>. It seemed as though only medium sized or especially heavy scopes fared decently. Small scopes jiggled too much, and big dobs got blown around. I must admit I was unprepared for the cold – I'd spent the previous night observing from BLM lands near Pinnacles National Park, at 3000ft,

## **PRESIDENT'S MESSAGE**

where I was comfortable wearing my medium-weight clothing. On Mt. Tam the very next night however, I found myself layering up to my "spacesuit" of ski clothing that I'd otherwise only wear if observing in freezing conditions. The show must go on as they say -- the club had about 10 scopes and/or binoculars out for folks to view through, and at one point there were lines at scopes.

A few of my updates from last month about Comet Pan-STARRS and the Messier Marathon, have been broken out into articles in this April/May edition.

The biggest news for March was the announcement of dates for our Yosemite Outreach and Camping Trip. Our dates are June 28-29. It will be chilly, I'm told, colder than it would be if our trip was to happen later in the summer.

Given all of my talk about cold weather and wind, I thought it would be fun to compile an advice article about how to dress to stay warm. What works for you on Mt. Tam or at the CSP? What articles of clothing, materials, or designs are your must-haves? Even better, how do you as a *San*

Francisco Amateur Astronomer stay warm AND  
look *fashionable*???

I wish you fabulous evenings of amateur astronomy  
this month!

Send your hints, tricks, and tips on staying warm to  
me [president@sfaa-astronomy.org](mailto:president@sfaa-astronomy.org) by May 20<sup>th</sup>,  
2013 and I'll compile them together for our June  
edition.

**Angie**

# **IMPORTANT DATES & UPCOMING SFAA VIEWING EVENTS**

## **SFAA GENERAL MEETINGS & LECTURES**

*Randall Museum, 199 Museum Way (Near 14<sup>th</sup> Street and Roosevelt)  
Third Wednesday of each month: 7:00 p.m. Doors open. 7:30 p.m. Announcements. 8:00 p.m.  
Speaker*

**SFAA BOARD MEETINGS  
IMMEDIATELY PRECEDE GENERAL MEETINGS AND BEGIN AT 6:00 P.M.**

April 17, May 15, June 19, July 17, August 21, September 18, October 15,  
November 20, December 18

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## **2010 MT TAM SPECIAL USE PERMIT STAR PARTIES MEMBERS ONLY**

**SPECIAL USE PERMIT** observing nights on Mount Tamalpais are private, open *only* to SFAA members.  
Please arrive by sunset. SFAA/Mt. Tam permit required for each car.  
We must vacate the mountain by 2:00 a.m. except on specially approved nights  
(such as Messier Marathon).

**ALWAYS ON A SATURDAY**  
May 4, June 8, July 6, August 3, August 31,  
October 5, November 2, November 30

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## **MT TAM PUBLIC STAR PARTIES (April through October)**

Public nights on Mount Tamalpais start with a lecture in the Mountain Theatre  
followed by public viewing in the Rock Springs parking lot.  
SFAA members may view privately after crowd departs from approx. 11 pm-2 am.  
For more information: <http://www.sfaa-astronomy.org/starparties/>

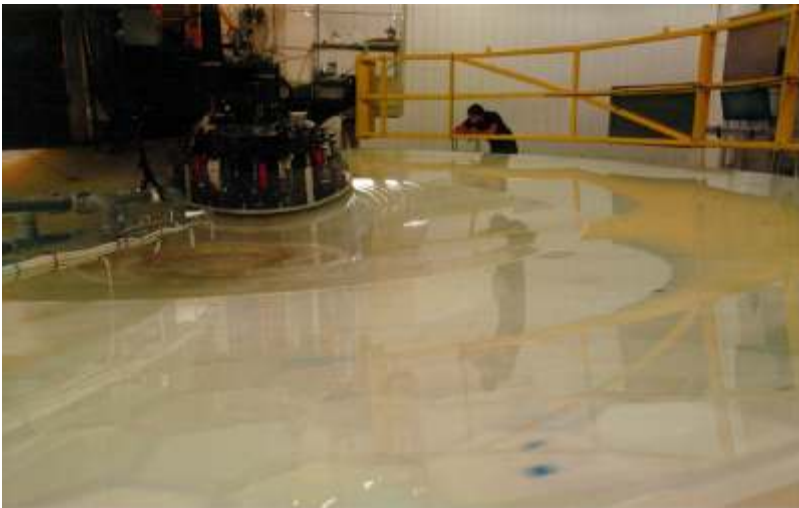
2013 Dates: May 11, June 15, July 13, Aug 10, Sept 7 and Oct 12

