

★ ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

Vol. 61, No. 6 - June 2013

GENERAL MEETING – JUNE 19, 2013

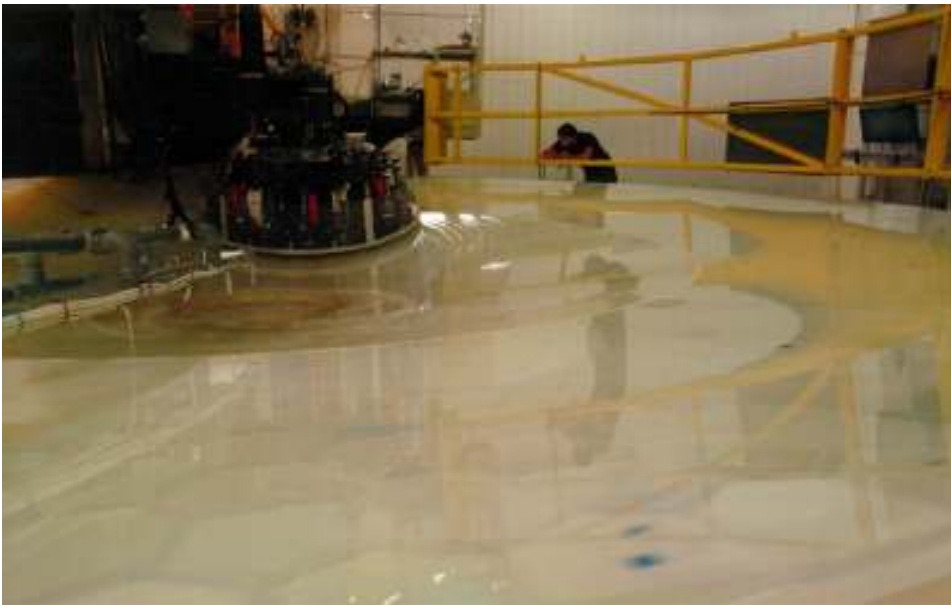
Randall Museum . 199 Museum Way . San Francisco

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

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

TOM ZOBRIST, Ph.D.

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.

AUGUST MEETING – CHANGE OF DATE TO AUGUST 28

Please note that due to a calendar conflict at the Randall,

San Francisco Amateur Astronomers August General Meeting
has been rescheduled to
Wednesday, August 28
Doors open 7:00 p.m., 7:30 p.m. Announcements, 8:00 p.m. Speaker

PRESIDENT'S MESSAGE

Greetings Fellow Stargazers,

I hope you have been enjoying the spring skies and were able to see the Dance of the Planets at the end of May. I observed the tight trio from our backyard in San Rafael, and I thought it was strange to see little Mercury sitting higher in the sky than blazing Venus.

Our foggy, cold, and dark member social was on April 27th, at Land's End. Matt, our VP, and my idea for holding the event at Land's End was that we could socialize as well as also do some casual Full Moon observing, equipment demos, etc. A fogged out evening and having a Plan B didn't occur to us (oops!). Thanks to all of you who showed up despite the fog, as I think we had some fun despite the lack of sky viewing.

At the member social, George T. showed us his home-made travel Dobsonian that fits into a box underneath an airplane seat. Ryan B. showed us his nifty pico-projector and displayed an album of SFAA members' astrophotography. Matt entertained us with some astronomy trivia. We then packed up and a few of us headed to the Beach Chalet to warm up by a fire and chat. Check out the picture of George's travel scope!



DIY projects seemed to be the hot discussion topic of the night during the member social, where people talked about taking classes at the Tech Shop (http://www.techshop.ws/take_classes.html?storeId=4). Later in May, Doug S., our club secretary and shop steward reported hearing much interest in enthusiasm about our stargazing nights from the "Makers" who attended the Maker Faire on May 18th and 19th, stopping to chat with him at his telescope making

booth. If you've never heard of the Maker Faire, check out these links (<http://www.space.com/21216-maker-faire-bay-area-photos-2013.html> or <http://makerfaire.com/makerfairehistory/>) to get an idea of what "Making" is about.

As always, thanks to those of you who volunteered for our programs in the last couple of months. Check out these pictures of Michael P., and of an event hosted by Sue-Ellen, with Joe H assisting, and Dave F.'s crowd while solar viewing on Mt. Tam in April. I wish I had a picture of Dave F., Mitchell, and Anil at our last CSP, helping folks use their telescopes, and chatting with fellow amateurs visiting from across the country.



Some bits of housekeeping. For those of you who attend our Mt. Tam events to observe, please see the accompanying list of requests from Ranger Ryen. Most importantly, remember to put your parking placard on the dashboard! Also, last month I asked for folks to share advice on staying warm while observing, and even better staying warm and looking fashionable. The deadline was rather short, May 20th, so this time I'll aim to compile them for October. Send your suggestions to president@sfaa-astronomy.org by September 20th.

Wishing you clear, dark, and dry skies as the Milky Way flies overhead this summer.

ANGIE TRAEGER
President
San Francisco Amateur Astronomers
2013

IMPORTANT DATES & UPCOMING SFAA VIEWING EVENTS

SFAA GENERAL MEETINGS & LECTURES

Randall Museum, 199 Museum Way (Near 14th 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.

June 19, July 17,

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Speaker**

September 18, October 15, November 20, December 18

CITY STAR PARTY

http://www.sfaa-astronomy.org/star_parties/city/

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

June 8, July 6, August 3, August 31,
October 5, November 2, November 30

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

UPCOMING LECTURES

**JULY 17 - DAVID BLAKE, NASA Ames Research Center
THE DEVELOPMENT OF THE CHEMIN MINERALOGY INSTRUMENT
AND ITS DEPLOYMENT ON MARS
(AND LATEST RESULTS FROM THE MARS SCIENCE LABORATORY ROVER CURIOSITY)**

The CheMin instrument (short for “Chemistry and Mineralogy”) on the Mars Science Laboratory rover *Curiosity* is one of two “laboratory quality” instruments on board the *Curiosity* rover that is exploring Gale crater, Mars. CheMin is an X-ray diffractometer that has for the first time returned definitive and fully quantitative mineral identifications of Mars soil and drilled rock. I will describe CheMin’s 23-year development from an idea to a spacecraft qualified instrument, and report on some of the discoveries that *Curiosity* has made since its entry, descent and landing on Aug. 6, 2012, including the discovery and characterization of the first habitable environment on Mars.

David Blake received a B.S. in Biological Sciences from Stanford University in 1973. After a stint in the US Navy, he attended graduate school at the University of Michigan, where he received a Ph.D. in Geology & Mineralogy in 1983. He came to Ames Research Center as a NRC postdoctoral fellow and became a research scientist in the Exobiology Branch at Ames in 1989. He was the Exobiology Branch Chief from 2000-2004. In nearly 25 years of research at Ames, he has studied astrophysical ices, interplanetary dust, Mars meteorites, lunar soils, stratospheric soot and the geology and mineralogy of ancient habitable environments on Mars. He is the Principal Investigator of the CheMin XRD/XRF instrument on the Mars Science Laboratory rover *Curiosity*, and is a member of the Principal Science Group that directs the activities of *Curiosity* during its 2-year mission.

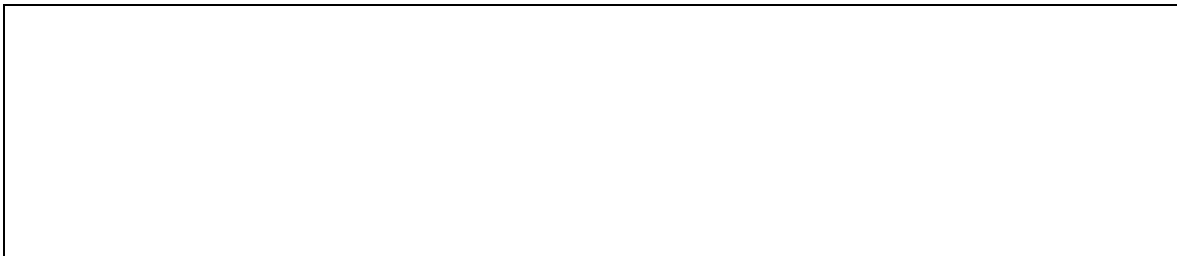


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WELCOME TO THE SFAA – 2013 YOSEMITE STAR PARTY AT GLACIER POINT – JUNE 28-29



To sign up, just email Dave Frey at fiestascope@yahoo.com.
Be sure to put "Yosemite Sign Up" in the subject line to reserve your campsite.

Sign up soon – It's filling up fast!

Remember, the trip is available to MEMBERS ONLY.

Since this is a Public Viewing Event that the SFAA attends as guests of the National Parks, all campers are expected to bring a telescope and be willing to host public viewing. The club aims to bring one telescope for every two SFAA members attending.

About the Trip:

The SFAA is provided with FREE admission to Yosemite National Park as well as FREE reserved, shared campgrounds at Bridalveil Group Campground.

The campsite is 8.5 miles away from Glacier Point.