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# UPCOMING LECTURES

**JUNE 19 TOM ZOBRIST**

## **BUILDING THE WORLD'S LARGEST TELESCOPES: THE FUTURE OF GROUND-BASED ASTRONOMY**



Tom Zobrist will recap his experience working at the Stewart Observatory Mirror Laboratory (SOML) helping to build the world's largest astronomical telescopes, including LBT, GMT, and LSST. Tom will discuss how LSST will allow every amateur astronomer to have access to an 8.4 m research-

grade telescope, and about the race between GMT and its competitors, the Universities of California led Thirty Meter Telescope and the European Extremely Large Telescope, for the title of World's Largest Telescope.

***Tom Zobrist** received his PhD in Optical Engineering from the University of Arizona. He worked as a metrologist and optical research engineer at the Optical Sciences Center and Stewart Observatory Mirror Laboratory in Tucson, AZ between 2003 – 2011. During that time he helped develop numerous optical metrology systems for measuring the surface figure of precision optics and astronomical mirrors for many of the world's largest astronomical telescopes. In 2011, he made a career change from supporting the fabrication of the world's largest optics to supporting the world's largest optical system: the National Ignition Facility at Lawrence Livermore National Laboratory, where he supports target and diagnostic alignment activities.*

From Kenneth Frank –

## **JOHN DOBSON WILL TURN 98! IN SEPTEMBER**

It's never too soon to plan --



### **JOHN DOBSON'S 98th BIRTHDAY CELEBRATION**

We will be celebrating John's 98th birthday with a day-long event on  
Wednesday, September 18  
at  
Griffith Observatory  
Los Angeles

In true sidewalk fashion, we'll be building a 12" telescope to use for observing the Moon that evening as part of the International Observe the Moon celebration.

There will be hands-on grinding for the public and any amateurs who want to get a work out. We'll also be assembling the mount so that everyone can see the entire telescope building process for themselves.

More info to come as we do the details. Maybe we can caravan down to LA.  
If you cannot go and would like to give him a card of good wishes, just mail it to me:

773 Tiburon Blvd.  
Tiburon, CA  
94920

or post on facebook:

<http://www.facebook.com/Sidewalkastro?fref=ts>

As John would say:

"Over & Out"

## MESSIER MARATHON NIGHT Angie Traeger

About 50 people and 25 scopes were set up for the Messier Marathon on Mt. Tamalpais last month. We had many new members who were beginners, which I was happy to see. To all of you experienced stargazers, please try to introduce yourself to some of the beginners – they are eager to learn! My favorite gem from the Messier Marathon evening was a rogue off-program object – Omega Centauri, the giant and bright globular cluster in Centaurus. In the southern hemisphere it's



apparently a naked eye object, "plainly visible to the unaided eye as a hazy looking 4<sup>th</sup> magnitude star," according to Burnham's Celestial Handbook. From Rock Springs, it was visible low over the ocean horizon in my 50mm finder scope, and a large, slightly grainy "puff" in my 16" scope with my widest eyepiece (about 60x magnification and just over a degree field of view). Rock Springs turns out to be a good spot for viewing the Centaurus constellation, and I can't help but look at it and think about the fact that our nearest star system

to our own, Alpha Centuari, is just a tad southward below the horizon. You should be able to catch Omega Centauri next month from Rock Springs with binoculars or a finder scope.

n of

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**"Mike the Comet Spy"**

**Andy the Saint  
of Hot Chocolate**



## CITY STAR PARTY ON ASTRONOMY DAY

Photo by Ryan B.



Mark R. and Anthony B. show solar views at the Cal Academy of Sciences - photo by Angie T.

Angie T. and Bob H., and Michael P. and Bob H. at the "booth" prepared and set up by Joe H., Doug S., Bob H., Adrian, F., and the Cal Acad folks.-- photos by Michael P. and Angie T.





## COMET PAN-STARRS

By Angie Traeger

Comet Pan-STARRS (officially known as C/2011 L4 (PANSTARRS)) is now an easy binocular object along the western horizon.

Our first known sighting of Pan-STARRS by an SFAA'er was on Saturday, March 9th, at our Messier Marathon SUP night, by Mike. Mike hiked up the hills west of Rock Springs and patiently waited. "Caught a brief glance of it between the clouds about 15-20 minutes after sunset. Waited it out another 5-10 minutes after the first sighting, but the clouds did not cooperate. Without the aforementioned clouds on the horizon it would have been easily spotted, but I'm not convinced it would have been seen with the naked eye – I needed my binocs to catch it."

As of Tuesday, March 12th, several of us saw it. I (Angie) caught it from my back yard, through 7×50 binoculars in San Rafael and at least 3 other SFAA'ers caught it from around the Bay Area. A clear low horizon is needed.

On Wednesday March 13th several SFAA'ers caught the object naked-eye but with averted vision. As Mike describes, it's was visible naked-eye, "but not while looking directly at it, had to look away to see it." Several folks reported a seeing a bright beautiful, almost stellar nucleus, and a fainter tail.

One of the last views we may have of Pan-STARRS was at the April 20th, 2013 City Star Party. Member Mark Yates shared views with the public through his 14" scope. Pan-STARRS was low in the sky but a distinct and bright smudge in the eyepiece. Perhaps we'll catch it once more during our Member Social on April 27th, and after that, wait patiently through the summer for comet ISON to visit.



**Panstarrs image - March 16 CSP – Photo by Ryan B.**

## Share Astronomy in the Classroom

Vivian White, Bay Area Project ASTRO

Hello Bay Area astronomers,

Show a child the universe and inspire the next generation of science leaders! ASP's Project ASTRO Partners Volunteer Astronomers with Teachers in Bay Area Schools & Community Organizations. Please pass this message onto anyone who may be interested.

Project ASTRO is looking for amateur and professional astronomers to work with teachers and students in 3rd - 9th grade classrooms. This is a great opportunity to share your love of astronomy with a receptive audience and help kids learn about science.

Bay Area Project ASTRO pairs you with a local teacher at a school convenient for you. Together, you and your teacher partner attend a 2-day summer workshop to learn hands-on, inquiry-based astronomy activities and then you "adopt" a class for a year. Both partners will receive "The Universe at Your Fingertips 2.0" -- a rich curriculum resource on DVD-ROM featuring a host of materials on teaching astronomy you can use in many settings.

Astronomer applications are now being accepted for the 2013 - 2014 school year. There is no cost, but space is limited. All participants are required to attend a 2-day workshop held August 2 & 3, 2013, at the San Mateo County Office of Education in Redwood City. Participants receive The Universe at Your Fingertips collection of activities and much more.

APPLY ONLINE by MAY 29th:

<http://astrosociety.org/education/k12-educators/astronomer-information/>

MORE INFORMATION:

<http://astrosociety.org/education/k12-educators/sf-bay-area-project-astro/>

Graduate students and advanced undergraduate students majoring in astronomy are also encouraged to apply.

Questions? Please contact Brian Kruse, Project ASTRO Coordinator by email:

[bayareaastro@astrosociety.org](mailto:bayareaastro@astrosociety.org)



## NIGHT SKY NETWORK

### May 2013 - THE EVENING SKY

May Sky Map: <http://skymaps.com/skymaps/tesmn1305.pdf>

May Sky Calendar: <http://skymaps.com/articles/n1305.html>

## BAY AREA ASTRONOMY EVENTS

Kenneth Lum

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

### BAY AREA EVENTS – MAY 2013

[BAY AREA EVENTS - MAY 2013](#)

### BAY AREA REGULARLY SCHEDULED EVENTS

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

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

## NASA SCIENCE CAST

The Science@NASA team is pleased to announce a new product: the ScienceCast. Every week, we produce a short video highlighting a topic in NASA science news. A complete list of ScienceCast episodes may be found on Science@NASA's Youtube channel. Enjoy!