We will host two public star parties at Glacier Point, on Friday and Saturday night. We have the public (about 200 – 300 people) from twilight for a few hours, and then the rest of the night (and all day) to ourselves; this is a mighty good deal, considering how some folks come 12,000 miles to see these rocks. The National Park Service limits astronomy clubs to a maximum of 30 SFAA campers. Please do not ask if your friends can come ...unless they are SFAA members and have telescopes.

Observing site at Glacier Point

The observing area is mostly open, with incredible views from about NNW to the east, around to due south. The horizon from south around to the west is partly blocked by tall trees. Still, there is a lot of open sky, and typically, the seeing and transparency are excellent. It has warm temperatures of 70 to 90 during the day, and cool to chilly 40's at night, due to the elevation of 7200 feet.

Star Party

One of the rangers does a sunset talk, and then delivers the crowd to us. Following that, a member of the club will give an evening talk, (want to volunteer?) The public will have white flashlights, and we need to be tolerant of that. We will have 3 club members with red brake light tape to politely cover the offending flashlights. Expect many questions from the public.

The Reward

By around 9:30 or so, we will have the place to ourselves, and can stay until dawn if you so choose. Scopes must be removed when we quit, then set up again on Saturday. Some of us may set up sun scopes during the afternoon, show Half Dome festooned with rock climbers, and invite people to come back again after sunset.

Gastronomic Astronomic

Early Saturday eve is the traditional potluck meal and is always tons of fun. Please provide enough food for ~ say 3 or 4 people. Salads, main courses, pu pu's, and desserts are all welcome. The question is: Who will have the best astronomical gastronomic theme of incredible edibles this year? Remember the Brown Dwarfs? Prizes will be awarded! Please remember this repast takes time. It's better to start our own gastronomic party early so that there's no need to rush for set up Saturday evening on Glacier Point.

Check the [National Weather Service](#) for up-to-date weather info on Yosemite Park current weather and conditions.

See you at the campsite.

Dave & Matt

From Kenneth Frank --
JOHN DOBSON WILL TURN 98! IN SEPTEMBER

It's ever 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"

NIGHT SKY NETWORK

June 2013 - THE EVENING SKY

June Sky Map: <http://skymaps.com/skymaps/tesmn1306.pdf>

June Sky Calendar: <http://skymaps.com/articles/n1306.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 REGULARLY SCHEDULED EVENTS

<p>EVERY FRIDAY NIGHT 7:00 PM – 10:00 PM excluding major holidays</p> <p>The Telescope Makers' Workshop</p> <p>CHABOT SPACE AND SCIENCE CENTER 10000 Skyline Boulevard Oakland, CA 94619-2450</p>	<p>THE TELESCOPE MAKERS' WORKSHOP 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 & Science Center, 10000 Skyline Blvd., Oakland. Contact us for more specific details:</p> <p>Contact: E-mail Richard Ozer (rozer@pacbell.net) or (510) 406-1914</p>
<p>EVERY FRIDAY & SATURDAY EVENING, weather permitting 7:30 PM – 10:30 PM</p> <p>CHABOT SPACE AND SCIENCE CENTER 10000 Skyline Boulevard Oakland, CA 94619-2450 (510) 336-7300</p>	<p>EXPLORE THE NIGHT SKIES AT THE CHABOT OBSERVATORIES For more information: http://www.chabot.space.org/</p> <p>Free Telescope Viewing Regular hours are every Friday & 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>Daytime Telescope Viewing 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>Sunset – 5:11 PM (TWICE MONTHLY)</p> <p>Inclement weather (clouds, excessive wind and showers) will cause the event to be canceled without notice.</p> <p>SAN MATEO COUNTY ASTRONOMICAL SOCIETY STAR PARTY</p>	<p>STAR PARTIES AT CRESTVIEW PARK, SAN CARLOS</p> <p>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, (650)592-2166, or send an email to SMCAS@live.com or call Ed Pieret at (650)862-9602.</p> <p>Reasons to Attend If you have kids interested in space or planets bring them here for a real life view of planets, nebula, star clusters and galaxies. 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.</p>