<http://www.youtube.com/user/ScienceAtNASA>

## NASA SCIENCE NEWS

<http://science.nasa.gov/science-news/>

### HUBBLE SEES COMET ISON

**April 24, 2013:** Later this year, Comet ISON is expected to become a naked-eye object when it skims through the atmosphere of the sun. The Hubble Space Telescope has just obtained a sneak preview.

Hubble photographed ISON on April 10th. At the time, the comet was 386 million miles from the sun (394 million miles from Earth), just inside the orbit of Jupiter. Even at that great distance the comet is already active as sunlight warms the surface and causes frozen gases to vaporize. A detailed analysis of the image reveals a strong jet blasting dust particles off the sunward-facing side of the comet's nucleus.

Hubble's view of Comet ISON (C/2012 S1) on April 10, 2013. This image was taken in visible light. The blue false color was added to bring out details in the comet structure. Credit: NASA, ESA, J.-Y. Li (Planetary Science Institute), and the Hubble Comet ISON Imaging Science Team



Astronomers are using Hubble images to measure the activity level of the comet and constrain the size of its icy nucleus. Preliminary measurements suggest that the ISON's nucleus is no larger than three or four miles (~5 to 6 km) across. This is remarkably small considering the high level of activity observed in the comet so far, said researchers.

The comet's dusty atmosphere, or "coma", is approximately 3,100 miles across, or 1.2 times the width of Australia. A dust tail extends more than 57,000 miles, far beyond Hubble's field of view.

A more careful analysis is underway to improve these measurements and to predict the comet's activity when it skims 700,000 miles above the sun's roiling surface on November 28.

For updates, stay tuned to Science@NASA.

**Credits:** Production editor: [Dr. Tony Phillips](#) |

Credit: [Science@NASA](#)

**More information:** [Comet ISON Meteor Shower](#) -- a video from Science@NASA

[Comet of the Century?](#) -- experts discuss how bright Comet ISON might become when it skims the sun in late 2013.

ISON stands for International Scientific Optical Network, a group of observatories in ten countries who have organized to detect, monitor, and track objects in space. ISON is managed by the Keldysh Institute of Applied Mathematics, part of the Russian Academy of Sciences.

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### COMET ISON METEOR SHOWER

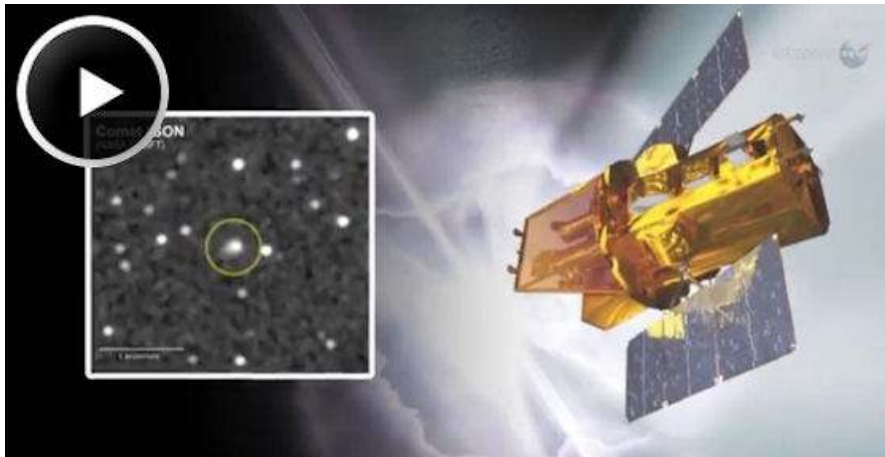
**April 19, 2013:** Anticipation is building as Comet ISON plunges into the inner solar system for a close encounter with the sun in November 2013. Blasted at point-blank range by solar radiation, the sungrazer will likely become one of the finest comets in many years.

When NASA's Swift spacecraft observed the comet in January 2013, it was still near the orbit of Jupiter, but already very



active. More than 112,000 pounds of dust were spewing from the comet's nucleus every *minute*.

It turns out, some of that dust might end up on Earth.