	<p>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.</p> <p>Please respect the telescopes and ask permission from the owner if you wish to touch. Parents, please watch your children.</p> <p>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>EVERY CLEAR FRIDAY EVENING 9:00 PM – 11:00 PM</p> <p>FOOTHILL COMMUNITY COLLEGE OBSERVATORY 12345 Moody Road Los Altos Hills</p> <p>Cost: Free</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>EVERY CLEAR SATURDAY MORNING OBSERVATORY 10:00 AM – 12:00 PM</p> <p>FOOTHILL COMMUNITY COLLEGE 12345 Moody Road Los Altos Hills</p> <p>Cost: Free</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>
<h2>BAY AREA EVENTS – JUNE 2013</h2>	
<p>Tuesday, June 18 12:00 NOON</p> <p>SETI INSTITUTE COLLOQUIUM SERIES 189 Bernardo Avenue Mountain View CA 94043</p>	<p>CONFORMAL GRAVITY: NEW LIGHT ON DARK MATTER AND DARK ENERGY ROBERT NESBET, IBM ALMADEN</p> <p>Dr. Nesbet will describe (in layman's terms) implications of a theory that differs from standard particle physics and cosmology only by imposing a universal symmetry principle. This theory has been found to explain dark energy and dark galactic halos without invoking dark matter. Subgalactic phenomenology (relevant to our solar system) is retained.</p> <p>The model postulates that strict conformal symmetry (local Weyl scaling covariance), already satisfied by standard fermion and gauge boson theory, can be extended to all elementary massless fields. This modifies Einstein-Hilbert general relativity and the Higgs scalar field model. No new physical fields are introduced.</p> <p>Dr. Nesbet will show that conformal gravity and a conformal Higgs model fit empirical data on galactic rotational velocities, galactic halos, and Hubble expansion including dark energy. By implication, dark matter is not needed for an isolated galaxy. This model appears to be a promising tool for understanding both cosmology and elementary particle physics.</p> <p>https://plus.google.com/events/c1fov3ao993mu9f1n9ei5s9q7vk</p>
<p>Tuesday, June 18 7:30 PM – 9:00 PM</p> <p>LONG NOW FOUNDATION MARINES MEMORIAL THEATER 609 Sutter Street San Francisco CA 94102</p>	<p>SPEAKER: ED LU ANTHROPOCENE ASTRONOMY: THWARTING DANGEROUS ASTEROIDS BEGINS WITH FINDING THEM ARE HUMANS SMARTER THAN DINOSAURS? WE HAVEN'T PROVED IT YET.</p> <p>In the long now, the greatest threat to life on Earth, or (more frequently) to civilization, or (still more frequently) to cities, is asteroid impact. The technology exists to eliminate the threat permanently. It is relatively easy and relatively cheap to do. However to date, government organizations have not made this a priority. That leaves nonprofits and private funding. Considerable efficiency may be gained by going that</p>

<p>Cost: \$15 General, Members free</p>	<p>route.</p> <p>Ed Lu is CEO and Chairman of the B612 Foundation, which, in partnership with Ball Aerospace is building an asteroid-detection system called Sentinel, aiming for launch in 2018. A three time NASA astronaut, Lu is also the co-inventor of the "gravity tractor" -- one of the several techniques that can be used to nudge threatening asteroids out their collision paths with Earth.</p> <p>Asteroid threat is an attention-span problem blended with a delayed-gratification problem---exactly the kind of thing that Long Now was set up to help with. Taking the extreme danger of asteroids seriously requires thinking at century and millennium scale. Dealing with the threat requires programs that span decades, because asteroids can only be deflected if they are found and dealt with many years before their potential impact. The reality is that the predictability of orbital mechanics makes cosmic planetary defense completely workable. Sometimes real science is more amazing than science fiction.</p> <p>On February 15th of this year, civilization got a wake-up call. A 45 meter asteroid, large enough to completely obliterate a major city, missed Earth by only 17,000 miles, and hours later a smaller rock, 17 meters in diameter, exploded in the air over Chelyabinsk, Russia, injuring 1500 people. Interest in B612's asteroid detection mission spiked accordingly.</p> <p>Website: http://longnow.org/seminars/02013/jun/18/anthropocene-astronomy-thwarting-danger/ ous-asteroids-begins-finding-them/</p>
<p>Saturday, June 22 7:30 PM</p> <p>SAN JOSE ASTRONOMICAL ASSOCIATION HOUGE PARK Twilight Drive San Jose CA 95124</p> <p>Cost: Free</p>	<p>Speaker: Dr. Dana Beckman, SOFIA NASA's stratospheric Observatory for Infrared Astronomy: Science from 41,000 Feet.</p>
<p>Monday, June 24 12:00 NOON</p> <p>SETI INSTITUTE COLLOQUIUM SERIES 189 Bernardo Avenue Mountain View 94043</p>	<p>LEE SMOLIN, PERIMETER INSTITUTE, ONTARIO, CANADA TIME REBORN: FROM THE CRISIS IN PHYSICS TO THE FUTURE OF THE UNIVERSE</p> <p>http://plus.google.com/events/ci38ihfu54i7ip666062u3060f0</p> <p>Interesting new book which he has been going around talking about.</p>
<p>Tuesday, June 25 7:15 PM – 9:15 PM</p> <p>MOUNT DIABLO ASTRONOMICAL SOCIETY 1931 First Avenue Walnut Creek CA 94597</p> <p>Cost: Free</p>	<p>ACCESSING ORIGINAL NASA OBSERVATIONS ONLINE SPEAKER: JEFF ADKINS, NASA</p>
<p>Wednesday, June 26 5:00 PM (Unfortunately)</p> <p>NASA AMES RESEARCH CENTER Moffett Field Mountain View 94043</p> <p>Cost: Free</p>	<p>IRIS TELEVISED LAUNCH VIEWING</p> <p><i>I see that all tickets have already been reserved. Maybe the event can be watched elsewhere such as NASA TV.</i></p> <p>On Wednesday, June 26, NASA's newest mission, the Interface Region Imaging Spectrograph or IRIS, will launch from Vandenberg Air Force Base in California. IRIS will take flight using a Pegasus XL rocket, carried aloft by an Orbital Sciences L-1011 aircraft from Vandenberg. This exciting launch will broadcast live at the NASA Ames Visitor Center at NASA's Ames Research Center, Moffett Field, Calif.</p> <p>Registrations for attendance are available now! Tickets are free and are first-come, first-serve. Space is limited and only ticketed guests will be admitted.</p> <p>IRIS will advance our understanding of the complex region immediately above the sun's surface that powers its dynamic, million-degree atmosphere, drives its solar winds, and is the source of the ultraviolet emissions</p>

	<p>that impact Earth's climate.</p> <p>IRIS' unique capabilities will be coupled with state of the art 3-D numerical modeling on supercomputers, such as Pleiades, housed at NASA Ames. NASA Ames also will provide IRIS mission operations and ground data systems.</p> <p>Launch is scheduled for 7:27, but is subject to change.</p> <p>Website: http://www.nasa.gov/centers/ames/events/2013/iris-televised-launch-viewing.html</p>
<p>Thursday, June 27 7:30 PM</p> <p>KANBAR FORUM EXPLORATORIUM Pier 15 San Francisco 94111</p>	<p>HIGGS: THE THEORY, THE DISCOVERY, AND THE FATE OF THE UNIVERSE WITH JOANNE HEWETT AND MARIA SPIROPULU</p> <p>Buy Tickets: http://www.exploratorium.edu/visit/calendar/higgs-theory-discovery-and-fate-univ\erse</p> <p>Last July, the international physics community witnessed what is arguably the biggest discovery in the history of high-energy physics: a Higgs boson. Scientists at CERN, the European Laboratory for Particle Physics, presented findings of the long-sought fundamental particle—findings confirmed in March this year. Prior to this discovery, individuals working across decades, nations, and scientific disciplines collaborated to invent and build one of the largest machines ever, the Large Hadron Collider and its giant detectors, as well as new ways to collect, share, and carefully sift through its mountains of data.</p> <p>To share the startling theoretical leaps and epic experimental program behind this monumental achievement, we've invited JoAnne Hewett, a theoretical physicist from the SLAC National Accelerator Laboratory, and Maria Spiropulu, a Caltech experimental physicist working at CERN, to speak with us. Join them to explore Higgs and its implications—from the ways elementary particles acquire mass to a greater understanding of our universe. All this from one particle? Are you in? Come and find out about this adventure and where it's taking us.</p> <p>-----</p> <p>JoAnne L. Hewett is a theoretical physicist and Professor of Particle Physics and Astrophysics at Stanford University. She received her PhD from Iowa State University and has worked at the SLAC National Accelerator Laboratory since 1994. Her research interests include theoretical particle physics, phenomenology of electroweak interactions within and beyond the Standard Model, collider signatures and effects in rare processes, heavy flavor physics, and the signature of extra space-time dimensions.</p> <p>Maria Spiropulu is an experimental physicist and Professor of Physics at the California Institute of Technology. She received her MA and PhD from Harvard University and has spent the past 20 years researching elementary particles and their interactions at Fermilab's Tevatron collider and CERN's Large Hadron Collider (LHC). Her research includes searches for dark matter and global analysis of particle observations in exploration of the nature of dark matter, characterization of the recently discovered boson at the LHC, look-alike model separation, big data analysis, new accelerator technologies, and multi-application detector R&D. She is a 2009 Fellow of the American Association for the Advancement of Science.</p>
<p>Friday, June 28 7:30 PM</p> <p>LICK OBSERVATORY 7299 Mt. Hamilton Road Mt. Hamilton 95140</p> <p>Cost: \$9.50</p>	<p>SPEAKER: BAHRAM MOBASHER, UC RIVERSIDE LET THERE BE LIGHT: THE FIRST BILLION YEARS</p> <p>Lick Observatory hosts a Summer Visitors Program (SVP), inviting the public to observe through both the 36-inch Great Lick Refractor and Nickel 40-inch Reflecting Telescope. Each evening also features two speakers, who present programs even if clouds or fog prohibit viewing.</p> <p>Lick astronomers present multimedia lectures on their research or topics of current interest. A "History of Lick Observatory" talk is also presented. Local amateur astronomers outside the buildings provide additional telescopes and informal astronomy discussions.</p> <p>Program begins with the first talk at sunset. Observing begins when it gets dark and continues until everyone has had the opportunity to view through both telescopes.</p> <p>Due to safety concerns, children under the age of 10 will not be admitted to SVP</p> <p>Tickets go on sale on April 30 at 12:00 Noon here.</p> <p>Website: http://www.ucolick.org/public/sumvispro.html</p>
<p>Friday, June 28 7:00 PM</p>	<p>X-15, AEROSPACE MUTATION</p> <p>The X-15 was truly one of the most cutting edge ideas ever to come from drafting tables. Scientists say that there was a first sea creature that took an evolutionary leap out of Earth's ocean to become the ancestor</p>