In a new ScienceCast video, experts discuss what might happen if Comet ISON peppers Earth's atmosphere with dust. [Play it](#)

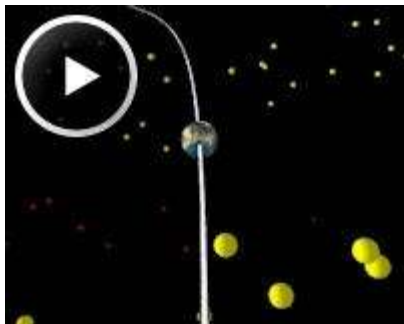
Veteran meteor researcher Paul Wiegert of the University of Western Ontario has been using a computer to model the trajectory of dust ejected by Comet ISON, and his findings suggest that an unusual meteor shower could be in the offing.

"For several days around January 12, 2014, Earth will pass through a stream of fine-grained debris from Comet ISON," says Wiegert. "The resulting shower could have

some interesting properties.

According to Wiegert's computer models, the debris stream is populated with extremely tiny grains of dust, no more than a few microns wide, pushed toward Earth by the gentle radiation pressure of the sun. They will be hitting at a speed of 56 km/s or 125,000 mph. Because the particles are so small, Earth's upper atmosphere will rapidly slow them to a stop.

"Instead of burning up in a flash of light, they will drift gently down to the Earth below," he says.



Don't expect to notice. The invisible rain of comet dust, if it occurs, would be very slow. It can take months or even years for fine dust to settle out of the high atmosphere.

While the dust is "up there," it could produce noctilucent clouds (NLCs).

Paul Wiegert's model of the Comet ISON debris stream: [AVI movie](#)

NLCs are icy clouds that glow electric-blue as they float more than 80 km above Earth's poles. Recent data from NASA's AIM spacecraft suggests that NLCs are seeded by space dust. Tiny meteoroids act as nucleating points where water molecules

gather; the resulting ice crystals assemble into clouds at the edge of space itself.

This is still speculative, but Comet ISON could provide the seeds for a noctilucent display. Electric-blue ripples over Earth's polar regions might be the only visible sign that a shower is underway.

Wiegert notes another curiosity: "The shower is going to hit our planet from two directions at once."

When Earth passes through the debris stream, we will encounter two populations of comet dust. One swarm of dust will be following the Comet ISON into the sun. Another swarm will be moving in the opposite direction, pushed away from the sun by solar radiation pressure. The streams will pepper opposite sides of Earth simultaneously.

"In my experience, this kind of double whammy is unprecedented," says Wiegert.

Bill Cooke, lead scientist at NASA's Meteoroid Environment Office, says there's little danger to Earth-orbiting spacecraft. "These particles are just too small to penetrate the walls of our satellites, and they don't stand a chance against the heavy shielding of the ISS." However, he adds, mission operators will be alert around January 12th for possible anomalies.

Sky watchers should probably be alert, too. The odds of seeing anything are low, but Comet ISON could prove full of surprises.

#### Credits:

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

**More information:**

[Comet of the Century?](#) -- ScienceCast video about Comet ISON

[NASA's Swift Sizes Up Comet ISON](#) -- press release

[The NASA Comet ISON Observing Campaign](#) -- get involved!

## 2013 Club Officers & Contacts

<i>President</i>	<b>ANGIE TRAEGER</b>	sfaapresident@sfaa- astronomy.org
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<i>Board Members</i>	Anhil Chopra Bob Haberman Sunil Nagaray Paul Salazar Mitchell Schoenbrun George Teiber	
<i>1<sup>st</sup> Alternate</i>		
<i>2<sup>nd</sup> Alternate</i>		
<i>Webmaster</i>	Matthew Jones	

## Club Telescopes

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

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

## Club Astronomy Videos

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

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

## Membership Dues

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

## SFAA Website and Online Services

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

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

Has your membership expired? Your mailing label includes the month and year through which your membership is paid. If it is past, your membership has expired and this may be your last issue.



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

### MEMBERSHIP APPLICATION

Membership is billed for each upcoming year on June 30. Between January 1 and June 30, new members pay one half the amount listed below

Membership Categories (Check one):  
 \$10 Youth/Student     \$40 Institutional  
 \$25 Individual         \$75 Supporting  
 \$30 Family

Information: Name(s) \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_  
Home Phone \_\_\_\_\_  
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You can choose E-Mail (Recommended) or hard copy delivery for *Above the Fog* (Check one)

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Please make checks payable to San Francisco Amateur Astronomers and mail to:

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