<p>CHABOT SPACE AND SCIENCE CENTER 1000 Skyline Boulevard Oakland CA 94619</p> <p>Cost: Free with admission</p>	<p>of all land animals. The X-15 is the first primitive spacecraft to retain its hereditary vestiges from aviation; like legs on fish carrying its wings into space where they serve no purpose. This test vehicle left Earth's atmosphere to become the evolutionary link to all manned spacecraft.</p> <p>Website: http://www.chabotspace.org/calendar.htm?date=6-28-2013&p=4424923</p>
<p>Friday, June 28 9:15 PM – 12:00 AM</p> <p>SAN JOSE ASTRONOMICAL ASSOCIATION HOUGE PARK Twilight Drive San Jose CA 95124</p> <p>Cost: Free</p>	<p>HOUGE PARK STAR PARTY Meet with members of San Jose Astronomical Society for a Star Party, weather permitting.</p>
<p>Saturday, June 29 7:30 PM</p> <p>LICK OBSERVATORY 7299 Mt. Hamilton Road Mt. Hamilton 95140</p> <p>Cost: \$40 General, preferred options available</p>	<p>SPEAKER: SANDRA FABER, UC SANTA CRUZ The Milky Way Galaxy, Quantum Fluctuations, and Schroedinger's Cat Programs include concert, a talk by a University of California astronomer about current research, and (weather permitting) viewing through the historic Great Lick Refractor and the Nickel 40-inch telescope. Knowledgeable local amateur astronomers outside the buildings provide additional telescopes and informal astronomy discussions.</p> <p>Due to safety concerns, children under the age of 10 will not be admitted to Music of the Spheres</p> <p>Performer: Tingstad & Rumble</p> <p>Tickets go on sale on April 30 at 12:00 Noon here.</p> <p>Website: http://www.ucolick.org/public/music.html</p>
<p>Thursday, July 4 9:30 AM – 11:30 AM</p> <p>EMBASSY SUITES SANTA CLARA 2885 Lakeside Drive Santa Clara 95054</p>	<p>GALAXY FORUM USA 2013 GALAXY EDUCATION, GALAXY EXPLORATION AND GALAXY ENTERPRISE IN THE 21ST CENTURY</p> <p>Presentations by: Mariska Kriek, University of California, Berkeley "Growing Galaxies" Steve Durst, Int'l Lunar Observatory Assoc / SPC Founder "ILO Galaxy First Light Imaging and Exploration" Marco Pavone, Asst Professor, Stanford University "Surface Exploration of Small Solar System Bodies: Challenges and Prospects" Pioneering Businesses with Galactic Aspirations: Tony Cardoza of Cardoza-Bungey Travel in Palo Alto, Accredited Space Agent for Virgin Galactic</p> <p>Panel Discussion</p> <p>Seating is limited. Please RSVP today: info@... or 650-324-3705</p> <p>Contact: Michelle Phone: 650-324-3705 Website: http://galaxyforum.org/future-galaxy-forums/#usa13</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: <http://www.youtube.com/user/ScienceAtNASA> . Enjoy!

NASA SCIENCE NEWS

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

DRY ICE "SNOWBOARDS" ON MARS

June 11, 2013: NASA research indicates hunks of frozen carbon dioxide -- dry ice -- may glide down some Martian sand dunes on cushions of gas similar to miniature hovercraft, plowing furrows as they go.

"I have always dreamed of going to Mars," said Serina Diniega, a planetary scientist at NASA's Jet Propulsion Laboratory in Pasadena, Calif., and lead author of a report published online by the journal *Icarus*. "Now I dream of snowboarding down a Martian sand dune on a block of dry ice."



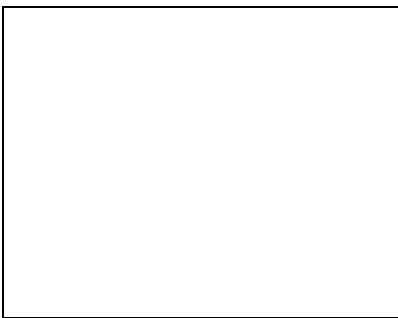
This image from the High Resolution Imaging Science Experiment (HiRISE) camera on NASA's Mars Reconnaissance Orbiter is an example of a type called "linear gullies," which may be explained by slabs of dry ice gliding down the slopes of sand dunes. Image credit: NASA/JPL-Caltech/Univ. of Arizona

Researchers deduced this process could explain one enigmatic class of gullies seen on Martian sand dunes by examining images from NASA's Mars Reconnaissance Orbiter (MRO) and performing experiments on sand dunes in Utah and California.

The hillside grooves on Mars, called linear gullies, show relatively constant width -- up to a few yards, or meters, across -- with raised banks or levees along the sides. Unlike gullies caused by water flows on Earth and possibly on Mars, they do not have aprons of debris at the downhill end of the gully. Instead, many have pits at the downhill end.

"In debris flows, you have water carrying sediment downhill, and the material eroded from the top is carried to the bottom and deposited as a fan-shaped apron," said Diniega. "In the linear gullies, you're not transporting material. You're carving out a groove, pushing material to the sides."

Images from MRO's High Resolution Imaging Science Experiment (HiRISE) camera show sand dunes with linear gullies covered by carbon-dioxide frost during the Martian winter. The location of the linear gullies is on dunes that spend the Martian winter covered by carbon-dioxide frost. By comparing before-and-after images from different seasons, researchers determined that the grooves are formed during early spring. Some images have even caught bright objects in the gullies.



A video from JPL shows how dry ice sliding down slopes can produce gully-like furrows. [Play it](#)

Scientists theorize the bright objects are pieces of dry ice that have broken away from points higher on the slope. According to the new hypothesis, the pits could result from the blocks of dry ice completely sublimating away into carbon-dioxide gas after they have stopped traveling.

"Linear gullies don't look like gullies on Earth or other gullies on Mars, and this process wouldn't happen on Earth," said Diniega. "You don't get blocks of dry ice on Earth unless you go buy them."

That is exactly what report co-author Candice Hansen, of the Planetary Science Institute in Tucson, Ariz., did. Hansen has studied other effects of seasonal carbon-dioxide ice on Mars, such as spider-shaped features that result from explosive release of carbon-dioxide gas trapped beneath a sheet of dry ice as the underside of the sheet thaws in spring. She suspected a role for dry ice in forming linear gullies, so she bought some slabs of dry ice at a supermarket and slid them down sand dunes.

That day and in several later experiments, gaseous carbon dioxide from the thawing ice maintained a lubricating layer under the slab and also pushed sand aside into small levees as the slabs glided down even low-angle slopes.

The outdoor tests did not simulate Martian temperature and pressure, but calculations indicate the dry ice would act similarly in early Martian spring where the linear gullies form. Although water ice, too, can sublime directly to gas under some Martian conditions, it would stay frozen at the temperatures at which these gullies form, the researchers calculate.

"MRO is showing that Mars is a very active planet," Hansen said. "Some of the processes we see on Mars are like processes on Earth, but this one is in the category of uniquely Martian."

To see images of the linear gullies and obtain more information about MRO, visit: <http://www.nasa.gov/mro> .

Credits:

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

More information:

Hansen also noted the dry ice "snowboarding" process could be unique to the linear gullies described on Martian sand dunes. "There are a variety of different types of features on Mars that sometimes get lumped together as 'gullies,' but they are formed by different processes," she said. "Just because this dry-ice hypothesis looks like a good explanation for one type doesn't mean it applies to others."

The University of Arizona Lunar and Planetary Laboratory operates the HiRISE camera, which was built by Ball Aerospace & Technologies Corp. of Boulder, Colo. JPL, a division of the California Institute of Technology in Pasadena, manages MRO for NASA's Science Mission Directorate in Washington. Lockheed Martin Space Systems, Denver, built the orbiter.

APPROACHING ASTEROID HAS ITS OWN MOON

May 30, 2013: Approaching asteroid 1998 QE2 has a moon. Researchers found it in a sequence of radar images obtained by the 70-meter Deep Space Network antenna at Goldstone, Calif., on the evening of May 29th (May 30th Universal Time) when the asteroid was about 6 million kilometers from Earth.

The preliminary estimate for the size of the asteroid's satellite is approximately 600 meters wide. The asteroid itself is approximately 2.7 kilometers in diameter and has a rotation period of less than four hours.



First radar images of asteroid 1998 QE2 were obtained when the asteroid was about 3.75 million miles (6 million kilometers) from Earth. The radar collage covers a little bit more than two hours. Image credit: NASA/JPL-Caltech/GSSR

The radar observations were led by scientist Marina Brozovic of NASA's Jet Propulsion Laboratory in Pasadena, CA.

These findings show that 1998 QE2 is a binary asteroid. In the near-Earth population, about 16 percent of asteroids that are about 200 meters or larger are binary or triple systems. Also revealed in the radar imagery of 1998 QE2 are several dark surface features that suggest large concavities.

The closest approach of the asteroid occurs on May 31 at 1:59 p.m. Pacific (4:59 p.m. Eastern / 20:59 UTC), when the asteroid will get no closer than about 5.8 million kilometers, or about 15 times the distance between Earth and the Moon. This is the closest approach the asteroid will make to Earth for at least the next two

centuries. Asteroid 1998 QE2 was discovered on Aug. 19, 1998, by the Massachusetts Institute of Technology Lincoln Near Earth Asteroid Research (LINEAR) program near Socorro, N.M.

The resolution of these initial images of 1998 QE2 is approximately 75 meters per pixel. Resolution is expected to increase in the coming days as more data become available. Between May 30 and June 9, radar astronomers using the Deep Space Network antenna at Goldstone, Calif., and the Arecibo Observatory in Puerto Rico, will perform an extensive campaign of observations on asteroid 1998 QE2. The two telescopes have complementary imaging capabilities that will enable astronomers to learn as much as possible about the asteroid during its brief visit near Earth.

Stay tuned for updates.

Credits:

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

More information:

NASA places a high priority on tracking asteroids and protecting our home planet from them. In fact, the United States has the most robust and productive survey and detection program for discovering near-Earth objects. To date, U.S. assets have discovered more than 98 percent of the known Near-Earth Objects.

In 2012, the Near-Earth Object budget was increased from \$6 million to \$20 million. Literally dozens of people are involved with some aspect of near-Earth object research across NASA and its centers. Moreover, there are many more people involved in researching and understanding the nature of asteroids and comets, including those objects that come close to Earth, plus those who are trying to find and track them in the first place.

In addition to the resources NASA puts into understanding asteroids, it also partners with other U.S. government agencies, university-based astronomers, and space science institutes across the country that are working to track and better understand these objects, often with grants, interagency transfers and other contracts from NASA.

NASA's Near-Earth Object Program at NASA Headquarters, Washington, manages and funds the search, study, and monitoring of asteroids and comets whose orbits periodically bring them close to Earth. JPL manages the Near-Earth Object Program Office for NASA's Science Mission Directorate in Washington. JPL is a division of the California Institute of Technology in Pasadena.

2013 Club Officers & Contacts

Club Telescopes

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Vice President	Matt Jones	vicepresident@sfaa-astronomy.org
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Treasurer	Michael Patrick	treasurer1@sfaa-astronomy.org
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City Star Party		
Bulletin Editor	Annette Gabrielli	editor@sfaa-astronomy.org
Telescope Loans	Anhil Chopra	telescopes@sfaa-astronomy.org
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1 st Alternate		
2 nd Alternate		
Webmaster	Matthew Jones	

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 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
- 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
- 7) 8" f/10 Meade SCT/Stefanie Ulrey/treasurer@sfaa-astronomy.org
- 8) 9.5" f/5.6 Celestron Newtonian/Ken Frank/ 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/tc/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 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

Sharing the Wonders of the Universe

Web Page: www.sf-a-a-astronomy.org

Information Hotline: (415) 289-6636

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):

<input type="checkbox"/> \$10 Youth/Student	<input type="checkbox"/> \$40 Institutional
<input type="checkbox"/> \$25 Individual	<input type="checkbox"/> \$75 Supporting
<input type="checkbox"/> \$30 Family	

Information:

Name(s)	_____
Address	_____
City	_____
State	_____ Zip _____
Home Phone	_____
E-Mail	_____

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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